Fang Yao

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Education

University of California at Davis, *PhD in Statistics*	*2003*
University of Science and Technology of China, *BS in Statistics*	*2000*

Employment

Director of Center for Statistical Science, Peking University	*2019–present*
Chair Professor, Chair for Department of Probability and Statistics, School of Mathematical Sciences, Peking U.	*2019–present*
Professor, Department of Statistical Sciences, University of Toronto	*2014–2018*
Associate Chair for Graduate Studies, Department of Statistical Sciences, U. Toronto	*2015–2017*
Associate Professor (with tenure), Department of Statistical Sciences, U. Toronto	*2008–2014*
Assistant Professor, Department of Statistical Sciences, U. Toronto	*2006–2008*
Assistant Professor, Department of Statistics, Colorado State University	*2003–2006*

Research Interests

- Complex-structured data analysis, including functional, high-dimensional, network, geometric types, etc
- Machine learning and deep learning, statistical modeling of partial/ordinary differential equations, etc
- Applications involving functional, high-dimensional and differential dynamics in clinical studies, human genetics, neuroimaging, finance and economics, engineering, etc

Awards and Honors

Xplorer Prize *(For contributions in analyzing functional and spatial-temporal data, time-varying manifold data and real-time streaming data, the Prize will support him to explore deep learning and physics-informed statistical inference—the **first recipient in Statistics** since the inauguration of the Xplorer Prize in 2018 that includes a prize of ¥3,000,000 that is approximately US$400,000)*	*2024*
Fellow, American Statistical Association (ASA) *(For groundbreaking contributions in functional data analysis and nonparametric statistics, for excellent teaching and advising, and for significant professional services, especially outstanding editorial service that includes being Associate Editor for nine statistical journals, including JASA, JCGS, and the Annals of Statistics)*	*2018*
Elected Member, International Statistical Institute (ISI)	*2018*
Fellow, Institute of Mathematical Statistics (IMS) *(honoring the outstanding research and professional contributions of IMS members, contributions which help keep IMS in a leading role in the field of statistics and probability)*	*2017*
CRM-SSC Prize *(Recognition of a statistical scientist's professional accomplishments in research primarily conducted in Canada during the first 15 years after having received a doctorate)*	*2014*

Discovery Accelerator Supplement (DAS) Award	*2012-2015*
(Provide substantial and timely additional funding to accelerate progress and maximize the impact of superior research programs)	
Dean's Excellence Award, U. Toronto	*2006–2017*

Professional Affiliations and Activities

Editorial boards

○ Editor for **Canadian Journal of Statistics**	*2019—2021*
○ Associate Editor for **Annals of Statistics**	*2007–2009, 2013–2015, 2025-present*
○ Associate Editor for **Journal of the American Statistical Association**	*2014–2022*
○ Associate Editor for **Journal of Computational and Graphical Statistics**	*2012–present*
○ Associate Editor for **Statistica Sinica**	*2011–2014, 2017–present*
○ Associate Editor for **Canadian Journal of Statistics**	*2010-2018*
○ Associate Editor for **Journal of Multivariate Analysis**	*2016-2018*
○ Associate Editor for **Bernoulli Journal**	*2013-2015*
○ Associate Editor for **Journal of Statistical Planning and Inference**	*2012–2014*
○ Associate Editor for **Electronic Journal of Statistics**	*2010-2012*

Professional activities

○ IMS Council Member	*2020-2023*
○ IMS Committee on Nominations	*2017-2018, 2020-2021*
○ ASA Noether Awards Committee	*2014-2018*
○ Co-organizer for Workshop on Distributed Data for Dynamics and Manifolds	*2017*
○ IMS Committee on Electronic Issues	*2013-2016*
○ Program Committee for the 2012 Joint Statistical Meetings, San Diego	*2012*
○ Chair for Student Paper Awards of American Statistical Association Section on Nonparametric Statistics	*2011,2012*

Research Grants

PI, National Key R&D Program of China, total RMB ¥14,000,000	*2023–2027*
PI, National Natural Science Foundation of China, Sub-contract of Major Grant, total RMB ¥3,430,000	*2023–2027*
PI, National Natural Science Foundation of China, Key Grant, total RMB ¥2,700,000	*2020–2024*
PI, National Natural Science Foundation of China, General Grant, total RMB ¥520,000	*2019–2022*
PI, Natural Sciences and Engineering Research Council of Canada (NSERC) Individual Discovery Grant, total CAD $255,000	*2017–2022*
PI, NSERC Individual Discovery Grant, total CAD $150,000	*2012–2017*
PI, Discovery Accelerator Supplement (DAS), total CAD $120,000	*2012-2015*
Research Fellow at SAMSI	*2010-2011*
PI, NSERC Individual Discovery Grant, CAD $85,000	*2007-2012*

List of Selected Publications (Statistical Methodoly and Theorey)

(students/trainees, co-first author #, corresponding author *, or alphabetical order.)

