PANPAN ZHANG

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Education

The George Washington University, Washington, DC
Ph.D. in Statistics, May 2016.
Dissertation: On properties of several random networks.
Advisor: Hosam M. Mahmoud.

Wake Forest University, Winston-Salem, NC
M.A. in Mathematics, May 2012.
Thesis: Statistical self-similarity in time series from financial data & chaotic dynamical systems.
Advisor: Miaohua Jiang.

Research

My current research focuses on developing novel statistical methods for missing data and longitudinal data, which are primarily motivated by neurodegenerative disease data. Besides, I have interest and experience in random networks and graphs, probabilistic graphical models, scalable algorithms, Bayesian analysis, and network data inference. I also have research experience in scan statistics, multivariate clustering analysis, combinatorial probabilities, asymptotic approximations, and analytical techniques for the analysis of algorithms and data structure.

Refereed Journal Publications

1. 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*. DOI.
2. Yuan, Y., Yan, J. and **Zhang, P.*** (2021). Assortativity measures for weighted and directed networks. *Journal of Complex Networks*, **9**, cnab017. MR4266155 DOI
3. Ren, Y., **Zhang, P.*** and Dey, D. K.. (2021). Investigating several fundamental properties of random lobster trees and random spider trees. *Methodology and Computing in Applied Probability*. DOI
4. **Zhang, P.*** (2020). Characterizing several properties of high-dimensional random Apollonian networks. *Journal of Complex Networks*, **8**, cnaa038. MR4189631
5. **Zhang, P.***, Wang, T. and Xie, S. X. (2020). Meta-analysis of several epidemic characteristics of COVID-19. *Journal of Data Science*, **18**, 536–549. DOI
6. 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**, 2844–2857. DOI
7. Galarza, C. E., **Zhang, P.** and Lachos, V. H.* (2020). Logistic quantile regression for bounded outcomes using a family of heavy-tailed distributions. *Sankhya B*. DOI.

8. **Zhang, P.*** (2020). On several properties of a class of preferential attachment trees—plane-oriented recursive trees. *Probability in Engineering and Informational Sciences*. DOI.
9. Mahmoud, H. M. and **Zhang, P.*** (2020). Distributions in the constant-differentials Pólya process. *Statistics & Probability Letters*, **156**, 108592. MR3996837
10. **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**, 625–645. MR4104007
11. Ouyang, G., Dey, D. K. and **Zhang, P.*** (2020). Clique-based method for network clustering. *Journal of Classification*, **37**, 254–274. MR4111894
12. **Zhang, P.*** and Dey, D. K. (2019). The degree profile and Gini index of random caterpillar trees. *Probability in Engineering and Informational Sciences*, **33**, 511–527. MR4010508
13. Chen, C. and **Zhang, P.*** (2019). *Communications in Statistics—Theory and Methods*, **48**, 5308–5321. MR4007715
14. **Zhang, P.*** and Mahmoud, H. M. (2016). The degree profile and weight in Apollonian networks and k-trees. *Advances in Applied Probability*, **48**, 163–175. MR3473572
15. **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
16. **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

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

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.

Software

1. Yan, J., Yuan, Y. and **Zhang, P.*** (2020). wdnet: Weighted Directed Network. `R` package version 0.0-3, `https://githlab.com/wdnetwork/wdnet`.

Preprints

1. **Zhang, P.*** and Wang, X. (2021+). Several topological indices of random caterpillars. ArXiv:2102.12535.

2. Wang, T.* and **Zhang, P.** (2021+). Directed hybrid random networks mixing preferential attachment with uniform attachment mechanisms. ArXiv:2101.04611.
3. Chen, J., Yan, J. and **Zhang, P.*** (2021+). Clustering US States by time series of COVID-19 new case counts with non-negative matrix factorization. ArXiv:2011.14412.
4. Tang, C., Wang, T. and **Zhang, P.*** (2021+). Functional data analysis: An application to COVID-19 data in the United States. ArXiv:2009.08363.
5. Ouyang, G., Dey, D. K. and **Zhang, P.*** (2021+). Model-based method for social network clustering. ArXiv:1708.07604.

