Tian-Yi Zhou (she/her)

CONTACT
INFORMATION

500 W 120th St # 535
New York, NY 10027
Website: https://tianyizhougt.github.io/
Google Scholar: Link to my Google Scholar Profile

Email: tz2699@columbia.edu

RESEARCH
INTERESTS

Deep learning theory, statistical learning theory, operator learning, anomaly detection, functional data analysis

EDUCATION /
EMPLOYMENT

Columbia University, New York, NY
Postdoctoral Researcher at the Data Science Institute   July 2025 - July 2027

- Mentors: Samory Kpotufe (Statistics), Qiang Du (Applied Physics and Applied Mathematics)

Georgia Institute of Technology, Atlanta, GA
Ph.D. in Machine Learning, GPA: 4.00/4.00   August 2020 - May 2025

- H. Milton Stewart School of Industrial and Systems Engineering (ISyE), Minor in Operations Research
- Thesis Advisor: Xiaoming Huo (ISyE)
- Thesis Committee: Vladimir Koltchinskii (School of Math), Wenjing Liao (School of Math), Sungha Kang (School of Math), Guang Cheng (UCLA Statistics)

University of California, Los Angeles, Los Angeles, CA   Jan 2019 - June 2019
Exchange Student, Study Mathematics and Statistics

- Supported by the University of California Education Abroad Program (UCEAP) Program

University of Hong Kong, Hong Kong SAR   Sep 2016 - June 2020
B.Sc. in Statistics, First Class Honors

- Department of Statistics and Actuarial Science

PUBLICATIONS

The titles contain an embedded link to the paper. * indicates equal distribution.

1. Classification of Data Generated by Gaussian Mixture Models using Deep ReLU Networks. (2024)
Tian-Yi Zhou, Xiaoming Huo.
Journal of Machine Learning Research (JMLR) 25(190): 1–54, 2024.

2. Learning Ability of Interpolating Deep Convolutional Neural Network. (2024)
Tian-Yi Zhou, Xiaoming Huo.
Applied and Computational Harmonic Analysis (ACHA) 68 (2024): 101582.

3. Approximation and Non-parametric Estimation of Functions over High-dimensional Spheres via Deep ReLU Networks. (2023)
Namjoon Suh, **Tian-Yi Zhou**, Xiaoming Huo.
International Conference on Learning Representations (ICLR) 2023.

4. Gone with the Weed: Incidents of Adolescent Marijuana Use in the United States, 1976–2021. (2023)
Gu, Jiaxin, Xin Guo, Xiaoxi Liu, Yue Yuan, Yushu Zhu, Minheng Chen, **Tian-Yi Zhou**, Qiang Fu.
Annals of Epidemiology 88 (2023): 23-29.

5. Modified Poisson Regression Analysis of Grouped and Right-censored Counts. (2021)
Qiang Fu, **Tian-Yi Zhou**, Xin Guo.
Journal of the Royal Statistical Society: Series A 184(4): 1347-1367.

PREPRINTS

6. Bridging Unsupervised and Semi-Supervised Anomaly Detection: A Theoretically-Grounded and Practical Framework with Synthetic Anomalies (2025+)
Tian-Yi Zhou*, Matthew Lau*, Xiangchi Yuan, Jizhou Chen, Wenke Lee, Xiaoming Huo.
In Submission.

7. Optimal Classification-based Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity. (2024+)
Tian-Yi Zhou*, Matthew Lau*, Jizhou Chen, Wenke Lee, Xiaoming Huo.
Major Revision at **Annals of Applied Statistics (AOAS)**.

8. Approximation of RKHS Functionals by Neural Networks. (2024+)
Tian-Yi Zhou, Namjoon Suh, Guang Cheng, Xiaoming Huo.
Major Revision at **Journal of Machine Learning Research (JMLR)**.

9. Drink like a Man? Modified Poisson Analysis of Adolescent Binge Drinking in the US, 1976–2022. (2024)
Jiaxin Gu, Minheng Chen, Yue Yuan, Xin Guo, **Tian-Yi Zhou**, Qiang Fu.
Just Accepted at Social Science & Medicine.

