Curriculum Vitae for James Sharpnack

Contact Details:

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Education:

The Ohio State University	Mathematics & Physics	2007	B.S.
Carnegie Mellon University	Machine Learning & Statistics	2013	Ph.D.
	Graph Structured Normal Means Inference		

Appointments:

2022 - present	Staff AI Research Scientist, Duolingo
2022 - present	Adjunct Associate Professor, Statistics Department, University of California at Davis.
2021 - 2022	Senior Applied Scientist, Amazon Inc.
2021 - 2022	Associate Professor (on leave), Statistics Department, University of California at Davis.
Summer 2020	Senior Research Scientist, Delphi Covid Response Team, Carnegie Mellon University.
2015 - 2021	Assistant Professor, Statistics Department, University of California at Davis.
2013 - 2015	Postdoctoral Researcher, Mathematics Department, University of California at San Diego.

Grants and Awards:

NSF DMS 1712996 "Point-to-Point Process Models for Spatio-temporal Networks" Award amount: $125,000. 2017—2020

Best Student Paper Award, Asilomar Conference on Signals, Systems, and Computers, 2013

Teaching:

Math 11: Introductory Probability and Statistics, Spr. 2015 (UC San Diego)

Stats 131A: Introduction to Probability Theory, Spr. 2016 (UC Davis)

Stats 141B: Data & Web Technologies for Data Analysis, Win. 2017, Win. 2018, Fall 2018, Spr. 2021

Stats 208: Statistical Machine Learning, Spr. 2016, Spr. 2017, Spr. 2018, Spr. 2019, Spr. 2020, Spr. 2021

Stats 220: Data Technologies, Win. 2020

Stats 290: Department Seminar Series, Fall 2016

Stats 251: Advanced Machine Learning, Win. 2019

Student Advising:

Liwei Wu (Ph.D. Statistics) — **graduated 2020**, co-advised with Cho-Jui Hsieh

Xiaoyue Li (Ph.D. Statistics) — **graduated 2020**

Dmitry Shemetov (Ph.D. Mathematics) — **graduated 2020**

Shitong Wei (Ph.D. Statistics) — **graduated 2021**

Qin Ding (Ph.D. Statistics) — **graduated 2021**, co-advised with Cho-Jui Hsieh

Lifeng Wei (Ph.D. Statistics) — **graduated 2021**, co-advised with Cho-Jui Hsieh

Stephen Sheng (Ph.D. Mathematics) — **graduated 2021**

Xiaoliu Wu (Ph.D. Statistics) — **graduated 2022**

Ran Sun (Ph.D. Civil and Environmental Engineering) — **graduated 2023**, co-advised with Yueyue Fan

Xiawei Wang (Ph.D. Statistics) — **graduated 2024**, co-advised with Thomas Lee

Professional Activities:

Conference Organization

Senior Area Chair and Co-organizer, AAAI Workshop on AI for Education, 2024 & 2025.

Conference Organizer, UC Davis Statistics 40th Anniversary Conference, 2020, Davis, CA. (Postponed due to Covid-19)

Session Organizer, International Workshop on Applied Probability (IWAP) 2020, Thessaloniki, Greece. (Postponed due to Covid-19)

Machine Learning Track Organizer, Symposium on Data Science and Statistics (SDSS) 2020, Pittsburgh, PA.

Conference Organizer, UC Davis Peter Hall Conference, 2019, Davis, CA.

Area Chair

International Conference on Machine Learning, 2025, Area Chair

Neural Information Processing Systems, 2024, Area Chair

International Conference on Machine Learning, 2020, Area Chair

Grant reviewer, NSF DMS Panelist 2018

Paper reviewer

Conference on Learning Theory (COLT)

Annals of Statistics

Electronic Journal of Statistics

Neural Information Processing Systems (NeurIPS) — 2019 highest scoring 400 reviewers award

Journal of the Royal Statistical Society, B

IEEE Transactions on Signal and Information Processing over Networks

IEEE Transactions on Knowledge and Data Engineering

Artificial Intelligence and Statistics (AIStats)

International Conference on Machine Learning (ICML)

