

Selena Wang

Network Science, Brain Imaging, Bayesian Analysis, Psychometrics.

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Major Research Interests

Methodology

- Neuroimaging, connectome-behavior linking
- Imaging genetics, imaging-genetics linking
- Social network analysis, network neuroscience
- High dimensional data analysis, clustering
- Psychometrics, item response theory, latent factor models
- Data integration
- Statistical machine learning, statistical philosophy

Application

- Childhood psychopathology and disorders
- Neurodegeneration through aging and Alzheimer's disease
- Social factor of health outcomes

Appointments

Indiana University

Assistant Professor, Department of Biostatistics and Health Data Science

Faculty Affiliate, Indiana Alzheimer's Disease Research Center

Faculty Affiliate, Stark Neuroscience Institute

Faculty Affiliate, Center for Computational Biology and Bioinformatics

Current

Yale University

Postdoctoral Associate, Department of Biostatistics

2024

Education

The Ohio State University

Ph.D. in Quantitative Psychology, Department of Psychology

2022

– Thesis: "Modeling dependence between a network and item responses."

M.S. in Statistics

– Thesis: "Joint analysis of social and item response networks with latent space models."

M.A. in Quantitative Psychology

– Thesis: "When reliability does not signal reliable detection of experimental effects."

University of Minnesota, Twin Cities

2017

B.S. in Psychology, Summa cum Laude with Highest Distinction

University of Amsterdam

2016

Visiting student

Peer-reviewed Publications

*indicates equal contribution. †indicates publication as a mentor/senior author.

Preprint

1. Zhang, X., Hulvershorn, L. A., Constable, T., Zhao, Y., & †**Wang, S.** (2024). Cost efficiency of fmri studies using resting-state vs task-based functional connectivity. *arXiv:2411.01092v1*. ([arXiv](#))
2. **Wang, S.**, Powla, P., Sweet, T., & Paul, S. (2024). The co-varying ties between networks and item responses via latent variables. *arXiv preprint arXiv:2409.19400*. ([arXiv](#))
3. **Wang, S.**, Liu, Y., Xu, W., Tian, X., & Zhao, Y. (2023). Inference-based statistical network analysis uncovers star-like brain functional architectures for internalizing psychopathology in children. *arXiv preprint arXiv:2309.11349*. ([arXiv](#))
4. Xu, W., **Wang, S.**, Tan, C., Shen, X., Luo, W., Constable, T., ... Zhao, Y. (2024). Supervised brain node and network construction under voxel-level functional imaging. *arXiv preprint arXiv:2407.21242*. ([arXiv](#))

Statistical Methodology

1. *Sweet, T., & ***Wang, S.** (in press). Network science in psychology. *Psychological Methods*. ([arXiv](#))
2. **Wang, S.**, Wang, Y., Xu, F., Shen, L., & Zhao, Y. (2025). Sex-specific topological structure associated with dementia identified via latent space network analysis (abstract). *Alzheimer's & Dementia*, 20, e090404. ([abstract](#))
3. **Wang, S.**, Wang, Y., Xu, F., Tian, X., Fredericks, C., Shen, L., ... Alzheimer's Disease Neuroimaging Initiative (2024). Sex-specific topological structure associated with dementia via latent space estimation. *Alzheimer's & Dementia*. ([paper](#))
4. **Wang, S.**, Wang, Y., Xu, F. H., Shen, L., Zhao, Y., & Alzheimer's Disease Neuroimaging Initiative. (2025). Establishing group-level brain structural connectivity incorporating anatomical knowledge under latent space modeling. *Medical Image Analysis*, 99, 103309. ([paper](#), [code](#))
5. Xu, W., **Wang, S.**, Shen, L., & Zhao, Y. (2024). Collaborative survival analysis on predicting alzheimer's disease progression. *Statistics in Biosciences*, 1–24. ([paper](#))
6. Qiu, W., Chu, H., **Wang, S.**, Zuo, H., Li, X., Zhao, Y., & Ying, Z. (2024). Learning high-order relationships of brain regions. *International Conference on Machine Learning 2024 (27.5% acceptance rate)*. ([conference paper](#))
7. Tian, X., Wang, Y., **Wang, S.**, Zhao, Y., & Zhao, Y. (2024). Bayesian mixed model inference for genetic association under related samples with brain network phenotype. *Biostatistics*. ([paper](#))
8. **Wang, S.**, Paul, S., & De Boeck, P. (2023). Joint latent space model for social networks with multivariate attributes. *Psychometrika*, 1–31. ([paper](#), [code](#))
9. **Wang, S.**, De Boeck, P., & Yotobieng, M. (2023). Heywood cases in unidimensional factor models and item response models for binary data. *Applied Psychological Measurement*, 47(2), 141–154. ([paper](#), [arXiv](#))
10. **Wang, S.** & Edgerton, J. (2022). Resilience to stress in bipartite networks: application to the islamic state recruitment network. *Journal of Complex Networks*, 10(4), cnac017. ([paper](#))