HONORS AND AWARDS

Columbia University Data Science Institute Postdoctoral Fellowship	2025-2027
Selected Participant, ISyE-MS&E-IOE Joint Rising Stars Workshop	2025
♛ Margaret and Stephen Kendrick Research Fellowship, Georgia Tech (Awarded annually to one Ph.D. student for research in machine learning and analytics)	2023-2024
PhD mentoring service award, Georgia Tech	2023-2024
Selected to Present at Cornell Young Researchers Workshop	2023
Selected to present at Association for Women in Mathematics (AWM) Research Symposium	2023
♛ Second Place in Student Paper Competition, The 13th American Institute of Mathematical Science (AIMS) Conference	2023
Selected Participant, FutureBAProf Workshop, Tippie College of Business, University of Iowa	2023
♛ ARC-ACO Fellowship, Georgia Tech (Institute-wide scholarship to support research in high-impact cross-disciplinary data science)	2023
♛ Runner-up, Alice and John Jarvis Ph.D. Student Paper Competition, Georgia Tech	2022
Stewart Fellowship, Georgia Tech	2020-2021
Overseas Research Fellowship, Columbia University (Supported by: Faculty of Science, University of Hong Kong)	2019
Wong Shek Yung Student Enrichment Award, University of Hong Kong	2019
Dean's Honors List, University of Hong Kong	2016-2017, 2017-2018
Dean's Honors List, University of California, Los Angeles	Spring 2019

TRAVEL AWARDS	Travel Award for attending "Research at the Interface of Applied Mathematics and Machine Learning" conference (University of Houston) 2025
	Travel Award for attending "Statistics in the Age of AI" conference (George Washington University) 2024
	SIAM Travel Award (Special W. Randolph Fund Recipient) to attend SIAM PP24 2024
	The 13th AIMS Conference Travel Award (Supported by NSF) 2023
	Graduate Student Travel Award, College of Engineering and Student Government Association, Georgia Tech 2023

TEACHING EXPERIENCE

Graduate Teaching Assistant, ISyE, Georgia Tech Fall 2020, Spring 2021
ISyE/CEE 3770 Statistics and Applications

Teaching Assistant, Department of Statistics and Actuarial Science, University of Hong Kong Spring 2020
STAT 2601 Statistics and Probability I

"Survival Cantonese" Tutor, Center of Development and Resources for Students, University of Hong Kong 2016-2017
Conduct 1-to-1 Cantonese tutoring sessions to international students

INVITED TALKS

INFORMS Annual Meeting 2025
Atlanta, GA October 2025
Talk: "Statistical learning theory of neural networks: from classification to anomaly detection in cybersecurity"

Joint Statistical Meeting 2025
Nashville, TN August 2025
Talk: "Statistical learning theory of neural networks: from classification to anomaly detection in cybersecurity"

Seminar Talk at the Department of Mathematics and Statistics
Georgetown University, Washington, DC March 2025
Talk: "Statistical learning theory of neural networks: from classification to anomaly detection in cybersecurity"

Seminar Talk at the Department of Mathematics
Hong Kong Baptist University, Hong Kong SAR December 2024
Talk: "Approximation of RKHS Functionals by Neural Networks"

Optimization and Machine Learning Seminar
University of Hong Kong, Hong Kong SAR December 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

Joint Meeting of the New Zealand, Australian and American Mathematical Societies
Auckland, New Zealand December 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

Seminar Talk at the Department of Mathematics
Universität Bayreuth, Bayreuth, Germany November 2024

Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

SIAM Seminar
Georgia Institute of Technology   November 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

INFORMS Annual Meeting 2024
Seattle, WA   October 2024
Talk: "Classification of Unbounded Data generated by Gaussian Mixture Models via Deep ReLU Networks"

ML@GT Student Conference
Georgia Institute of Technology   August 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

Statistics and Data Science Seminar
University of Sydney, Sydney, Australia   July 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

ACTION AI Institute Annual Review and Knowledge Expo (Lightening talk & Poster)
UC Santa Barbara, Santa Barbara, California   June 2024
Talk: "Optimal Unsupervised Anomaly Detection by Neural Networks: Theory and Practice in Cybersecurity"

