

David S. Choi

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Contact

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Education

Ph.D., Electrical Engineering, Stanford University (2004)
Dissertation: *Optimization for Value Function Approximation*
Advisor: Benjamin Van Roy
M.S., Stanford University, Electrical Engineering (1999)
B.S., Stanford University, Electrical Engineering (1998)

Appointments

2023-current Associate Professor with tenure, Heinz College, Carnegie Mellon University,
with courtesy appointment in Statistics
(to begin in July 2023)
2018-2023 Associate Professor without tenure, Heinz College, Carnegie Mellon University,
with courtesy appointment in Statistics
2012-2018 Assistant Professor, Heinz College, Carnegie Mellon University,
with courtesy appointment in Statistics
2011-2012 Visiting Scholar, Department of Statistics, UC Berkeley
2009-2011 Post-doctoral Fellow, School of Engineering, Harvard University
2004-2009 Researcher, MIT Lincoln Laboratory, 2004-2009

Research Interests

Statistics and machine learning for social networks and other network data:

1. Stochastic blockmodels, other network models with latent variables or unsupervised learning
2. Causal inference under interference
3. Application to social, biological, and other networks

Working Papers

1. Estimating the Prevalence of Indirect Effects and other Spillovers. [arxiv:2309.03969](https://arxiv.org/abs/2309.03969)

Journal and Peer-reviewed Conference Publications

1. New Estimands for Experiments with Strong Interference. (2023)
To appear in *Journal of the American Statistical Association*. [arxiv:2107.00248](https://arxiv.org/abs/2107.00248).
2. Balancing Weights for Estimated Region-Level Data: The Effect of Medicaid Expansion on the Uninsurance Rate Among States that did not Expand Medicaid. (2023)
Annals of Applied Statistics, 17(2), 1469-1490. With M. Rubenstein and A. Haviland.

3. Constructing Local Cell-Specific Networks from Single-Cell Data (2021).
Proceedings of the National Academy of Sciences, 118(51). With X. Wang and K. Roeder
4. APOE and TREM2 Regulate Amyloid Responsive Microglia in Alzheimers Disease (2020).
Acta Neuropathologica, 140, 477-493. With A. Nguyen, K. Wang, G. Hu, X. Wang, Z. Miao, J.A. Azevedo, E. Suh, V.M. Van Deerlin, K. Roeder, M. Li, and E.B. Lee
5. Clustering Ensembles of Social Networks (2019).
Network Science, 7(2), 141-159. With T. Sweet, and A. Flynt.
6. Global Spectral Clustering in Dynamic Networks (2018).
Proceedings of the National Academy of Sciences, 115(5), 927-932. With F. Lu, L. Xie, and K. Roeder.
7. Co-clustering of Non-smooth Graphons (2017).
The Annals of Statistics, 45(4), 1488-1515. arxiv:1507.06352
8. Estimation of Monotone Treatment Effects in Network Experiments (2017).
Journal of the American Statistical Association, 112(519), 1147-1155. arxiv:1408.4102
9. Consistency of Co-clustering for Bipartite Graph Data (2014).
The Annals of Statistics, 42(1), 29-63. With P.J. Wolfe. arxiv:1212.4093.
10. Asymptotic Normality of Maximum Likelihood and its Variational Approximation for Stochastic Blockmodels (2013).
The Annals of Statistics, 41(4), 1922-1943. With P.J. Bickel, X. Chang, and H. Zhang. arxiv:1207.0865
11. Stochastic Blockmodels with Growing Numbers of Classes (2012).
Biometrika, 99(2), 274-284. With P.J. Wolfe and E.M. Airoldi. arxiv:1011.4644.
12. Confidence Sets for Network Structure (short version) (2011).
Advances in Neural Processing Systems (NIPS). With E.M. Airoldi and P.J. Wolfe.
13. Learnability of Latent Position Network Models (2011).
Statistical Signal Processing Workshop (SSP). With P.J. Wolfe.
14. Confidence Sets for Network Structure (2011).
Statistical Analysis and Data Mining, 4(5), 461-469. With E.M. Airoldi and P.J. Wolfe. arxiv:1011.4644.
15. A Generalized Kalman Filter for Fixed Point Approximation and Efficient Temporal-Difference Learning (2006).
Discrete Event Dynamic Systems, vol. 16, no. 2, pp. 207-239. With B.V. Roy.
16. Nonparametric Bayesian methods for Large Scale Multi-Target Tracking (2006).
Proceedings of the 40th Asilomar Conference on Signals, Systems, and Computers. With E.B. Fox and A.S. Willsky.
17. Cost-optimal Dimensioning of a Large Scale Video on Demand System (2002).
4th International Workshop on Networked Group Communication,. With E. Biersack and G. Urvoy-Keller.

18. Generalized Kalman Filter for Fixed Point Approximation and Efficient Temporal-Difference Learning (short version) (2001).
Machine Learning: Proceedings of the Eighteenth International Conference (ICML). With B.V. Roy.