1. Zhang, W.#, Wang, F.#, and **Yao, F.***(2025). Fast signal region detection with application to whole genome association studies. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2025.2464271.

2. Yan, S., **Yao, F.***, and Zhou, H. (2025) Deep regression for repeated measurements. ***Journal of the Amer-***

ican Statistical Association, https://doi.org/10.1080/01621459.2025.2458344.

3. Tan, J.#, Zhang, G.#, Wang, X., Huang, H., and **Yao, F.** (2024) Green's matching: an efficient approach to parameter estimation in complex dynamic systems. ***Journal of the Royal Statistical Society, Series B***, https://doi.org/10.1093/jrsssb/qkae031.

4. Chen, Z.#, Yang, Y.#, and **Yao, F.*** (2024). Dynamic matrix recovery. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2023.2297468.

5. Luo, S., Yang, Y., Shi, C., **Yao, F.**, Ye, J., and Zhu, H. (2023) Policy Evaluation for Temporal and/or Spatial Dependent Experiments. ***Journal of the Royal Statistical Society, Series B***, https://doi.org/10.1093/jrsssb/qkad136.

6. Ma, T., **Yao, F.** and Zhou, Z. (2023) Network-level traffic flow prediction: functional time series vs. functional neural network approach. ***Annals of Applied Statistics***, https://doi.org/10.1214/23-AOAS1795.

7. Yang, Y., **Yao, F.***, and Zhao, P. (2023) Online smooth backfitting for generalized additive models. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2023.2182213.

8. Xu, L., **Yao, F.**, Yao, Q., and Zhang, H. (2023). Non-asymptotic guarantees for robust statistical learning under infinite variance assumption. ***Journal of Machine Learning Research***, 24(92).

9. Xue, K.#, Yang, J.#, and **Yao, F.*** (2023) Optimal linear discriminant analysis for high-dimensional functional data. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2022.2164288.

10. Hu, X., and **Yao, F.*** (2022) Dynamic principal component analysis in high dimensions. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2022.2115917.

11. Zhou, H., **Yao, F.***, and Zhang, H. (2022) Functional linear regression for discretely observed data: from ideal to reality. ***Biometrika***, https://doi.org/10.1093/biomet/asac053.

12. Zhou, Y., Koustaal, M., Yu, D., Kong D., and **Yao, F.*** (2022) Nonparametric principal subspace regression. ***Journal of Machine Learning Research***, https://jmlr.org/papers/v23/20-963.html.

13. Shao, L.#, Lin Z.#, and **Yao, F.***. (2022) Intrinsic Riemannian functional data analysis for sparse longitudinal observations. ***Annals of Statistics***, 50, 1696-1721.

14. Ying, Y., and **Yao, F.***. (2022) Online estimation for functional data. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2021.2002158.

15. Liang, D., Huang, H., Guan, Y., and **Yao, F.***. (2021) Test of weak separability for spatially stationary functional field. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2021.2002156.

16. Chen, H., Ren, H., **Yao, F.***, and Zou, C. (2021) Data-driven selection of the number of change-points via error rate control. ***Journal of the American Statistical Association***, https://doi.org/10.1080/01621459.2021.1999820.

17. Lin, Z., and **Yao, F.*** (2021). Functional regression on manifold with contamination. ***Biometrika***, 108(2), 167-181.

18. Xue, K., and **Yao, F.*** (2020). Distribution and correlation free two-sample test of high-dimensional means. ***Annals of Statistics***, 48, 1304-1328.

19. Lin, Z., and **Yao, F.*** (2019). Intrinsic Riemannian functional data analysis. ***Annals of Statistics***, 47, 3533-3577.