11. **Wang, S.** & De Boeck, P. (2022). Understanding the role of subpopulations and reliability in between-group studies. *Behavior Research Methods*, 1–16. ([paper](#))
12. **Wang, S.**, Wu, H., & Pek, J. (2022). Performance of alternative regression weights in the context of prediction versus inference (abstract). *Multivariate Behavioral Research*, 57(1), 163–163. ([abstract](#))
13. **Wang, S.** (2021). Recent integrations of latent variable network modeling with psychometric models. *Frontiers in Psychology*, 12. ([paper](#))

Collaborative Service

1. Misra, S., **Wang, S.**, Quinn, T. J., Dawson, J., Zelano, J., Tanaka, T., ... others (2025). Antiseizure medications in poststroke seizures: A systematic review and network meta-analysis. *Neurology*, 104(3), e210231. ([paper](#))
2. Miller, A. A., Sharp, E. S., **Wang, S.**, Zhao, Y., Mecca, A. P., van Dyck, C. H., ... Alzheimer's Disease Neuroimaging Initiative (2024). Self-reported hearing loss is associated with faster cognitive and functional decline but not diagnostic conversion in the adni cohort. *Alzheimer's & Dementia*. ([paper](#))
3. Li, J. S., Tun, S. M., Ficek-Tani, B., Xu, W., **Wang, S.**, Horien, C., ... others (2024). Medial amygdalar tau is associated with anxiety symptoms in preclinical alzheimer's disease. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 2024–06. ([paper](#))
4. Misra, S., Dawson, J., Kwan, P., Kasner, S. E., Grotta, J. C., Larsson, D., ... others (2024). Antiseizure medications in post-stroke seizures: A systematic review and network meta-analysis (p8-1.012). In *Neurology* (Vol. 102, p. 5192). ([paper](#))
5. Mishra, N. K., Kwan, P., Tanaka, T., Sunnerhagen, K. S., Dawson, J., Zhao, Y., ... others (2023). Clinical characteristics and outcomes of patients with post-stroke epilepsy: protocol for an individual patient data meta-analysis from the international post-stroke epilepsy research repository (ipserr). *BMJ open*, 13(11), e078684. ([paper](#))
6. Jamrozik, A., Clements, N., Hasan, S. S., Zhao, J., Zhang, R., Campanella, C., ... others (2019). Access to daylight and view in an office improves cognitive performance and satisfaction and reduces eyestrain: A controlled crossover study. *Building and Environment*, 165, 106379. ([paper](#))

Grants

- **REC Scholar Program**

Agency: IADRC

Status: Funded

Role: Principle Investigator

- **Indiana Alzheimer's Disease Research Center**

Agency: National Institute of Aging

Status: Active

Role: Co-Investigator

- **Mechanics of Brain Folding in Human Infants Evaluated Using MRI**

Agency: National Institute of Health

Status: Active

Role: Co-Investigator

Teaching

- **Lead instructor of the course** at the Ohio State University (SEI available) Fall 2020, Spring 2021
Introduction to Psychology (PSYCH 1100)
 - Lead online courses during pandemic
 - Develop syllabus
 - Design course assignments
 - Deliver live lectures
- **Teaching Assistant** at the Ohio State University Fall 2018 –Spring 2020
Quantitative and Statistical Methods in Psychology (PSYCH 3321)
Data Analysis in Psychology (PSYCH 2220)
 - Design and grade course assignments
 - Quest lecture at weekly lab and review sessions
 - Tutor students and hold office hours