"Statistics in the Age of AI" Conference (poster)
The George Washington University, Washington, DC   May 2024
Poster: "Classification of Unbounded Data generated by Gaussian Mixture Models via Deep ReLU Networks"

Analysis and Data Science Seminar
SUNY Albany, Albany, NY   April 2024
Talk: "Classification of Unbounded Data generated by Gaussian Mixture Models via Deep ReLU Networks"

Southeast Applied and Computational Mathematics Workshop
Georgia Institute of Technology   April 2024
Talk: "Approximation of RKHS Functionals by Neural Networks"

SIAM Conference on Parallel Processing for Scientific Computing (PP24)
Baltimore, MD   March 2024
Talk: "Classification of Unbounded Data generated by Gaussian Mixture Models via Deep ReLU Networks"

SIAM Seminar
Georgia Institute of Technology   October 2023
Talk: "Classification of Unbounded Data generated by Gaussian Mixture Models via Deep ReLU Networks"

Cornell Young Researchers Workshop 2023 (Poster)
Cornell University, Ithaca, NY   October 2023

Poster: "Learning Ability of Interpolating Deep Convolutional Neural Network"

Georgia Statistics Day 2023 (Poster)
Georgia Institute of Technology   October 2023
Poster: "Learning Ability of Interpolating Deep Convolutional Neural Network"

The 2023 Association for Women in Mathematics (AWM) Research Symposium
Clark Atlanta University, Atlanta, GA   September 2023
Talk: "Learning Ability of Interpolating Deep Convolutional Neural Network"

Algorithms & Randomness Center (ARC) Colloquium
Georgia Institute of Technology   September 2023
Talk: "Classification of Unbounded Data by Gaussian Mixture Models
via Deep ReLU Networks"

10th International Congress on Industrial and Applied Mathematics (ICIAM 2023)
Waseda University, Tokyo, Japan   August 2023
Talk: "Learning Ability of Interpolating Deep Convolutional Neural Network"

The 13th American Institute of Mathematical Science (AIMS) Conference
Wilmington, NC   June 2023
Talk: "Learning Ability of Interpolating Deep Convolutional Neural Network"

PROFESSIONAL
SERVICE

Referee:
Journals: Journal of the American Statistical Association (JASA), Bernoulli, Electronic Journal of Statistics (EOJS), INFORMS Journal on Computing (IJOC), Journal of Complexity, Journal of Approximation Theory, Technometric
Conferences: NeurIPS, ICML, ICLR, AISTATS, AAAI

Institutional Service:
Co-organisor, ISyE Student Seminar, Georgia Tech   2024-2025

Co-organisor, SIAM Seminar, Georgia Tech   2023

Secretary, SIAM Student Chapter, Georgia Tech   2023, 2024

Reviewer, President's Undergraduate Research Awards, Georgia Tech   2023, 2024

Co-organisor, "Machine Learning + Dynamics" Seminar, School of Mathematics, Georgia Tech 2023

Ph.D. Mentor, ISyE Ph.D. peer mentoring program, Georgia Tech   2022-2023, 2023-2024

Outreach:
Volunteer, Georgia Science Olympiad State Tournament, Atlanta, GA   2023

Exam Writer and Grader, AP Statistics competition (for high school students), Georgia Tech   2023

REFERENCES
- Samory Kpotufe (Professor)
  Department of Statistics, Columbia University
  Email: samory@columbia.edu

- Qiang Du (Fu Foundation Professor of Applied Mathematics)
  Department of Applied Physics and Applied Mathematics, Columbia University
  Email: qd2125@columbia.edu

- Xiaoming Huo (A. Russell Chandler III Professor)
  H. Milton Stewart School of Industrial and Systems Engineering, Georgia Tech
  Email: huo@gatech.edu

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- Guang Cheng (Professor and Graduate Vice Chair)
  Department of Statistics and Data Science, UCLA
  Email: guangcheng@stat.ucla.edu
- Wenjing Liao (Associate Professor)
  School of Mathematics, Georgia Tech
  Email: wliao60@gatech.edu