20. Lin, Z., Müller, H. G., and **Yao, F.*** (2018). Mixture inner product spaces and their application to functional data analysis, ***Annals of Statistics***, 46, 370-400.

21. Koudstaal, M., and **Yao, F.***. (2018). From multiple Gaussian sequences to functional data and beyond: A Stein estimation approach. ***Journal of the Royal Statistical Society, Series B***, 80, 319-342.

22. Dai, X., Müller, H. G., and **Yao, F.*** (2017). Optimal Bayes classifiers for functional data and density ratios. ***Biometrika***, 104, 545-560.

23. Kong, D., Xue, K., **Yao, F.***, and Zhang, H. (2016). Partially functional linear regression in high dimensions, ***Biometrika***, 103, 147-159.

24. **Yao, F.***, Wu, Y., and Zou, J. (2016) Probability enhanced effective dimension reduction for classifying sparse functional data (with rejoinder to comments), ***Test***, 25, 1-22, 52-58.

25. **Yao, F.***, Lei, E., and Wu, Y. (2015). Effective dimension reduction for sparse functional data. ***Biometrika***, 102, 421-437.

26. Zhu, H., **Yao, F.**, and Zhang, H. (2014). Structured functional additive regression in reproducing kernel Hilbert spaces, ***Journal of the Royal Statistical Society, Series B***, 76, 581-603.

27. Müller, H. G., Wu, Y., and **Yao, F.*** (2013). Continuously additive models for nonlinear functional regression. ***Biometrika***, 100, 607-622.

28. Acar, E., Craiu, R.V., and **Yao, F.** (2011). Dependence calibration in conditional copulas: a nonparametric approach. ***Biometrics***, 67, 445-453.

29. **Yao, F.***, Fu, Y., and Lee, T. C. M. (2011). Functional mixture regression. ***Biostatistics***, 12, 341-353.

30. **Yao, F.**, and Müller, H. G. (2010). Additive modeling of functional gradients. ***Biometrika***, 97, 791-805.

31. Müller, H. G., and **Yao, F.** (2010). Empirical dynamics for longitudinal data. ***Annals of Statistics***, 38, 3458-3486.

32. Lai, R. C. S., Lee, T. C. M., Wong, R. K. W., and **Yao, F.** (2010). Nonparametric cepstrum estimation via optimal risk smoothing, ***IEEE Transactions on Signal Processing***, 58, 1507-1514.

33. **Yao, F.**, and Müller, H. G. (2010). Functional quadratic regression. ***Biometrika***, 97, 49-64.

34. Hall, P., Müller, H. G., and **Yao, F.** (2009). Estimation of functional derivatives. ***Annals of Statistics***, 37, 3307–3329.

35. Müller, H. G., and **Yao, F.** (2008). Functional additive models. ***Journal of the American Statistical Association***, 103, 1534-1544.

36. Hall, P., Müller, H. G., and **Yao, F.** (2008). Modeling sparse generalized longitudinal observations with latent Gaussian processes. ***Journal of the Royal Statistical Society, Series B***, 70, 703-723.

37. **Yao, F.** (2007) Functional principal component analysis for longitudinal and survival data. ***Statistica Sinica***, 17, 965-983.

38. **Yao, F.**, and Lee, T. C. M. (2007). Spectral density estimation using sharpened periodograms, ***IEEE Transactions on Signal Processing***, 55, 4711-4716.

39. **Yao, F.***, and Lee, T. C. M. (2006). Penalized spline models for functional principal component analysis. ***Journal of the Royal Statistical Society, Series B***, 68, 3-25.

40. Müller, H. G., Stadtmüller, U., and **Yao, F.** (2006). Functional variance processes. ***Journal of the American Statistical Association***, 101, 1007-1018.

41. **Yao, F.**, Müller, H. G., and Wang, J. L. (2005). Functional linear regression analysis for longitudinal data. ***Annals of Statistics***, 33, 2873-2903.

42. **Yao, F.**, Müller, H. G., and Wang, J. L. (2005). Functional data analysis for sparse longitudinal data. ***Journal of the American Statistical Association***, 100, 577-590.

43. **Yao, F.**, Müller, H. G., Clifford, A. J., Dueker, S. R., Follett, J., Lin, Y., Buchholz, B. A., and Vogel, J. S. (2003). Shrinkage estimation for functional principal component scores with application to the population kinetics of plasma folate. ***Biometrics***, 59, 676-685.

