Yidong Zhou

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Research Interests

Theory and methodology: Statistical modeling and inference for complex and non-Euclidean data, with a focus on developing models that respect intrinsic geometric structure. Areas of interest include *causal inference*, *deep learning*, and *Fréchet regression* for structured data types such as probability distributions, networks, trees, functional data, and data on manifolds (e.g., compositional data, symmetric positive-definite matrices).
Applications: Longitudinal studies, neuroimaging, early child development (through participation in the NIH ECHO consortium and Gates Foundation research teams), economics/policy evaluation, and plant genomics.

Employment

Postdoctoral Scholar, University of California, Davis — Apr. 2024 – present

- **Advisor:** Hans-Georg Müller

Education

Ph.D. in Statistics, University of California, Davis — Sep. 2019 – Mar. 2024

- **Dissertation:** "Regression Methods for Networks and Probability Measures"
- **Advisor:** Hans-Georg Müller; committee members: Jane-Ling Wang, Miles Lopes

B.Sc. in Statistics, University of Science and Technology of China — Aug. 2015 – Jun. 2019

Selected Awards

- 2025 ASA Early Career Travel Award.
- 2025 IMS New Researcher Travel Award.
- 2024 IMS Hannan Graduate Student Travel Award.
- 2023 NeurIPS Scholar Award.
- 2023 Peter Hall Graduate Student Research Award, Department of Statistics, UC Davis.
  (*Given annually to one advanced Ph.D. student to recognize overall excellence in statistical research*)
- 2023 Student Paper Award Finalist, ASA Nonparametric Statistics Section.

Publications and Preprints

* indicates equal contributions
† indicates corresponding author(s) (if not the senior author)

Publications

[1] Zhou, Y. and Müller, H.-G. (2025), "Dynamic modelling of sparse longitudinal data and functional snippets with stochastic differential equations," **Journal of the Royal Statistical Society Series B: Statistical Methodology** 87(3), pp. 833–849, *2024 IMS Hannan Graduate Student Travel Award.*

[2] Iao, S. I.*, Zhou, Y.*, and Müller, H.-G. (2025), "Deep Fréchet regression," **Journal of the American Statistical Association**, in press, this paper was selected as a *2025 Student Paper Award Finalist, ASA Nonparametric Statistics Section.*

[3] Zhou, Y. and Müller, H.-G. (2022), "Network regression with graph Laplacians," **Journal of Machine Learning Research** 23(320), pp. 1–41, *2023 Student Paper Award Finalist, ASA Nonparametric Statistics Section.*

[4] Zhou, Y.*, Iao, S. I.*, and Müller, H.-G. (2025), "Fréchet geodesic boosting," In **Advances in Neural Information Processing Systems**, in press.

[5] Zhang, K.*, Zhang, S.*, Zhou, D.†, and Zhou, Y.† (2025), "Wasserstein transfer learning," In **Advances in Neural Information Processing Systems**, in press.

[6] Zhou, Y. and Müller, H.-G. (2024), "Wasserstein regression with empirical measures and density estimation for sparse data," **Biometrics** 80(4), ujae127.

[7] ——, (2025), "Wasserstein-Kaplan-Meier survival regression," **Journal of Computational and Graphical Statistics** 34(2), pp. 580–590.

[8] Zhou, Y.†, Müller, H.-G., Zhu, C., Chen, Y., Wang, J.-L., O'Muircheartaigh, J., Bruchhage, M., and Deoni, S. (2023), "Network evolution of regional brain volumes in young children reflects neurocognitive scores and mother's education," **Scientific Reports** 13(1), p. 2984.

[9] Dubey, P., Chen, Y.*, Gajardo, Á.*, Bhattacharjee, S.*, Carroll, C.*, Zhou, Y.*, Chen, H.*, and Müller, H.-G. (2022), "Learning delay dynamics for multivariate stochastic processes, with application to the prediction of the growth rate of COVID-19 cases in the United States," **Journal of Mathematical Analysis and Applications** 514(2), p. 125 677.

[10] Wu, Y., Wei, J., Cheng, B., Sun, H., Zhou, Y., Li, C., Wang, P., Zhang, H., Wang, Y., Huang, L., and Chen, K. (2025), "Mental health impacts of particulate matter exposure and non-optimal temperature among rural and urban children in eastern China," **npj Mental Health Research** 4(1), p. 21.

Manuscripts Under Revision

[11] Chen, H., Zhou, Y., and Müller, H.-G. (2023), "Sliced Wasserstein regression," arXiv: 2306.10601, In major revision at **Journal of Machine Learning Research**.

[12] Song, W.*, Zhou, H.*, Zhou, Y.*, and Müller, H.-G. (2025), "Non-Euclidean data analysis with metric statistics," In minor revision at **Harvard Data Science Review**.

Manuscripts Under Review

[13] Kurisu, D.*, Zhou, Y.*, Otsu, T., and Müller, H.-G. (2024), "Geodesic causal inference," arXiv: 2406.19604, *2025 IMS New Researcher Travel Award*.

[14] Zhou, Y.*, Kurisu, D.*, Otsu, T., and Müller, H.-G. (2025), "Geodesic difference-in-differences," arXiv: 2501.17436.

