Curriculum Vitae

Panpan Zhang

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Contact:

Department of Biostatistics
Vanderbilt School of Medicine
2525 West End Avenue
Suite 1100, Room 11128A
Nashville TN 37203, U.S.A.

Phone: (615) 322-2001
Fax: (615) 343-4924
Email: panpan.zhang@vumc.org
Personal Website
Google Scholar

Education

- M.A. in **Mathematics**, Wake Forest University, Winston-Salem, NC 08/2010 – 05/2012
  Thesis: Statistical self-similarity in time series from financial data & chaotic dynamical systems
  Advisor: Miaohua Jiang
- Ph.D. in **Statistics**, George Washington University, Washington, DC 08/2012 – 05/2016
  Dissertation: On properties of several random networks
  Advisor: Hosam M. Mahmoud

Postgraduate training: Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA 08/2018 – 08/2022
Mentor: Sharon X. Xie (Sharon Xie Lab)

Academic Appointments

- **Visiting Assistant Professor of Statistics,** Department of Statistics, University of Connecticut, Storrs, CT 08/2016 – 08/2018
- **Postdoctoral Researcher,** Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA 08/2018 – 08/2022
- **Assistant Professor of Biostatistics (tenure track),** Department of Biostatistics, Vanderbilt University Medical Center, Nashville, TN 09/2022 – present
- **Assistant Professor of Biostatistics (affiliate faculty),** Vanderbilt Memory & Alzheimer's Center, Vanderbilt University Medical Center, Nashville, TN 09/2022 – present
- **Assistant Professor of Neurology (secondary),** Department of Neurology, Vanderbilt University Medical Center, Nashville, TN 09/2022 – present

Other Appointments

- **Teaching Assistant,** Department of Mathematics & Statistics, Wake Forest University, Winston-Salem, NC 09/2010 – 05/2012
- **Graduate Teaching Assistant,** Department of Statistics, George Washington University, Washington, DC 01/2013 – 05/2015

- **Graduate Student Instructor,** Department of Statistics, George Washington University, Washington, DC 05/2015 – 05/2016

Honors and Awards

- **Washington Statistical Society's Outstanding Graduate Student Award,** Washington Statistical Society, Washington, DC 2015
- **First Prize,** Graduate Student Oral Presentations, The 9th Annual Probability & Statistics Day, University of Maryland, Baltimore County, Baltimore, MD 2015
- **Kullback Award,** George Washington University, Washington, DC 2016
- **Excellence in Teaching Award,** University of Connecticut, Storrs, CT, Fall 2017
- **Excellence in Teaching Award,** University of Connecticut, Storrs, CT, Spring 2018

Professional Organizations

- **Member,** American Statistical Association (ASA) 2012 – present
- **Member,** International Biometric Society Eastern North American Region (ENAR) 2018 – present
- **Member,** International Chinese Statistical Association (ICSA) 2022 – present
- **Member,** Institute of Mathematical Statistics (IMS) 2022 – present
- **Member,** Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment (ISTAART) 2022 – present

Professional Activities

Extramural Committees

- **Student paper/poster competition committee**, New England Statistical Symposium (NESS 2019), Hartford, CT 2019
- **Program committee**, New England Statistical Symposium (NESS 2022), Storrs, CT 2022
- **Co-chair**, IMS New Researchers Conference (NRC 2025), Nashville, TN 2025

Conference Organizations

- **Chair,** an invited session of New England Statistical Symposium (NESS 2019), Storrs, CT
- **Chair,** an invited session of New England Statistical Symposium (NESS 2022), Storrs, CT
- **Chair,** an invited session of ENAR 2023 Spring Meeting, Nashville, TN
- **Chair,** an invited session of ICSA 2023 Applied Statistics Symposium, Ann Arbor, MI

Editorial Boards

- **Associate Editor,** Journal of Data Science 2020 – present
- **Guest Editor,** "Advances in Network Data Science", Journal of Data Science 2021

Review Services

1. Annals of the Institute of Statistical Mathematics
2. Applied Artificial Intelligence
3. Applied Probability Trust
    - Advances in Applied Probability
    - Journal of Applied Probability
4. BMJ Open
5. Communications in Statistics—Theory and Methods
6. Contemporary Clinical Trials Communications
7. Environmental and Ecological Statistics
8. Epidemiology & Infection
9. Frontiers in Neuroscience
10. Journal of Alzheimer's Disease
11. Journal of Applied Statistics
12. Journal of Computational Science
13. Journal of Data Science
14. Methodology and Computing in Applied Probability
15. Networks and Spatial Economics
16. Physica A: Statistical Mechanics and its Applications
17. Probability in Engineering and Informational Sciences
18. Random Structure & Algorithms
19. Statistics and Its Interface
20. Statistics in Biosciences
21. Statistics & Probability Letters
22. Stochastic Systems

