

Jiayi (Joanna) Li

CONTACT INFORMATION	<p>UCLA Department of Statistics 8145 Math Sciences Bldg. Los Angeles, CA 90095, USA</p> <p>Email: jiayi.li@g.ucla.edu Homepage: jl2ml.github.io</p>
RESEARCH INTERESTS	<p>My research is in mathematical machine learning. I am interested in the optimization and generalization behaviors of neural networks, seeking to understand the representation capacity and algorithm bias on different architectures. In particular, I am interested in applying and developing algebro-geometric tools to machine learning theory.</p>
EDUCATION	<p>University of California Los Angeles Ph.D. Statistics, 2019 – present Thesis advisor: Prof. Guido Montúfar</p> <p>The University of Hong Kong and Stony Brook University, New York B.S. Mathematics, pure Mathematics concentration Thesis advisor: Prof. Robert Lazarsfeld</p>
PROFESSIONAL EXPERIENCE	<p>Institute for Mathematical and Statistical Innovation, Chicago, IL, USA Long-term participant, September 2023 – December 2023 Program: Algebraic Statistics and Our Changing World</p> <p>MPI for Mathematics in the Sciences, Leipzig, Germany Visiting researcher, July 2023 – September 2023 Research area: Mathematical Machine Learning</p> <p>Simons Institute for the Theory of Computing, Berkeley, CA, USA Short-term visitor, August 2022 Program: Summer Cluster: Deep Learning Theory</p>
HONORS AND AWARDS	<p>University of California Los Angeles Summer Mentored Research Fellowship, 2022 ACM-W Scholarship, 2020 Cathay Bank Scholarship, 2020</p> <p>Stony Brook University William Lowell Putnam Competition, school team, 2017, 2018 MSRI Travel Fund, 2017</p> <p>The University of Hong Kong Overseas Research Fellowship, 2016 Undergraduate Research Fellowship, 2015</p>
PRESENTATIONS	<ol style="list-style-type: none">1. <i>An Algebraic approach to supply network formation and fragility</i>, Special Session: Applications of Algebra and Geometry, AMS 2024 Spring Central Sectional Meeting, April 20242. <i>Geometry of Polynomial Neural Networks</i>, Applied Algebra Seminar, Department of Mathematics, University of Wisconsin-Madison, December 20233. <i>Gradient Descent in Optimization</i>, SCALE Seminar, UCLA, November 20234. <i>Algebraic Structures in Terminal Phase of Neural Network Training</i>, Institute for Mathematical and Statistical Innovation, October 2023

5. *Neural Collapse Beyond Unconstrained Feature Models*, Deep Learning Theory Seminar, UCLA, September 2023
6. *Mathematical Machine Learning: Theory and Beyond*, SCISS Workshop, UCLA, July 2023

PUBLICATIONS

Research articles

1. Kaie Kubjas, **Jiayi Li**, Maximillian Wiesmann. *Geometry of polynomial neural networks*, preprint.
2. Shuang Liang, Renata Turkes, **Jiayi Li**, Nina Otter, Guido Montufar. “*Pull-back Geometry of Persistent Homology Encodings*”, preprint.
3. **Jiayi Li**, Yuantong Li, Xiaowu Dai. “*Discussion: Estimating means of bounded random variables by betting*” by Waudby-Smith and Ramdas”, Journal of the Royal Statistical Society: Series B (JRSSB), 2023.
4. Dejun Guo, Xu Jin, Dan Shao, **Jiayi Li**, Yang Shen, Huan Tan “*Image-Based Regulation of Mobile Robots without Pose Measurements*”, IEEE Control Systems Letters (L-CSS), vol. 6, pp. 2156-2161, 2022.
5. Guruprasad Raghavan, **Jiayi Li**, and Matt Thomson. “*Geometric algorithms for predicting resilience and recovering damage in neural networks*”, preprint.
6. Ziqi Huang, Yang Shen, **Jiayi Li**, Marcel Fey, Christian Brecher. “*A Survey on AI-Driven Digital Twins in Industry 4.0: Smart Manufacturing and Advanced Robotics*”, Sensors, 2021.

Editorial articles

1. **Jiayi Li**, “*Computational Creativity: Bridging Art and Computer Science*”. XRDS 29, 4 (Summer 2023), pp. 5-6, 2023.
2. **Jiayi Li**, Karan Ahuja, “*Making with a Sustainable Purpose: an Interview with Matthew L. Mauriello*”. XRDS 27, 4 (Summer 2021), pp. 38-41, 2021.
3. **Jiayi Li**, Yingfei Wang “*An Interview with Owen McCall from TREECYCLE*”. XRDS 27, 4 (Summer 2021), pp. 42-45, 2021.