IEEE Transactions on Signal Processing

IEEE Transactions on Information Theory

Journal of Machine Learning Research

Applied and Computational Harmonic Analysis

Applied Mathematics and Optimization

Peer Reviewed Publications:

1. X. Wang, J. Sharpnack, and T. C. Lee. Improving lung cancer diagnosis and survival prediction with deep learning and ct imaging. *PLoS One*, 20(6):e0323174, 2025

2. D. B. Mallick, J. Burstein, S. Woodhead, J. Sharpnack, and Z. Wang. Preface: Innovation and responsibility in ai-supported education. In *Innovation and Responsibility in AI-Supported Education*, pages i–vi. PMLR, 2025

3. J. Sharpnack, K. Hao, P. Mulcaire, K. Bicknell, G. LaFlair, K. Yancey, and A. A. von Davier. Banditcat and autoirt: Machine learning approaches to computerized adaptive testing and item calibration. In *Large Foundation Models for Educational Assessment*, pages 121–135. PMLR, 2025

4. C. Niu, K. Yancey, R. Liu, M. Baig, A. Horie, and J. Sharpnack. Detecting llm-assisted cheating on open-ended writing tasks on language proficiency tests. In *Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing: Industry Track*, pages 940–953, 2024

5. V. Sadhanala, R. Bassett, J. Sharpnack, and D. J. McDonald. Exponential family trend filtering on lattices. *Electronic Journal of Statistics*, 18(1):1749–1814, 2024

6. M. Ananda, D. B. Malick, J. Burstein, L. T. Liu, Z. Liu, J. Sharpnack, Z. Wang, and S. Wang. AI for education at AAAI 2024 bridging innovation and responsibility. In *AI for Education Workshop*, pages 1–2. PMLR, 2024

7. S. Garg, N. Erickson, J. Sharpnack, A. Smola, S. Balakrishnan, and Z. C. Lipton. Rlsbench: Domain adaptation under relaxed label shift. In *International Conference on Machine Learning*, pages 10879–10928. PMLR, 2023

8. V. G. Keerthi, S. Sheng, T. Jones, C. P. Choi, and J. Sharpnack. Optimizing machine learning methods to discover strong gravitational lenses in the deep lens survey. *Monthly Notices of the Royal Astronomical Society*, 2023

9. G. Vidal, J. Sharpnack, P. Pinedo, I. C. Tsai, A. R. Lee, and B. Martínez-López. Impact of sensor data pre-processing strategies and selection of machine learning algorithm on the prediction of metritis events in dairy cattle. *Preventive Veterinary Medicine*, 215:105903, 2023

10. G. Vidal, J. Sharpnack, P. Pinedo, I. C. Tsai, A. R. Lee, and B. Martínez-López. Comparative performance analysis of three machine learning algorithms applied to sensor data registered by a leg-attached accelerometer to predict metritis events in dairy cattle. *Frontiers in Animal Science*, 4:1157090, 2023

11. J. Sharpnack. On l2-consistency of nearest neighbor matching. *IEEE Transactions on Information Theory*, 2022

12. Q. Ding, Y.-W. Liu, C.-J. Hsieh, and J. Sharpnack. Syndicated bandits: A framework for auto tuning hyper-parameters in contextual bandit algorithms. *In Advances in Neural Information Processing Systems*, 2022

13. H. Safford, R. E. Zuniga-Montanez, M. Kim, X. Wu, L. Wei, J. Sharpnack, K. Shapiro, and H. N. Bischel. Wastewater-based epidemiology for covid-19: Handling qpcr nondetects and comparing spatially granular wastewater and clinical data trends. *ACS Es&t Water*, 2022

14. S. Sheng, K. V. GC, C. P. P. Choi, J. Sharpnack, and T. Jones. An unsupervised hunt for gravitational lenses. In *International Conference on Artificial Intelligence and Statistics*, pages 9827–9843. PMLR, 2022

15. Q. Ding, C.-J. Hsieh, and J. Sharpnack. Robust stochastic linear contextual bandits under adversarial attacks. In *International Conference on Artificial Intelligence and Statistics*, pages 7111–7123. PMLR, 2022

16. M. L. Daza-Torres, Y. E. García, A. J. Schmidt, B. H. Pollock, J. Sharpnack, and M. Nuño. The impact of covid-19 vaccination on california's return to normalcy. *PloS one*, 17(5):e0264195, 2022