Teaching Activities

George Washington University

- Introduction to Statistics in Social Science (STAT 1053) (Summer 2015)
- Introduction to Business and Economic Statistics (STAT 1051) (Fall 2016, Spring 2017)

University of Connecticut

- Mathematical Statistics I (STAT 3375Q) (Fall 2016/2017, Spring 2018)
- Mathematical Statistics II (STAT 3445Q) (Spring 2017)
- Introduction to Statistics II (STAT 2215Q) (Spring 2018)

Vanderbilt University Medical Center

- Biostatistics I (MSCI 5009-01) (Fall 2022)

Research Programs

Present Funding

1. 5R01AG034962-09 (NIA) 06/01/2020 – 03/31/2026
   PI: Angela L. Jefferson
   Title: Vanderbilt Memory & Aging Project
   Role: Biostatistician (40% FTE)
2. 5U24AG074855-02 (NIA) 10/01/2021 – 08/31/2026
   PI: Timothy J. Hohman
   Title: Alzheimer's Disease Sequencing Project Phenotype Harmonization Consortium
   Role: Biostatistician (20% FTE)
3. 5R01AG062826-03 (NIA) 02/01/2020 – 01/31/2025
   PI: Katherine A. Gifford
   Title: Subjective Cognitive Decline in Older Adults
   Role: Biostatistician (10% FTE)
4. 5R01EB017230-06 (NIBIB) 09/20/2015 – 06/30/2025
   PI: Bennett A. Landman
   Title: Controlling Quality and Capturing Uncertainty in Advanced Diffusion Weighted MRI
   Role: Biostatistician (10% FTE)

Publications

Peer-Reviewed Journal Publications

(∗ refers to the corresponding author)
(† refers to my students, postdocs or trainees)

1. **Zhang, P.***, Chen, C. and Mahmoud, H. M. (2015). Explicit characterization of moments of balanced triangular Pólya urns by an elementary approach. *Statistics & Probability Letters*, **96**, 149–153. MR3281759 DOI
2. **Zhang, P.*** and Mahmoud, H. M. (2016). Distributions in a class of Poissonized urns with an application to Apollonian networks. *Statistics & Probability Letters*, **115**, 1–7. MR3498362 DOI

3. **Zhang, P.*** and Mahmoud, H. M. (2016). The degree profile and weight in Apollonian networks and k-trees. *Advances in Applied Probability*, **48**(1), 163–175. MR3473572 DOI

4. Chen, C. and **Zhang, P.*** (2019). Characterizations of asymptotic distributions of continuous-time Pólya processes. *Communications in Statistics—Theory and Methods*, **48**(21), 5308–5321. MR4007715 DOI

5. **Zhang, P.*** and Dey, D. K. (2019). The degree profile and Gini index of random caterpillar trees. *Probability in Engineering and Informational Sciences*, **33**(4), 511–527. MR4010508 DOI

6. Ouyang, G., Dey, D. K. and **Zhang, P.*** (2020). Clique-based method for social network clustering. *Journal of Classification*, **37**(1), 254–274. MR4111894 DOI

7. **Zhang, P.*** and Mahmoud, H. M. (2020). On nodes of small degrees and degree profile in preferential dynamic attachment circuits. *Methodology and Computing in Applied Probability*, **22**(2), 625–645. MR4104007 DOI

8. Mahmoud, H. M. and **Zhang, P.*** (2020). Distributions in the constant-differentials Pólya process. *Statistics & Probability Letters*, **156**, 108592. MR3996837 DOI

9. **Zhang, P.*** (2020). On several properties of a class of preferential attachment trees—plane-oriented recursive trees. *Probability in Engineering and Informational Sciences*, **35**(4), 839–857. MR4320478 DOI

10. Robinson, J. L., Porta, S., Garrett, F. G., **Zhang, P.**, Xie, S. X., Sun, E., Van Deerlin, V. M., Abner, E. L., Jicha, G. A., Barber, J. M., Lee, V. M.-Y., Lee, E. B., Trojanowski, J. Q. and Nelson, P. T.* (2020). Limbic-predominant age-related TDP-43 encephalopathy differs from frontotemporal lobar degeneration. *Brain*, **143**(9), 2844–2857. DOI PubMed

11. **Zhang, P.***, Wang, T. and Xie, S. X. (2020). Meta-analysis of several epidemic characteristics of COVID-19. *Journal of Data Science*, **18**(3), 536–549. DOI PubMed

12. **Zhang, P.*** (2020). Characterizing several properties of high-dimensional random Apollonian networks. *Journal of Complex Networks*, **8**(4), cnaa038. MR4189631 DOI