SERVICES

Reviewer for

ICML, ICLR, Stat, Algebraic Statistics (AStat)

Editor for

ACM XRDS

Editor-in-Chief	2022 – present
Lead Editor	2022
Feature Editor	2021

Outreach

Westwood Village Rotary Club, Invited Speaker	2023
UCLA Statistics Club, Mentor	2022 – present
Society of Women in Statistics, Chair	2022 – present

EVENTS

ORGANIZED

Distinguished Women in Statistics and Data Science Workshop,	
Women in Industry Symposium, Los Angeles, CA	10/17/2023
Distinguished Women in Statistics and Data Science Workshop,	
Women in Academia Symposium, Los Angeles, CA	05/23/2023

TEACHING
EXPERIENCE

Instructor, Department of Statistics, University of California Los Angeles
Math Camp for Master in Applied Statistics students Fall, 2021-2023

Teaching Associate, MSOL, University of California Los Angeles

ENGR 200 “*Program Management Principles for Engineers and Professionals*”
Instructors: Leslie Lackman (UCLA) Winter, 2021-2024

ENGR 202 “*Reliability, Maintainability, and Supportability*”
Instructor: Myron Hecht (The Aerospace Corporation) Spring, 2021-2023

ENGR 203 “*System Architecture*”
Instructor: Steven Silverman (UCLA) Summer, 2021-2023

ENGR 205 “*Model-Based System Engineering*”
Instructor: Myron Hecht (The Aerospace Corporation) Fall, 2021-2023

ENGR 116 “*Statistics for Management Decisions*”
Instructors: Hamed Mamani (U Washington), Lara Dolecek (UCLA)
Alireza Mehrnia (UCLA) Summer, 2023

Teaching Assistant, Department of Statistics, University of California Los Angeles

STATS 13 “*Intro to Statistical Methods for Life and Health Sciences*”
Instructor: Guani Wu (UCLA) Summer, 2021

CONFERENCES
& SEMINARS
ATTENDED

[IPAM2024] EnCORE Workshop on Computational vs Statistical Gaps in Learning and Optimization 02/26-03/01, 2024
[IMSI2023] Bayesian Statistics and Statistical Learning 12/11-12/15, 2023
[IMSI2023] Algebraic Economics 11/06-11/10, 2023
[IMSI2023] Algebraic Statistics for Ecological and Biological Systems 10/09-10/13, 2023
[IMSI2023] Apprenticeship Week: Varieties from Statistics 10/02-10/06, 2023
[IMSI2023] Invitation to Algebraic Statistics and Applications 09/18-09/23, 2023
[MPI MIS + UCLA[†]] Math Machine Learning Seminar Series 01/01-11/30, 2023
[DLT2022] Summer Cluster: Deep Learning Theory, Berkeley, CA 08/01-08/05, 2022
[AS2022] Algebraic Statistics Conference 2022, Honolulu, HI 05/16-05/20, 2022
[LMS2022[†]] LMS Invited Lecture Series 2022: The Mathematics of Deep Learning 02/28-03/04, 2022
[BIRS2021[†]] Banff International Research Station Workshop: Geometry & Learning from Data 10/24-10/29, 2021
[DeepMath2020[†]] Mathematical Theory of Deep Neural Network 11/05-11/06, 2020
[UC Irvine[†]] Frontiers in Machine Learning for the Physical Sciences 10/26, 2020
[MDCCSA[†]] IAS Missing Data Challenges in Computation, Statistics and Applications 09/08-09/11, 2020
[Bernoulli-IMS 2020[†]] Bernoulli-IMS One World Symposium 2020 08/24-08/28, 2020
[Simons Institute for the Theory of Computing[†]] Probability, Geometry, and Computation in High Dimensions Boot Camp 08/19-08/28, 2020
[CMI-HIMR 2020[†]] Clay Mathematics Institute-Heilbronn Institute for Mathematical Research Integrable Probability Summer School 07/27-07/31, 2020
[MSML 2020[†]] Mathematical and Scientific Machine Learning 07/20-07/24, 2020
[ICML 2020[†]] 37th International Conference on Machine Learning 07/12-07/18, 2020
[COLT 2020[†]] 33rd International Conference on Learning Theory 07/09-07/12, 2020
[STOC 2020[†]] Theoretical Computer Science (TCS) Workshop 06/25, 2020
[ICLR 2020[†]] International Conference on Learning Representations 04/26-05/01, 2020
[Simons Institute for the Theory of Computing] Foundations of Deep Learning, Berkeley, CA 05/23-08/09, 2019
[IPAM 2019] Geometry and Learning from Data in 3D and Beyond 03/11-06/14, 2019
[SOCAMS 2019] Southern Calif. Applied Mathematics Symposium 04/27, 2019
[SCMLS 2019] Southern Calif. Machine Learning Symposium 03/15, 2019

GRANTS AWARDED	Travel and Registration Grants	
	The Institute for Mathematical and Statistical Innovation	2023
	Simons Institute for the Theory of Computing	2022
	Algebraic Statistics Conference	2022
	International Conference on Machine Learning	2020, 2021
	International Conference on Learning Representations	2020, 2021
	PyData LA	2019
	Mathematical Sciences Research Institute (now SLMath)	2017
PROFESSIONAL MEMBERSHIPS	American Statistical Association	
	Institute of Mathematical Statistics	
	Association for Computing Machinery	
REFERENCES	Available upon request.	