17. D. J. McDonald, J. Bien, A. Green, A. J. Hu, N. DeFries, S. Hyun, N. L. Oliveira, J. Sharpnack, J. Tang, R. Tibshirani, et al. Beyond cases and deaths: The benefits of auxiliary data streams in tracking the covid-19 pandemic: Can auxiliary indicators improve covid-19 forecasting and hotspot prediction? *Proceedings of the National Academy of Sciences of the United States of America*, 118(51), 2021

18. A. Reinhart, L. Brooks, M. Jahja, A. Rumack, J. Tang, S. Agrawal, W. Al Saeed, T. Arnold, A. Basu, J. Bien, et al. An open repository of real-time covid-19 indicators. *Proceedings of the National Academy of Sciences*, 118(51):e2111452118, 2021

19. Q. Ding, C.-J. Hsieh, and J. Sharpnack. An efficient algorithm for generalized linear bandit: Online stochastic gradient descent and thompson sampling. In *International Conference on Artificial Intelligence and Statistics*, pages 1585–1593. PMLR, 2021

20. L. Wu, S. Li, C.-J. Hsieh, and J. Sharpnack. Sse-pt: Sequential recommendation via personalized transformer. In *Fourteenth ACM Conference on Recommender Systems*, pages 328–337, 2020

21. L. Wu, H.-F. Yu, N. Rao, J. Sharpnack, and C.-J. Hsieh. Graph dna: Deep neighborhood aware graph encoding for collaborative filtering. In *International Conference on Artificial Intelligence and Statistics*, pages 776–787. PMLR, 2020

22. D. T. Fitch, J. Sharpnack, and S. L. Handy. Psychological stress of bicycling with traffic: examining heart rate variability of bicyclists in natural urban environments. *Transportation Research Part F: Traffic Psychology and Behaviour*, 70:81 – 97, 2020

23. O. H. Madrid Padilla, J. Sharpnack, Y. Chen, and D. M. Witten. Adaptive nonparametric regression with the k-nearest neighbour fused lasso. *Biometrika*, 2020

24. L. Wu, S. Li, C.-J. Hsieh, and J. L. Sharpnack. Stochastic shared embeddings: Data-driven regularization of embedding layers. In *Advances in Neural Information Processing Systems*, pages 24–34, 2019

25. R. Bassett and J. Sharpnack. Fused density estimation: Theory and methods. *Journal of the Royal Statistical Society Series B*, 81(5):839–860, November 2019

26. K. Paramonov, D. Shemetov, and J. Sharpnack. Estimating graphlet statistics via lifting. In *Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining*, pages 587–595. ACM, 2019

27. J. Sharpnack. Learning patterns for detection with multiscale scan statistics. In *Proceedings of Machine Learning Research (31st Annual Conference on Learning Theory)*, volume 75, 2018

28. L. Wu, C.-J. Hsieh, and J. Sharpnack. Sql-rank: A listwise approach to collaborative ranking. In *Proceedings of Machine Learning Research (35th International Conference on Machine Learning)*, volume 80, 2018

29. M. F. Sharpnack, N. Ranbaduge, A. Srivastava, F. Cerciello, S. G. Codreanu, D. C. Liebler, C. Mascaux, W. O. Miles, R. Morris, J. E. McDermott, J. Sharpnack, et al. Proteogenomic analysis of surgically resected lung adenocarcinoma. *Journal of Thoracic Oncology*, 2018

30. V. Sadhanala, Y.-X. Wang, J. L. Sharpnack, and R. J. Tibshirani. Higher-order total variation classes on grids: Minimax theory and trend filtering methods. In *Advances in Neural Information Processing Systems*, pages 5802–5812, 2017

31. K. Lin, J. L. Sharpnack, A. Rinaldo, and R. J. Tibshirani. A sharp error analysis for the fused lasso, with application to approximate changepoint screening. In *Advances in Neural Information Processing Systems*, pages 6887–6896, 2017

32. L. Wu, C.-J. Hsieh, and J. Sharpnack. Large-scale collaborative ranking in near-linear time. In *Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, pages 515–524. ACM, 2017