Supervision of PhD Students and Post-doctoral Fellows

Ongoing doctoral students at Peking U.

Qiyun Huang (2024-), Xiaonan Liu (2024-), Zhifei Wang (2023-), Ruizhe Yi (2023-), Guoyu Zhang (2022–), Shunxing Yan (2021–), Ziyuan Chen (2021–), Tongyu Li (2020–), Wei Zhang (2020–).

Ongoing post-doctoral fellow at Peking U.

Rui Qiu (2024-)

Completed doctoral students

○ Lingxuan Shao (Peking U.), 2018–2022, Assistant Professor in Department of Statistics and Data Science at Fudan Univ.

○ Ying Yang (Peking U.), 2017–2022, Assistant Professor in Center for Applied Mathematics at Fudan Univ.

○ Hang Zhou (Peking U.), 2017–2022, Post-doctoral Fellow in Department of Statistics at UC Davis, will start as an Assistant Professor in Department of Statistics and Operations Research at University of North Carolina, Chapel Hill in Fall 2025.

○ Xiaoyu Hu (Peking U.), 2016–2021, Professor in School of Mathematics and Statistics at Xi'an Jiaotong Univ.

○ Huiming Zhang (Peking U.), 2016–2020, Associate Professor in Intitute of AI at Beihang University.

○ Decai Liang (Peking U.), 2015–2020, Assistant Professor in School of Statistics and Data Science at Nankai University.

○ Zhenhua Lin (U. Toronto), 2013–2017, Assistant Professor in Department of Statistics and Data Science at National University of Singapore.

○ Kaijie Xue (U. Toronto), 2012–2017, Professor at Shanghai University of International Business and Economics.

○ Shivon Sue-Chee (U. Toronto), 2008–2014, Assistant Professor in Department of Statistical Science at University of Toronto.

○ Edwin Lei (U. Toronto), 2010–2014, Software Engineer at Airbnb (previously at Apple, Netfliex, Amazon).

○ Elif Acar (U. Toronto), 2006–2010, Associate Professor in Department of Mathematics and Statistics at University of Guelph.

Post-doctoral fellows supervised

○ Yang Zhou, 2020-2022, Assistant Professor in School of Statistics at Beijing Normal University.

List of Courses

Undergraduate courses taught (including courses cross-listed at graduate level)

○ PMU 199: Statistics, A Journey to Information Behind Numbers (U. Toronto), Fall 2014, Winter 2015, Fall 2015

○ STA 302: Design of Experiments (Colorado State U.), Fall 2005 and Spring 2006

○ STA 309: Statistics for Engineers and Scientists (Colorado State U.), Fall 2003, Spring 2004, Fall 2004, Spring 2005, Fall 2005

○ STA 257: Probability and Statistics I (U. Toronto), Fall 2009

○ STA 261: Probability and Statistics II (U. Toronto), Winter 2007, Winter 2009, Winter 2012

○ STA 302/1001: Methods of Data Analysis (U. Toronto), Fall 2013

○ STA 437/2005: Applied Multivariate Statistics (U. Toronto), Fall 2006,

○ Winter 2008, Fall 2011, Fall 2012, Fall 2013, Fall 2016

○ STA 133050: Applied Multivariate Statistics (Peking U.), Fall 2017, Fall 2018, Fall 2020, Fall 2021

○ STA 137992: Mathematical Statistics (Honor Course, Peking U.), Fall 2021, Fall 2022, Spring 2023

○ STA 102892: Statistical and Machine Learning (Peking U.), Fall 2024

Graduate courses taught

○ STA 645: Generalized Linear Models (Colorado State U.), Spring 2005

○ STA 740: Nonparametric Smoothing and Functional Data Analysis (Colorado State U.), Spring 2004

- STA 2201: Methods of Applied Statistics II (U. Toronto), Winter 2007, Winter 2008, Winter 2009, Winter 2010.
- STA 3000: Advanced theory of Statistics II (U. Toronto), Winter 2010, Winter 2012
- STA 4501/526B: Functional Data Analysis, Winter 2011 (UBC), Fall 2012 (U. Toronto)
- STA 101756 Statistical Modeling and Methods (Peking U.), Spring 2018, Spring 2019, Spring 2020, Spring 2021, Spring 2022