Lang Liu

Contact Information

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Professional Experience

Citadel Securities, *Chicago* Jan. 2023 – Present
Quantitative Researcher

Education

University of Washington (UW), *Seattle* Dec. 2022
Ph.D. in Statistics (Advanced Data Science)
Advisors: Zaid Harchaoui & Soumik Pal
Thesis: Statistical Divergences for Learning and Inference: Limit Laws and Non-Asymptotic Bounds

University of Washington, *Seattle* Mar. 2022
Master of Science (Statistics)

Tsinghua University, *Beijing* Jul. 2017
B.S. in Mathematics and Applied Mathematics
Thesis: Bayesian Structure Learning for Stationary Time Series

Publications

The Benefits of Balance: From Information Projections to Variance Reduction.
Lang Liu*, Ronak Mehta*, Soumik Pal, Zaid Harchaoui (*Equal contribution).
NeurIPS, 2024.

Asymptotics of Discrete Schrödinger Bridges via Chaos Decomposition.
Zaid Harchaoui, **Lang Liu**, Soumik Pal.
Bernoulli, 2024.

The Rao, Wald, and Likelihood-Ratio Tests under Generalized Self-Concordance.
Lang Liu, Zaid Harchaoui.
ICASSP, 2024.

MAUVE Scores for Generative Models: Theory and Practice.
Krishna Pillutla*, **Lang Liu***, John Thickstun, Sean Welleck, Swabha Swayamdipta, Rowan Zellers, Sewoong Oh, Yejin Choi, Zaid Harchaoui (*Equal contribution).
Journal of Machine Learning Research, 2023.

Influence Diagnostics under Self-concordance.
Jillian Fisher, **Lang Liu**, Krishna Pillutla, Yejin Choi, Zaid Harchaoui.
AISTATS, 2023.
SLDS Student Paper Competition for JSM, 2023 (Honorable Mention).

Stochastic Optimization for Spectral Risk Measures.
Ronak Mehta, Vincent Roulet, Krishna Pillutla, **Lang Liu**, Zaid Harchaoui.
AISTATS, 2023.
Risk Analysis Student Paper Competition for JSM, 2023 (Honorable Mention).

Distribution Embedding Networks for Generalization from a Diverse Set of Classification Tasks.
Lang Liu, Mahdi Milani Fard, Sen Zhao.
Transactions on Machine Learning Research, 2022.

Orthogonal Statistical Learning with Self-Concordant Loss.
Lang Liu, Carlos Cinelli, Zaid Harchaoui.
COLT, 2022.

Entropy Regularized Optimal Transport Independence Criterion.
Lang Liu, Soumik Pal, Zaid Harchaoui.
AISTATS, 2022 (Oral, top 2.6% of the submissions).

Divergence Frontiers for Generative Models: Sample Complexity, Quantization Effects, and Frontier Integrals.
Lang Liu, Krishna Pillutla, Sean Welleck, Sewoong Oh, Yejin Choi, Zaid Harchaoui.
NeurIPS, 2021.

Score-Based Change Detection for Gradient-Based Learning Machines.
Lang Liu, Joseph Salmon, Zaid Harchaoui.
ICASSP, 2021.

Workshops

Likelihood Score under Generalized Self-Concordance.
Lang Liu, Zaid Harchaoui.
NeurIPS Score-Based Methods Workshop, 2022.

Discrete Schrödinger Bridges with Applications to Two-Sample Homogeneity Testing.
Zaid Harchaoui, **Lang Liu**, Soumik Pal.
NeurIPS OTML Workshop, 2021 (Best Paper Award).

Working papers

Confidence Sets under Generalized Self-Concordance.
Lang Liu, Zaid Harchaoui.
Submitted. Available at arXiv.

Software

Autodetect, autodiff-friendly change detection for monitoring machine learning models.

Research Experience

Graduate Research Assistant Jul. 2018 – Dec. 2022
University of Washington, *Seattle*
Advisor: Zaid Harchaoui & Soumik Pal

Data Scientist Intern Jun. 2020 – Sep. 2020
Glassbox Machine Learning Team, *Google Research*, *Virtual*
Hosts: Sen Zhao & Mahdi Milani Fard

Applied Scientist Intern Jun. 2019 – Sep. 2019
Music Machine Learning Team, *Amazon*, *Seattle*
Manager & Mentor: Fabian Moerchen & Brandyn Kusenda

Undergraduate Research Assistant Dec. 2015 – Jul. 2017
Tsinghua University, *Beijing*
Advisor: Xuegong Zhang

Research Intern Jul. 2016 – Sep. 2016
University of Washington, *Seattle*
Advisors: Emily Fox & Nicholas Foti