Manuscripts in Preparation

1. **Zhang, P.** and Xie, S. X.* (2021+). Bias and efficiency comparison between multiple imputation of missing data and available-case analysis in longitudinal studies.
2. 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. (2021+). Cerebral microvascular perfusion as a biomarker of cerebral small vessel function.

(* refers to the corresponding author)

Professional Experiences

- **Postdoctoral Researcher,** The Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, August 2018 – present.
  Advisor: Sharon X. Xie.
- **Visiting Assistant Professor,** University of Connecticut, Storrs, CT, August 2016 – August 2018.
  1. Mathematical Statistics I (STAT 3375Q) (Fall 2016/2017, Spring 2018)
  2. Mathematical Statistics II (STAT 3445Q) (Spring 2017)
  3. Introduction to Statistics II (STAT 2215Q) (Spring 2018)
- **Graduate Instructor,** The George Washington University, Washington, DC, May 2015 – May 2016.
  1. Introduction to Statistics in Social Science (STAT 1053) (Summer 2015)
  2. Introduction to Business and Economic Statistics (STAT1051) (Fall 2016, Spring 2017)
- **Graduate Teaching Assistant,** The George Washington University, Washington, DC, January 2013 – May 2015.
- **Teaching Assistant,** Wake Forest University, Winston-Salem, NC, September 2010 – May 2012.

Presentations

1. Invited speaker at the School of Statistics Seminar, Renmin University of China, online, 2021.
2. Contributed speaker at the spring meeting of the Eastern North American Region (ENAR 2021), online, 2021.
3. Invited speaker at the Brown Bag Forum (organized by DBEI at Penn Medicine), online, 2021.

4. Invited speaker at Data Science in Action in Response to the Outbreak of COVID-19 (sponsored by Korean FDA and Korean Region of International Biometric Society), online, 2020.
5. Contributed speaker at the Joint Statistical Meeting (JSM 2020), online, 2020.
6. 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.
7. Invited speaker at the New England Statistical Symposium (NESS 2019), Hartford, CT, 2019.
8. Invited speaker at the International Workshop of on Applied Probability (IWAP 18), Budapest, Hungary, 2018.
9. Poster presenter at the SouthEastern Probability Conference, Duke University, Durham, NC, 2017.
10. Invited speaker at the Statistics Colloquium, University of Connecticut, Storrs, CT, 2016.
11. Invited speaker at the 13^{th} Workshop on Analytic Algorithmics and Combinatorics (ANALCO 16), Arlington, VA, 2016.
12. Contributed speaker at the 11^{th} Annual UNCG Regional Mathematics and Statistics Conference, University of North Carolina at Greensboro, Greensboro, NC, 2015.
13. Invited speaker at the Mathematics Department Colloquium, Wake Forest University, Winston Salem, NC, 2015.
14. Contributed speaker at the 9^{th} Annual Probability & Statistics Day, University of Maryland, Baltimore County, Baltimore, MD, 2015.
15. Invited speaker at the Seminar in Probability, The Catholic University of America, Washington, DC, 2015.
16. Invited speaker at the GWU STAT Student Seminar, The George Washington University, Washington, DC, 2014.
17. Invited speaker at the Probability Seminar, The George Washington University, Washington, DC, 2014.
18. Poster presenter at the 12^{th} Graduate Student and Postdoctoral Research Day, Wake Forest University, Winston Salem, NC, 2012.

Editorial Services

- **Associate editor,** Journal of Data Science.

Journal Reviews (**In alphabetic order**)

1. Advances in Applied Probability
2. Annals of the Institute of Statistical Mathematics
3. Contemporary Clinical Trials Communications
4. Environmental and Ecological Statistics
5. Journal of Alzheimer's Disease
6. Journal of Applied Probability
7. Journal of Applied Statistics
8. Journal of Computational Science
9. Journal of Data Science
10. Methodology and Computing in Applied Probability

11. Probability in Engineering and Informational Sciences
12. Random Structure & Algorithms
13. Statistics and Its Interface
14. Statistics & Probability Letters

Awards

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