Softwares

- **jlsM**: An R package estimating joint latent space models for social networks and multivariate attributes using a fast inference approach.
Link: <https://github.com/selenashuowang/jlsM.git>
- **ABCModel**: An R package estimating the attributes-informed brain connectivity model.
Link: <https://github.com/selenashuowang/ABCModel.git>
- **LatentSNA**: An R package estimating the latent variables-assisted statistical network analysis model.
Link: <https://github.com/selenashuowang/LatentSNA.git>

Honours, Awards and fellowships

- REC Scholar, Indiana Alzheimer's Disease Research Center 2025
- DETxDigital Harbor Fellowship in Computational Psychometrics, Duolingo English Test 2021
- Finalist, Student Paper Competition, IISA 2021
 - Project: Joint latent space model for social networks with high-dimensional multivariate attributes.
- Ray Travel Award (for Service and Scholarship), Graduate Student Council, Ohio State 2020
- Graduate Student Conference Presentation Award, Ohio State 2018, 2019
- The International Meeting of the Psychometric Society Travel Award 2019
 - Project: The integration of social network analysis with psychometric models.
- Algorithms for Threat Detection (ATD) Travel Award 2018
 - Project: Joint Analysis of Social and Item Response Networks with Latent Space Models.
- College of Arts and Sciences Division of Social and Behavioral Sciences (SBS) Fellowship, Ohio State 2018
- Distinguished University Fellowship, Ohio State 2017, 2022
- Donald G. Paterson Award, Minnesota Psychological Association 2017
- Innovative Community Building Grants Award, University of Minnesota 2016
- Undergraduate Research Opportunities Program Grant, University of Minnesota 2016
 - Project: Gender and racial measurement bias in vocational interest assessment.
- Global Excellence Scholarship, University of Minnesota (4-years of in-state tuition) 2013

Presentations

Invited Presentations

1. **S. Wang**, “Current Projects in Network-based Connectome Research”, *Indiana Public Health Informatics*, March, 2025.
2. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *Center for Complex Networks and Systems Research*, March, 2025.
3. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *Adolescent Behavioral Health Research Program 2025*, February, 2025.
4. **S. Wang**, “Sex-specific topological structure associated with dementia via latent space estimation”, *2025 ICSA Applied Statistics Symposium 2025*, June, 2025.
5. **S. Wang**, “Heritability and Genetic Contribution Analysis of the Co-development of FC and SC during Childhood”, *Eastern North American Region Spring Meeting 2025*, March, 2025.
6. **S. Wang**, “Linking social networks with behavior outcomes”, *Indiana University Biostatistics Seminar*, 2024.
7. **S. Wang**, Y. Wang, F. Xu, C. Fredericks, L. Shen and Y. Zhao, “Sex-specific topological structure associated with dementia via latent space estimation”, *18th International Joint Conference on Computational and Financial Econometrics (CFE) and Computational and Methodological Statistics*, 2024.
8. **S. Wang**, “Neuroimaging connectivity analysis needs network science for brain-behavior linking”, *Stark Neurosciences Research Institute*, 2024.
9. **S. Wang**, Y. Wang, F. Xu, C. Fredericks, L. Shen and Y. Zhao, “Sex-specific topological structure associated with dementia via latent space estimation”, *Statistical Methods in Imaging Conference 2024*, May, 2024.
10. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis.”, *Virtual Working Group*, 2024.
11. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis.”, *Purdue University CONNplexity Lab*, 2024.
12. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis.”, *Purdue and Indiana University Joint Seminar*, 2024.
13. **S. Wang**, “Inference-based Statistical Network Analysis Uncovers Star-like Brain Functional Architectures for Internalizing Psychopathology in Children.”, *Center for Computational Biology and Bioinformatics*, 2024.
14. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *University of Illinois Urbana-Champaign, Urbana-Champaign*, January, 2024.
15. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *Rush University, Chicago*, January, 2024.
16. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *Indiana University, Indianapolis*, January, 2024.
17. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *University of Minnesota, Online*, December, 2023.
18. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *University of Utah, Online*, November, 2023.
19. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *St Jude Children’s Research Hospital, Online*, November, 2023.
20. **S. Wang**, “Detect Imaging Biomarkers with Statistical Network Analysis”, *Georgia Tech University, Atlanta*, November, 2023.