Honors and Awards

Z.W. Birnbaum Award, *Department of Statistics, University of Washington* 2022
Post-General Statistics Conference Travel Award, *University of Washington* 2022
Graduate Student Conference Presentation Award, *University of Washington* 2022

Best Paper Award, *NeurIPS OTML Workshop* 2021
Second Prize in the Mathematical Contest in Modeling, *CUMCM* 2016
Academic Excellence Award, *Department of Mathematics, Tsinghua University* 2015
Honorable Mention in the Mathematical Contest in Modeling, *COMAP* 2015
First Prize in the Math Olympiad, *Hunan Province, China* 2011 & 2012

Talks

Confidence Sets under Generalized Self-Concordance
- *ICASSP*, Apr. 2024.
- *NeurIPS Score-Based Methods Workshop*, Dec. 2022.

Orthogonal Statistical Learning with Self-Concordant Loss
- *UW IFDS Seminar*, Oct. 2022.
- *IFDS Workshop on Distributional Robustness*, Aug. 2022.
- *COLT*, Jul. 2022.

Entropy Regularized Optimal Transport Independence Criterion
- *ITA*, Feb. 2023.
- *COMPSTAT*, Aug. 2022.
- *JSM*, Aug. 2022.
- *PIMS-IFDS-NSF Summer School on Optimal Transport*, Jun. 2022.
- *AISTATS*, Mar. 2022.
- *UW Kantorovich Retreat*, Mar. 2022.

Divergence Frontiers for Generative Models: Sample Complexity, Quantization Effects, and Frontier Integrals
- *SIAM MDS 2022*, Sep. 2022.
- *TRIPODS Meeting*, Sep, 2022.
- *UW IFDS Seminar*, Jan. 2022.
- *NeurIPS*, Dec. 2021.
- *Joint IFML/CCSI Symposium*, Nov. 2021.

Discrete Schrödinger Bridges with Applications to Two-Sample Homogeneity Testing.
- *NeurIPS OTML Workshop*, Dec. 2021.

Asymptotics of entropy-regularized optimal transport via chaos decomposition.
- *Joint Statistical Meeting*, Aug. 2021.
- *BIRS Workshop on Entropic Regularization of Optimal Transport and Applications*, Jun. 2021.
- *UW Probability Seminar*, Nov. 2020.
- *UW Machine Learning Retreat*, Nov. 2020.

Gradient-based monitoring of learning machines.
- *IEEE International Conference on Acoustics, Speech and Signal Processing*, Jun. 2021.
- *Symposium on Data Science and Statistics*, Jun. 2021.
- *IFDS Kickoff Meeting Poster Session*, Sep. 2020.
- *Google Statistics Journal Club*, Sep. 2020.
- *Google Research NYC and Athena Org Intern Talks*, Jul. 2020.
- *ICML Workshop on Challenges in Deploying and Monitoring Machine Learning Systems*, Jul. 2020.

Teaching

Teaching Assistant, *University of Washington*

- CSE 541: Interactive Learning 2022
- MATH 394: Probability I 2021
- STAT 516: Stochastic Modeling 2020
- STAT 538: Statistical Learning 2019 & 2020
- STAT 311: Elements of Statistical Methods 2017 & 2018

Guest lecture on statistical machine learning with random features, *STAT 538* 2022

Tutorial on optimal transport in computational neuroscience, *Neurohackademy* 2020

Tutor for mathematics, *Tsinghua University* 2015

Mentoring

Ronak Mehta (UW Ph.D. in Statistics, Sep. 2022 – Oct. 2024)
Medha Agarwal (UW Ph.D. in Statistics, Oct. 2022 – Mar. 2023)
Jillian Fisher (UW Ph.D. in Statistics, May 2022 – Dec. 2022)

Professional Memberships and Other Affiliations

American Statistical Association (ASA).
Institute of Mathematical Statistics (IMS).
Institute for Foundations of Data Science (IFDS).
Institute for Foundations of Machine Learning (IFML).
Pacific Interdisciplinary hu b on Optimal Transport (PIHOT).
The Kantorovich Initiative.

Services

Panelist of Day on the Job with Thrive Scholars at Citadel Securities.
Co-founder of the Internship Preparation Program in Statistics at UW.
Reviewer for the Annals of Statistics.
Reviewer for the Annals of Applied Probability.
Reviewer for the Journal of Machine Learning Research.
Reviewer for Statistics and Computing.
Reviewer for the Journal of Computational and Graphical Statistics.
Reviewer for the Journal of Optimization Theory and Applications.
Reviewer for ICML 2021 & 2022 & 2024, NeurIPS 2020 & 2021 & 2022 & 2023 & 2024, AISTATS 2022, ICLR 2023.

Reading Groups

Host Machine Learning and Mass Transportation working group at UW, 2021.

Skills

Python, PyTorch, R, C++, MATLAB