PATTY LIU

patty.liu@mail.utoronto.ca +1 647-980-9920 Toronto, Canada

EDUCATION

BASc. in Engineering Science Machine Intelligence, GPA: 3.96 **Toronto, Canada**
University of Toronto 2019-2024

- Awards: NSERC Undergraduate Student Research Award 2021, 2022; Dean's Honour List (2019, 2020, 2021, 2022)

SKILLS

Programming Languages: Python, C, SQL, Java, MATLAB, C++, C#, Verilog, ARM, HTML
Machine Learning Frameworks: PyTorch, JAX, TensorFlow, Keras, scikit-learn
Technologies: Git, Jupyter Notebook

RESEARCH PROJECTS

Subgroup Fairness in Survival Analysis August 2023 - Present

- Working on surfacing subgroups and developing methods to decrease unfairness in the setting of survival analysis.

Governance Games February 2023 - Present

- Proposed a framwork that models trust in ML, specifically the interaction between fairness, privacy, and model performance, as a Stackelberg competition between stakeholders.
- Instantiated the game on pre-computed Pareto frontier using two different algoritms on vision datasets and studied the games dynamics as well as recovered equilibria to show the sub-optimalities in multi-agent games and the need for mechanism design.

Impartiality May 2022 - May 2023

- Proposed and implemented frameworks as extensions to two Differential Privacy algorithms, PATE and DP-SGD, to jointly optimize for multiple trustworthy objectives during model training.
- Analyzed the trade-offs between fairness, privacy, and accuracy in training machine learning models. Identified the Pareto frontier based on the results and compared the performance to other baseline implementations.

Fascicle-selective Bidirectional Peripheral Nerve Interface IC May 2021 - September 2021

- Reduced computational cost (storage and energy) used by convolutional neural networks by reducing the number of model parameters while preserving accuracy.

EXPERIENCE

Thesis Student **Vector Institute for Artificial Intelligence**
Machine Learning and Computational Healthcare (Professor Rahul G. Krishnan) September 2023 - Present

Software Engineer Intern **Amazon**
AWS Route53 June 2023 - August 2023

Research Intern **Vector Institute for Artificial Intelligence**
CleverHans Lab (Professor Nicolas Papernot) May 2022 - September 2023

Research Intern **University of Toronto**
Intelligent Sensory Microsystems Laboratory (Professor Roman Genov) May 2021 - September 2021

PUBLICATIONS

Fascicle-Selective Bidirectional Peripheral Nerve Interface IC with 173dB FOM Noise-Shaping SAR ADCs and 1.38 pJ/bit Frequency-Multiplying Current-Ripple Radio Transmitter. Jianxiong Xu, Jose Sales Filho, Sudip Nag, Liam Long, Camilo Tejeiro, Eugene Hwang, Gerard O'Leary, Yu Huang, Mustafa Kanchwala, Mohammad Abdolrazzaghi, Chenxi Tang, **Patty Liu**, Yuan Sui, Xilin Liu, Jose Zariffa, Roman Genov. *ISSCC 2023*

Learning to Walk Impartiality on the Pareto Frontier of Fairness, Privacy, and Utility Mohammad Yaghini, **Patty Liu**, Franziska Boenisch and Nicolas Papernot. *Regulatable ML Workshop NeurIPS 2023* (Oral presentation)

Regulation Games for Trustworthy Machine Learning Mohammad Yaghini, **Patty Liu**, Franziska Boenisch and Nicolas Papernot. *Regulatable ML Workshop NeurIPS 2023*