21. **S. Wang**, “The integration of psychometric and network models for behavior and neuroscience research”, *University of Maryland, College Park, April, 2023*.
22. **S. Wang**, “The integration of psychometric and network models for educational research”, *Michigan State University, February, 2023*.
23. **S. Wang**, “The integration of psychometric and network models for educational research”, *University of Nebraska, Lincoln, January, 2023*.
24. **S. Wang**, J.R. Lockwood, and Y. Attali, “Fitting psychometric models to digital-first assessment”, *Duolingo English Test, August, 2021*.
25. **S. Wang**, S. Paul, and P. De Boeck, “Joint latent space model for social networks with high-dimensional multivariate attributes.”, *International Indian Statistical Association Conference, May, 2021*.
26. **S. Wang**, S. Paul, J. Logan, and P. De Boeck, “Joint modeling of network and psychometric data”, *International Meeting of Psychometric Society, July, 2019*.

National & Regional Conferences

27. **S. Wang**, Y. Wang, F. Xu, C. Fredericks, L. Shen and Y. Zhao, “Sex-specific topological structure associated with dementia via latent space estimation (poster)”, *The Alzheimer’s Association International Conference, August, 2024*.
28. **S. Wang**, Y. Liu, W. Xu, X. Tian and Y. Zhao, “Inference-based statistical network analysis uncovers star-like brain functional architectures for internalizing psychopathology in children”, *Eastern North American Region Spring Meeting 2024, March, 2024*.
29. **S. Wang**, Zhang, X., Y. Liu, W. Xu, X. Tian and Y. Zhao, “Unveiling Star-Like Brain Networks in Adolescent Internalizing Psychopathology: An Inference-Based Statistical Approach (Poster)”, *Neuroscience Track Brunch and Poster Sessions, February, 2024*.
30. **S. Wang**, Y. Wang, F. Xu, L. Shen and Y. Zhao, “Establishing group-level brain structural connectivity incorporating anatomical knowledge under latent space modeling”, *Statistical Methods in Imaging Conference 2023, May, 2023*.
31. W. Qiu, **S. Wang**, X. Li, Y. Zhao, R. Ying, “Understanding Interactions of ROIs via Learnable Hyperedges (Poster)”, *Organization for Human Brain Mapping, July, 2023*.
32. **S. Wang**, Y. Wang, F. Xu, L. Shen and Y. Zhao, “Identifying Gender based Neuromarkers of Alzheimer’s Disease Using ABC Network Model” (Poster), *Organization for Human Brain Mapping, July, 2023*.
33. P. De Boeck **S. Wang** and S. Cho, “Binary Time Series for Eye Fixations: The Quality of Parameter Estimates”, *National Council on Measurement in Education Conference, April, 2023*.
34. P. De Boeck and **S. Wang**, “Pervasive measurement bias”, *Quantitative Methodology Center 2022 Conference, June, 2022*.
35. **S. Wang**, J.R. Lockwood, and Y. Attali, “Fitting psychometric models to digital-first assessment”, *National Council on Measurement in Education, April, 2022*.
36. **S. Wang**, S. Paul, and P. De Boeck, “Modeling classroom outcome with network analysis”, *National Council on Measurement in Education, April, 2022, cancelled*.
37. **S. Wang**, S. Paul, and P. De Boeck, “Joint latent space model for social networks with high-dimensional multivariate attributes”, *International Meeting of Psychometric Society, July, 2021*.
38. **S. Wang**, S. Paul, J. Logan, and P. De Boeck, “Joint modeling with network analysis and psychometrics”, *Geometry and Topology meet Data Analysis and Machine Learning, May, 2019*.

39. **S. Wang**, S. Paul, J. Logan, P. De Boeck, “Joint Analysis of Social and Item Response Networks with Latent Space Models”, *Algorithms for Threat Detection (ATD)*, November, 2018.
40. **S. Wang** and P. De Boeck, “Does low reliability lead to low replication rates?”, *International Meeting of Psychometric Society*, July, 2018.
41. **S. Wang**, B. Wiernik and B. Morgan, “Gender measurement bias versus trait differences in vocational interest assessment.”, *Society for Industrial and Organizational Psychology conference*, April, 2017
42. C.D. Nye, J. J. Prasad, J.C.Bradburn, F.Elizondo, W.M.J.Phan, R.Amrhein, S.Cho, J.Rounds, B.M.Wiernik, **S.Wang**, B.Morgan, C.J.M.We, E.Wetzel, D.Ispas, “New directions for vocational interest research in organizations.”, *Society for Industrial and Organizational Psychology conference*, April, 2017