[15] Zhou, Y.*, Iao, S. I.*, and Müller, H.-G. (2025), "End-to-end deep learning for predicting metric space-valued outputs," Submitted.

[16] Kurisu, D.*, Zhou, Y.*, Otsu, T., and Müller, H.-G. (2025), "Geodesic synthetic control methods for random objects and functional data," arXiv: 2505.00331.

[17] ——, (2025), "Regression discontinuity designs for functional data and random objects in geodesic spaces," arXiv: 2506.18136.

[18] Zhou, H.*, Zhou, Y.*, and Müller, H.-G. (2024), "Quantifying centrality for complex data," Submitted.

[19] Zhou, H., Zhou, Y., Deoni, S., O'Muircheartaigh, J., Bruchhage, M., and Müller, H.-G. (2025), "Longitudinal centrality regions for random objects with applications to early brain development," Submitted.

Teaching

Instructor, UC Davis
STA 100 - Applied Statistics for Biological Sciences, Summer 2023

- A foundational undergraduate course for students in biological sciences and pre-med tracks.
- Topics: Descriptive statistics, probability, estimation, hypothesis testing, ANOVA, and regression using R.
- Teaching evaluation: 4.5/5.

Teaching Assistant, UC Davis

- STA 220 - Data & Web Technologies for Data Analysis (graduate), Winter 2021, Winter 2022.
- STA 108 - Applied Statistical Methods: Regression Analysis (undergraduate), Spring 2021.
- STA 138 - Analysis of Categorical Data (undergraduate), Fall 2020.
- Applied Statistics for Biological Sciences (undergraduate), Fall 2019, Winter 2020, Spring 2020.

Mentoring

Kaicheng Zhang, Mathematics, Zhejiang University 2024 – 2025

- Topic: Transfer learning for non-Euclidean data.
- Publication: Wasserstein Transfer Learning (**NeurIPS 2025**).
- Next step: UNC Biostatistics PhD.

Jared Smith, Data Science and Applied Math, UC Davis 2024 – present

- Topic: Autoregressive models for time series of non-Euclidean data.

Software

fdapace: Functional Data Analysis and Empirical Dynamics **153k downloads**

- **Maintainer** and **developer**.

frechet: Statistical Analysis for Random Objects and Non-Euclidean Data **19k downloads**

- **Developer**.

fdaconcur: Concurrent Regression and History Index Models for Functional Data **8k downloads**

- **Developer**.

Professional Service

Reviewer

- Journal: Journal of the Royal Statistical Society Series B: Statistical Methodology, Journal of the American Statistical Association, Journal of Machine Learning Research, Biometrics, Bernoulli.
- Conference: NeurIPS 2024, ICLR 2025, AISTATS 2025, ICML 2025, NeurIPS 2025.

Conference Organization

- Chair, "Functional and Longitudinal Modeling" session, International Conference on Statistics and Data Science, Vancouver, Canada, Jun. 2025.
- Organizer, "Innovations in Causal Inference and Statistical Methods for Complex Data Structures" session, ICSA China Conference, Zhuhai, China, Jun. 2025.
- Chair, "Breakthroughs in Inferences for Diverse Complex Data" session, Joint Statistical Meetings, Nashville, TN, Aug. 2025.

Presentations

NIH ECHO/Gates Foundation Neuromodeling Workshop

- Vail, CO, Oct. 2022.
- Vail, CO, Sep. 2023.
- Dubai, UAE, Apr. 2024.
- Palma, Spain, Oct. 2024.
- Jackson, WY, Nov. 2024.

Network Regression with Graph Laplacians

- CMStatistics, Online, Dec. 2022. (*Invited*)
- Joint Statistical Meetings, Toronto, Canada, Aug. 2023. (*Student paper award*)
- NeurIPS, New Orleans, LA, Dec. 2023. (*Scholar award*)
- Conference on Statistical Methods for High-Dimensional Complex Data, College Station, TX, May 2024. (*Young investigator presentation*)

Dynamic Modeling of Sparse Longitudinal Data and Functional Snippets with Stochastic Differential Equations

- Statistics in the Age of AI Conference, Washington, DC, May 2024.
- Biostatistics Seminar, UC Davis, Apr. 2025. (*Invited*)

Wasserstein Regression with Empirical Measures and Density Estimation for Sparse Data

- Joint Statistical Meetings, Portland, OR, Aug. 2024.

Deep Fréchet Regression

- Conference on Statistical Learning and Data Science, Newport Beach, CA, Nov. 2024. (*Invited*)
- Columbia Biostatistics FDAWG, Online, Dec. 2024. (*Invited*)
- CMStatistics, Online, Dec. 2024. (*Invited*)

Geodesic Causal Inference

- International Conference on Statistics and Data Science, Vancouver, Canada, Jun. 2025. (*Invited*)
- ICSA China Conference, Zhuhai, China, Jun. 2025.
- USTC Conference on Frontiers of Statistics, Hefei, China, Jul. 2025.
- The 3rd Joint Conference on Statistics and Data Science in China, Hangzhou, China, Jul. 2025. (*Invited*)
- Joint Statistical Meetings, Nashville, TN, Aug. 2025.