13. Galarza, C. E., **Zhang, P.** and Lachos, V. H.* (2021). Logistic quantile regression for bounded outcomes using a family of heavy-tailed distributions. *Sankhya B*, **83**(2), 325–349. MR4332185 DOI

14. Yuan, Y., Yan, J. and **Zhang, P.*** (2021). Assortativity measures for weighted and directed networks. *Journal of Complex Networks*, **9**(2), cnab017. MR4266155 DOI

15. Wang, T., Xiao, S., Yan, J. and **Zhang, P.*** (2021). Regional and sectoral structures and their dynamics of Chinese economy: A network perspective from multi-regional input-output tables. *Physica A: Statistical Mechanics and its Applications*, **581**, 126196. DOI

16. Tang, C., Wang, T. and **Zhang, P.*** (2022). Functional data analysis: An application to COVID-19 data in the United States. *Quantitative Biology*, **10**(2), 172–187. DOI **(equal contribution)**

17. **Zhang, P.*** and Wang, X. (2022). Several topological indices of random caterpillars. *Methodology and Computing in Applied Probability*, **24**(3), 1773–1789. MR4457565 DOI

18. Ren, Y., **Zhang, P.*** and Dey, D. K. (2022). Investigating several fundamental properties of random lobster trees and random spider trees. *Methodology and Computing in Applied Probability*, **24**(1), 431–447. MR4379497 DOI

19. **Zhang, P.***, Wang, T. and Yan, J. (2022). PageRank centrality and algorithms for weighted, directed networks. *Physica A: Statistical Mechanics and its Applications*, **586**, 126438. DOI

20. Wang, T.* and **Zhang, P.** (2022). Directed hybrid random networks mixing preferential attachment with uniform attachment mechanisms. *Annals of the Institute of Statistical Mathematics*, **74**(5), 957–986. MR4467842 DOI

21. Li, X., **Zhang, P.*** and Feng, Q. (2022). Exploring COVID-19 in Mainland China during the lockdown of Wuhan via functional data analysis. *Communications for Statistical Applications and Methods*, **29**, 103–125. DOI

22. **Zhang, P.*** (2022). The Zagreb index of several random models. *Journal of Stochastic Analysis*, **3**(1), article no. 1. MR4385450 DOI

23. Chen, J. and **Zhang, P.*** (2022). Clustering US states by time series of COVID-19 new case counts with non-negative matrix factorization. *Journal of Data Science*, **20**(1), 79–94. DOI

24. Weinshel, S., Irvin, D. J., **Zhang, P.**, Weintraub, D., Shaw, L. M., Siderowf, A. and Xie, S. X.* (2022). Appropriateness of applying CSF biomarker cutoffs from Alzheimer's disease to Parkinson's disease. *Journal of Parkinson's Disease*, **12**(4), 1155–1167. DOI PubMed

25. Wang, T., Yan, J., Yuan, Y. and **Zhang, P.*** (2022). Generating directed networks with predetermined assortativity measures. *Statistics and Computing*, **32**, article no. 91. MR4493723 DOI **(equal contribution)**

26. Xiao, S.*, Yan, J. and **Zhang, P.** (2022). Incorporating auxiliary information in betweenness measure for input-output networks. *Physica A: Statistical Mechanics and its Applications*, **607**, 128200. MR4497328 DOI

27. Domicolo, C., **Zhang, P.*** and Mahmoud, H. M. (2022). The degree Gini index of several classes of random trees and their poissonized counterparts—Evidence for duality. *Journal of Stochastic Analysis*, **3**(4), article no. 1.

Peer-reviewed Conference Proceedings

1. **Zhang, P.*** (2016). On terminal nodes and the degree profile of preferential dynamic attachment circuits. In *Proceedings of SIAM: Thirteenth Workshop on Analytic Algorithmics and Combinatorics (ANALCO 16)*, 80–92. Arlington, VA. MR3480250 DOI

Book Chapters

1. **Zhang, P.*** and Glaz, J. (2018). "Scan Statistics on Graphs and Networks." In: Glaz, J. and Koutras, M. (Eds.) *Handbook of Scan Statistics*, 1–36. Springer, New York, NY. DOI

Software

1. Xiao S., Yan J. and **Zhang, P.** (2022). ionet: Network analysis for input-output tables. `R` package version 0.2.0, `https://github.com/Carol-seven/ionet`.

2. Yuan, Y., Wang, T., Yan, J. and **Zhang, P.** (2022). wdnet: Weighted Directed Network. `R` package version 0.0.4, `https://cran.r-project.org/web/packages/wdnet/index.html`.

