PATTY LIU

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EDUCATION

Ph.D. in Computer Science — **Princeton, NJ, US**
Princeton University, *advised by Prof. Peter Henderson* — 2024 - Present

BASc. in Engineering Science Machine Intelligence, GPA: 3.95/4.00 — **Toronto, ON, Canada**
University of Toronto — 2019 - 2024

- Awards: EngSci Awards of Excellence; 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

RESEARCH PROJECTS

Interview Study on AI Legal Tools — November 2024 - Present

- Conducting interviews with legal professionals to understand their current workflow and identify how AI legal tools can help them in their work to guide future projects on developing new AI tools.

Emotional Dependence on AI Chatbots — February 2025 - Present

- Categorizing and characterizing people's relationships with AI chatbots through analyzing Reddit data.

Governance Games — February 2023 - June 2024

- 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

Graduate Researcher — **Princeton University**
POLARIS Lab (*advised by Prof. Peter Henderson*) — September 2025 - Present

Thesis Student — **Vector Institute for Artificial Intelligence**
ML and Computational Healthcare Lab (*Advised by Prof. Rahul G. Krishnan*) — September 2023 - June 2024

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

Research Intern — **Vector Institute for Artificial Intelligence**
CleverHans Lab (*Advised by Prof. Nicolas Papernot*) — May 2022 - September 2023

Research Intern — **University of Toronto**
Intelligent Sensory Microsystems Laboratory (*Advised by Prof. 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*

REFERENCE

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