Colloquiums & Symposiums

43. P. Powla, S. Stephens, T. Sweet and **S. Wang**, “The relationship between tau levels in functionally connected cortical brain regions and a region’s tau burden.”, *2024 IADRC Fall Research Symposium*, 2024.
44. **S. Wang**, “Relationship between Changes in biomarkers and self-perceived functioning .”, *Indiana Alzheimer’s Disease Research Center*, 2024.
45. **S. Wang** and J. Edgerton, “Disrupting terrorist recruitment: Network knockouts of Islamic State recruiters.”, *OSU Psychological Studies Quantitative Colloquium*, 2021.
46. **S. Wang** and J. Edgerton, “Disrupting terrorist recruitment: Network knockouts of Islamic State recruiters.”, *OSU Political Science Studies Methodological Colloquium*, 2021.
47. **S. Wang** and P. De Boeck, “Understand reliability with the reliability paradox.”, *OSU Psychological Studies Quantitative Colloquium*, 2020.
48. **S. Wang**, S. Paul, J. Logan, and P. De Boeck, “A joint modeling framework for social network analysis and psychometrics”, *OSU Psychological Studies Quantitative Colloquium*, 2019.
49. **S. Wang** and P. De Boeck, “The role of reliability in the replication crisis.”, *OSU Psychological Studies Quantitative Colloquium*, 2018.
50. **S. Wang**, “Applications of differential item functioning analysis with item response theory.”, *Undergraduate Research Symposium*, April, 2016.

Mentoring

Plamena Powla 2024-
PhD student, Biostatistics and Health Data Science, Indiana University

Connor Cornelison 2024-
Master student, Data Science, Indiana University

Theyaneshwaran Jayaprakash 2024-
Master student, Data Science, Indiana University

Yunhe Liu 2023-2024
Master student, Biostatistics, Yale University
– Now PhD student of Statistics at Texas A&M University

Yiting Wang 2022-2024
Master student, Biostatistics, Yale University

– Now PhD student of Statistics at University of Virginia

Xinzhi Zhang

2023-2024

Master student, Biostatistics, Yale University

Service

University Service

- Member, Admission Committee, Department of Biostatistics and Health Data Science, Indiana University 2025
- Member, Equality and Inclusivity Committee, Ohio State University 2021
- Member, Quantitative Psychology Group, Ohio State University 2019
- Member, Discussion Panel, the Office of Diversity and Inclusion, Ohio State University 2019
- Member, Psychology Diversity Council, University of Minnesota 2016
- Member, International and LGBTQA: A Panel Discussion, University of Minnesota 2015
- Member, Orientation committee, International Student and Scholar Services, University of Minnesota 2015

Professional Service

- Meeting Organizer, Regenstrief/IU AI conference 2025
- Session Chair, The Statistical Methods in Imaging Conference 2024
- Session Organizer, The Statistical Methods in Imaging Conference 2024
- Session Organizer, The Statistical Methods in Imaging Conference 2023
- Session Chair, International Meeting of Psychometric Society 2021
- Meeting Organizer, Translational Data Analytics Institute Fall Forum 2021
- Meeting Volunteer, American Statistical Association, the Caucus for Women in Statistics 2019
- Meeting Volunteer, State Science Day 2019
- Session Chair, International Meeting of Psychometric Society 2018

Editorial Service

- International Conference on Bioinformatics and Biomedicine (BIBM2022)
- Network Science
- Brain Imaging and Behavior
- Alzheimer's & Dementia
- Biostatistics
- Biometrics
- Journal of Educational Measurement
- Developmental Science
- Big Data Mining

Peer Review Group/Grant Review

- Reviewer, Eastern North American Region Spring Meeting student paper competition 2025
- Reviewer, The Statistical Methods in Imaging Conference student paper competition 2024
- Reviewer, NSF Methodology, Measurement & Stats Proposal 2024
- Reviewer, President's Research Excellence (PRE) program Catalyst concept papers, Ohio State 2022
- Reviewer, National Council on Measurement in Education 2020