Preprints

1. Ouyang, G., Dey, D. K. and **Zhang, P.*** (2022+). Model-based method for social network clustering. Revision invited by *Journal of Data Science*. ArXiv

2. Liu, J., Ye, Z., Chen, K. and **Zhang, P.*** (2022+). Variational Bayesian inference for bipartite mixed-membership stochastic block model with applications to collaborative filtering. Revision invited by *Computational Statistics & Data Analysis*.

3. Mechanic-Hamilton, D.*, Lydon, S., Xie, S. X., **Zhang, P.**, Miller, A., Rascovsky, K. Rhodes, E. and Massimo, L. (2022+). Turning apathy in to action in neurodegenerative disease: Development of a goal-directed behavior app. Submitted to *Neuropsychological Rehabilitation*.

Manuscripts in Preparation

1. **Zhang, P.** and Xie, S. X.* (2022+). An efficient approach for handling missing data in nonlinear longitudinal models.

2. Suttner, L. H., **Zhang, P.** and Xie, S. X.* (2022+). Nonparametric estimation for time-varying missing covariates in longitudinal models. **(co-first authorship: Suttner, L. H. and Zhang, P.)**

3. **Zhang, P.** and Xie, S. X.* (2022+). Bias and efficiency comparison between multiple imputation of missing data and available-case analysis in longitudinal studies.

4. Dolui, S.*, Tisdall, M. D., Vidorreta, M., Nasrallah, I. M., Habes, M., **Zhang, P.**, Davatzokos, C., Xie, S. X., Wolk, D. A. and Detre, J. A. (2022+). Cerebral microvascular perfusion as a biomarker of cerebral small vessel function.

Presentations and Posters

1. Poster presenter at the 12th Graduate Student and Postdoctoral Research Day, Wake Forest University, Winston Salem, NC, 2012.

2. Invited speaker at the Probability Seminar, George Washington University, Washington, DC, 2014.

3. Invited speaker at the GWU STAT Student Seminar, George Washington University, Washington, DC, 2014.

4. Invited speaker at the Seminar in Probability, Catholic University of America, Washington, DC, 2015.

5. Contributed speaker at the 9th Annual Probability & Statistics Day, University of Maryland at Baltimore County, Baltimore, MD, 2015.

6. Invited speaker at the Mathematics Department Colloquium, Wake Forest University, Winston-Salem, NC, 2015.

7. Contributed speaker at the 11th Annual UNCG Regional Mathematics and Statistics Conference, University of North Carolina at Greensboro, Greensboro, NC, 2015.

8. Invited speaker at the 13th Workshop on Analytic Algorithmics and Combinatorics (ANALCO 16), Arlington, VA, 2016.

9. Invited speaker at the Statistics Department Colloquium, University of Connecticut, Storrs, CT, 2016.

10. Poster presenter at the SouthEastern Probability Conference, Duke University, Durham, NC, 2017.

11. Invited speaker at the International Workshop of on Applied Probability (IWAP 18), Budapest, Hungary, 2018.

12. Invited speaker at the New England Statistical Symposium (NESS 2019), Hartford, CT, 2019.

13. Invited speaker and short course instructor at the Virtual Conference on Data Science in Action (organized by Shanxi University of Finance and Economics), online, 2020.

14. Contributed speaker at the Joint Statistical Meeting (JSM 2020), online, 2020.
15. Invited speaker at Data Science in Action in Response to the Outbreak of COVID-19 (jointly sponsored by Korea Food & Drug Administration and Korean Region of International Biometric Society), online, 2020.
16. Invited speaker at the Brown Bag Forum (organized by DBEI at Penn Medicine), online, 2021.
17. Contributed speaker at the spring meeting of the Eastern North American Region (ENAR 2021), online, 2021.
18. Poster presenter at the Research Day 2021 (organized by DBEI at Penn Medicine), online, 2021.
19. Invited speaker at the School of Statistics Seminar, Renmin University of China, online, 2021.
20. Guided poster presenter at the MDS Virtual Congress 2021 (sponsored by International Parkinson and Movement Disorder Society), online, 2021.
21. Invited speaker at the Applied Mathematics Webinar (jointly sponsored by Imam Abdulrahman Bin Faisal University, King Saud University, Université de Tunis EI Manar and University of Jeddah), online, 2022.
22. Invited speaker at the Brown Bag Forum (organized by DBEI at Penn Medicine), online, 2022.
23. Poster presenter at the New Research Conference 2022 (NRC 2022, sponsored by IMS), George Mason University, Fairfax, VA, 2022.
24. Poster presenter at the MDS International Congress 2022 (sponsored by International Parkinson and Movement Disorder Society), hybrid (Madrid, Spain), 2022.
25. Invited speaker at the 4th International Conference on Statistical Distributions and Applications (ICOSDA 2022), Huntington, WV, 2022.