33. O. H. M. Padilla, J. G. Scott, J. Sharpnack, and R. J. Tibshirani. The dfs fused lasso: Linear-time denoising over general graphs. *The Journal of Machine Learning Research*, 18(1):6410–6445, 2017

34. Y.-X. Wang, J. Sharpnack, A. J. Smola, and R. J. Tibshirani. Trend filtering on graphs. *The Journal of Machine Learning Research*, 17(1):3651–3691, 2016

35. J. Sharpnack, A. Krishnamurthy, and A. Singh. Detecting activations over graphs using spanning tree wavelet bases. *International Conference on Artificial Intelligence and Statistics, JMLR W&CPJournal of*, 31:536–544, 2013

36. J. Sharpnack, A. Rinaldo, and A. Singh. Sparsistency of the edge lasso over graphs. *International Conference on Artificial Intelligence and Statistics, JMLR W&CP*, 22:1028–1036, 2012

37. J. Sharpnack, A. Rinaldo, and A. Singh. Changepoint detection over graphs with the spectral scan statistic. *International Conference on Artificial Intelligence and Statistics, JMLR W&CP*, 31:545–553, 2012

38. J. Sharpnack and A. Singh. Identifying graph-structured activation patterns in networks. In *Advances in Neural Information Processing Systems*, pages 2137–2145, 2010

39. J. Sharpnack, E. Arias-Castro, et al. Exact asymptotics for the scan statistic and fast alternatives. *Electronic Journal of Statistics*, 10(2):2641–2684, 2016

40. J. Sharpnack, A. Rinaldo, and A. Singh. Detecting anomalous activity on networks with the graph fourier scan statistic. *Signal Processing, IEEE Transactions on*, 64(2):364–379, 2016

41. A. Krishnamuthy, J. Sharpnack, and A. Singh. Recovering graph-structured activations using adaptive compressive measurements. In *Signals, Systems and Computers, 2013 Asilomar Conference on*, pages 765–769. IEEE, 2013

42. J. L. Sharpnack, A. Krishnamurthy, and A. Singh. Near-optimal anomaly detection in graphs using lovász extended scan statistic. In *Advances in Neural Information Processing Systems*, pages 1959–1967, 2013

43. M. Kolar and J. Sharpnack. Variance function estimation in high-dimensions. *International Conference of Machine Learning*, 12:1447–1454, 2012

Lightly Reviewed Publications, Conference Tutorials, and Editorials:

1. M. Ananda, D. B. Malick, J. Burstein, L. T. Liu, Z. Liu, J. Sharpnack, Z. Wang, and S. Wang. AI for education at AAAI 2024 bridging innovation and responsibility. In *AI for Education Workshop*, pages 1–2. PMLR, 2024

2. N. Erickson, X. Shi, J. Sharpnack, and A. Smola. Multimodal automl for image, text and tabular data. In *Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, pages 4786–4787, 2022

3. X. Li and J. Sharpnack. Compression of spatio-temporal networks via point-to-point process models. In *Proceedings of the 13th International Workshop on Mining and Learning with Graphs (MLG)*, 2017

4. J. Sharpnack and A. Singh. Near-optimal and computationally efficient detectors for weak and sparse graph-structured patterns. In *Global Conference on Signal and Information Processing (GlobalSIP), 2013 IEEE*, pages 443–446. IEEE, 2013

5. J. Sharpnack. A path algorithm for localizing anomalous activity in graphs. In *Global Conference on Signal and Information Processing (GlobalSIP), 2013 IEEE*, pages 341–344. IEEE, 2013

Academic Service Committees:

Co-lead of Healthy Davis Together Modeling Team, 2020–2021

Ph.D. Admissions, Graduate Group in Applied Maths, 2019–2020

MS Admissions, Statistics Dept., 2018–2019, 2019–2020

MS Advising, Statistics Dept., 2018–2019, 2019–2020

Ed Policy and Curriculum Committee, Statistics Dept., 2018–2019

Peter Hall Conference Organizing Committee, Statistics Dept., 2018–2019

Faculty Search Committee, Statistics Dept., 2017—2018

Publicity and Event Planning, Statistics Dept., 2016—2017

Education Policy and Curriculum Committee, Statistics Dept., 2016—2017

Data Science White Paper Committee (ad-hoc), Statistics Dept., 2016—2017

Faculty Search Committee, Statistics Dept., 2015—2016

Invited Talks, Conference Presentations, and Seminars:

NeurIPS Keynote at The First Workshop on Large Foundation Models for Educational Assessment, Vancouver, Canada, 2024

9th Conference of the International Association for Computerized Adaptive Testing (IACAT), Seoul, South Korea, 2024

Data Science Conference, Texas A&M, TX, 2022

OpenSearch Conference, Fremont, CA, 2022

KDD Tutorial: Multimodal AutoML for Image, Text and Tabular Data, Washington D.C., 2022

Statistics Department Seminar, Columbia University, NY, 2021

Statistical Learning and Data Science (SLDS), UC Irvine, 2020 (Cancelled due to Covid-19)

Booth-Esc Machine Learning Workshop, University of Chicago-Booth, 2020

Mathematics of Data and Decisions at Davis (MADDD), UC Davis, 2019

GeoVet Conference, Senior Presentation, UC Davis, 2019

Fall Sectional Meeting of AMS, Special Session on Data Science, UC Riverside, 2019

Symposium on Data Science and Statistics, Invited Session: Machine Learning Problems in the Tech Industry, Seattle, WA, 2019.

Peter Hall Conference, UC Davis, 2019

Statistical Machine Learning Seminar, Machine Learning Department, Carnegie Mellon University, 2018.

Joint Meeting on Statistics (JSM), Invited Session: Nonparametrics on Graphs, Vancouver, BC, 2018.

Conference on Learning Theory (COLT), Main Conference Session, Stockholm, Sweden, 2018.

Information Theory and Applications (ITA) Workshop, San Diego, CA, 2018.

University of Washington, Statistics Department Seminar, Seattle, WA, 2017.

UC Davis, Institute of Transportation Studies Seminar, Davis, CA, 2017.

Joint Meeting on Statistics (JSM), Invited Session: Scan Statistics in Networks and Graphs, Baltimore, MD, 2017.

European Meeting of Statisticians (EMS), Topic Contributed Session: Multiplicity control for structured systems, Helsinki, Finland, 2017.

Information Theory and Applications (ITA) Workshop, San Diego, CA, 2017.

World Congress on Statistics and Probability, Invited session: Statistical computing and complex data, Toronto, ON, 2016.

UC Davis, Network Working Group, Davis, CA, 2016.

UC Davis, Graduate Group in Applied Mathematics Seminar, Davis, CA, 2016.

Information Theory and Applications (ITA) Workshop, San Diego, CA, 2016.

International Workshop on Applied Probability, Invited Talk, Toronto, ON, 2016.

Carnegie Mellon University, Statistics Department Seminar, Pittsburgh, PA, 2015.

UC Davis, Statistics Department Seminar, Davis, CA, 2015.

Indiana University, Bloomington, Statistics Department Seminar, Bloomington, IN, 2015.

Waterloo University, Statistics and Actuarial Science, Department Seminar, Waterloo, ON, 2015.

Boston University, Mathematics and Statistics Department Seminar, Boston, MA, 2015.

McGill University, Mathematics and Statistics Department Seminar, Montreal, QC, 2014.

SPAWAR Systems Center Pacific (SSC Pacific), Machine Learning Series Seminar, San Diego, CA, 2015.

International Conference on Artificial Intelligence and Statistics (AIStats), Main Conference Session, Scottsdale, AZ, 2013.

Carnegie Mellon University, Machine Learning Lunch, Pittsburgh, PA, 2010.

Neural Information Processing Systems (NIPS), Main Conference Session, Vancouver, BC, 2010.

Affiliations:

Graduate Group in Applied Mathematics Member, 2016—2022

Data Science Initiative Faculty Affiliate, 2017—2022

Graduate Group in Epidemiology Member, 2018—2022

Transportation Technology and Policy Graduate Group, 2019—2022

Outreach Activities:

Outreach Presentation, "Can we see election hacking with Data Science?", Pioneer High School, May 2018

Panelist, iidata Student Convention, UC Davis, 2016