Leo Murao Watson

Curriculum Vitae

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Education

Sept 2024 **Statistics Ph.D. Student**, *University of Toronto*.
Computational Statistics; Supervised by Radu Craiu and Joshua Speagle

2020-2024 **BSc., Statistics**, *University of Toronto*, GPA - 3.93.
Notable Courses: Mathematical Statistics (A+), Statistical Computation (Graduate, A), Methods for Multivariate Data (Graduate, A+), Methods for Machine Learning II (Graduate, A+), Stochastic Processes (Graduate, A+), Quantum Information (A)

Reading and Research Projects

May 2024 - July 2024 **Decentralized Finance**, *Visiting Researcher*, *École Normale Supérieure*, *Supervisor: Prof Vincent Danos*.
Worked on optimal allocation problems for automated market makers (paper below). Specifically, developing an algorithm that efficiently computes best execution of a Uniswap V3 market order against a set of liquidity providers expressing their offers as curves.

Sep 2023 - Dec 2023 **Alternatives to Hamiltonian Monte Carlo**, *Reading Course*, *University of Toronto*, *Supervisor: Prof Scott Schwartz*.
Reading course examining properties of modern MCMC methods (Langevin MC, Stochastic Gradient MCMC, etc.) through reading recent papers such as Neal 2012, Betancourt 2017, Nemeth 2019. Writing out step-by-step derivations of claims in papers and repurposing information for use in Prof Schwartz's STA365 Bayesian Statistics course in the form of simulations, write-ups, and interactive notebooks.

May 2022 - Oct 2022 **Predicting Japanese Economic Intervention by Applying NLP to Financial Texts**, *Research Project*, *University of Toronto*, *Supervisor: Prof Mark Manger*.
Worked on measuring the semantic polarity of Japanese newspaper articles to predict whether the Japanese government would intervene in the economy. Adapted state-of-the-art Japanese tokenizer library to finance-specific corpora by designing a custom dictionary of terms. Tested resulting tokenizer with multiple word embedding techniques to predict the polarity of articles and aggregated trends over time.

May 2022 - Sep 2022 **Methods for Missing Data**, *Reading Course*, *University of Toronto*, *Supervisor: Prof Nathalie Moon*.
Reading course following Buuren's *Flexible Imputation of Missing Data*. Created write-up and designed simulations demonstrating the optimality of different imputation techniques under different missingness mechanisms. Presented material weekly and discussed new concepts.

Internship Experience

June 2023 - Aug 2023 **Sales and Trading Internship**, *Citigroup*, *Tokyo*.

10 week program rotating at seven desks on the trading floor including:

- **Multi-Asset Structuring**: coded and backtested multi-asset systematic trading strategy based on modern portfolio theory and equity research analyst calls. Ultimately outperformed TOPIX index returns by 75%.
- **Equity Trading**: Worked on generating alpha by coding cross-market ADR model based on correlations observed in time series data and cluster analysis of similarly behaving equities.
- **FX Quant**: Analyzed client flow across hundreds of products using matrix decomposition methods to determine client archetypes and estimated flow proportions. Presented to sales team to provide client-tailored trade ideas based on analysis.

July 2021 - Sep 2021 **Quantum Communications Internship**, *Keio University*, *Supervisor: Prof Rodney Van Meter*.

Through the Q-LEAP program (*link*) funded by Japanese Ministry of Education. Developed 180+ pages of lecture notes in English and Japanese for undergraduate course on quantum communications. Wrote Python programs to streamline lecture note creation for future interns. Acknowledged as contributor for the final published textbook: *Quantum Communications* (*link*).

Scholarships and Awards

2025 NSERC Doctoral Postgraduate Scholarship - $120,000 over 3 years

2024 Doctoral Recruitment Award - $10000

2024 Samuel Beatty Scholarship - $1000

2022 University of Toronto Excellence Award $7500

2021 Trinity College Scholarship for High Academic Achievement $500

All Years Dean's List Scholar

Publications and Preprints

Nov 2024 **Danos, V., Watson, L.M., El Khalloufi, H., Valencia, S.** *On-chain optimal aggregation of Uniswap v3 clones.* Presented at 6th International Conference on Blockchain Economics, Security and Protocols (Tokenomics 2024) (*link*)

Teaching

Jan 2025 - Apr 2025 **Teaching Assistant**, *University of Toronto*.

STA255: Statistical Theory

Sep 2024 - Dec 2024 **Teaching Assistant**, *University of Toronto*.

STA130: An Introduction to Statistical Reasoning and Data Science

Administrative Service

Sep 2023 - June 2024 **President**, *Undergraduate Statistics Student Union*, *University of Toronto*.

Elected president of 6000+ students in undergraduate statistics programs at the University of Toronto.