Technical Reports

1. Using Exposure Mappings as Side Information in Experiments with Interference. arxiv:1806.11219
2. A Semidefinite Program for Structured Blockmodels. arxiv:1611.05407

Invited Talks

“Estimating the Prevalance of Peer Effects and Other Spillovers”

- ICSA Applied Statistics Symposium, University of Michigan, 2023
- 6th International Conference on Econometrics and Statistics, 2023

“Causal Inference in Experiments with Interference”

- Workshop on Statistical Network Analysis and Beyond, New York University, 2022
- 5th International Conference on Econometrics and Statistics, 2022
- New Advances in Statistics and Data Science, IMS-sponsored conference, 2022
- Department Seminar, Statistics, University of Pittsburgh, 2021
- Seminar, Center for Causal Inference, UPenn, 2021
- International Indian Statistical Association (IISA) Conference, 2021
- Topic Contributed Session, JSM, 2021

“Change Point Detection for Networks with Dynamic Community Structure”

- 12th International Conference on Computational and Methodological Statistics, 2019

“Global Spectral Clustering in Dynamic Networks”

- Workshop on Statistics of Network Analysis, Alan Turing Institute, 2018
- Invited Session, JSM, 2018
- Conference on Statistical Learning and Data Science (SLDS), 2018
- International Workshop on Network Data Analysis, 2018
- 11th International Conference on Computational And Methodological Statistics, 2018
- IEEE Data Science Workshop, 2019

“Improved Estimation of Monotone Treatment Effects in Network Experiments”

- Netsci Satellite Workshop on Networked Causal Inference and Design of Experiments, 2018

“A Semidefinite Program for Structured Blockmodels”

- 10th International Conference on Computational and Methodological Statistics, 2017
- Operations Research Seminar, Tepper School of Business, Carnegie Mellon University, 2017
- Machine Learning Seminar, Electrical and Computer Engineering, Duke University, 2017
- 1st International Conference on Econometrics and Statistics, 2017
- ICSA International Conference, 2016

“Estimation of Monotone Treatment Effects in Network Experiments”

- Department Seminar, Biostatistics, University of Pittsburgh, 2017
- Department Seminar, Heinz College, Carnegie Mellon University, 2017
- Atlantic Causal Inference Conference (ACIC), 2017
- Workshop on Causal Inference, Columbia University, 2016
- Causal Inference Seminar, Johns Hopkins University, 2016
- IISA Conference, 2016
- INFORMS, 2015
- Conference on Digital Experiments (CODE), MIT 2015
- JSM, 2015
- WNAR, 2015

“Co-clustering of Nonsmooth Graphons”

- INFORMS, 2016
- JSM, 2016
- Workshop on Networks, Random Graphs, and Statistics, Columbia University, 2016
- Graph Limits and Statistics Workshop, Newton institute, 2016
- ICOSA Conference on Data Science, 2016
- ICOSA Applied Statistics Symposium, 2016
- Department seminar, Applied Mathematics and Statistics, Johns Hopkins University, 2016
- International Society for Non-Parametric Statistics (ISNPS) meeting 2015

“Consistency of Co-clustering for Exchangeable Arrays”

- Topic-contributed session, JSM, 2014
- Joint Applied Statistics Symposium of ICOSA and KISS, 2014
- ISBIS and SLDM annual meeting, Duke University, 2014
- Workshop on Statistical Inference for Network Models, Netsci 2014
- Department seminar, Statistics, University of Wisconsin Madison, 2014
- Stochastics and statistics seminar, MIT, 2013
- INFORMS annual meeting, 2013
- Department seminar, Statistics, University College London, 2013
- Graph Exploitation Seminar, Lincoln Laboratory, 2013
- Microsoft Research New England, 2013

“Stochastic Blockmodels with Growing Number of Classes”

- Workshop on Information and Decision in Social Networks (WIDS@LIDS), MIT 2011

“The Learnability of Link Prediction and Recommendation Systems”

- Stochastic Systems Group Seminar, MIT, 2010

Contributed Talks and Other Conference Activities

- Contributed Talks

- “Contrasts Attributable to Treatment: What Can be Inferred Under No Assumptions on Interference?” – Conference on Digital Experimentation (CODE), 2018

- “Global Spectral Clustering in Dynamic Networks” – Netsci Satellite Workshop on Statistical Inference for Network Models, 2018.
- “A Semidefinite Program for Structured Blockmodels” – SIAM Workshop on Network Science, 2017; Oral presentation, Netsci, 2017.
- “Estimation of Monotone Treatment Effects in Network Experiments” – Netsci Satellite Workshop on Statistical Inference for Network Models, 2017.

- Discussant Activities

- Discussant for “Mechanisms of Interference: New Strategies for Identification and Estimation”, invited session, JSM, 2018
- Discussant for “On Imprecise Probability and Imprecise Information”, Info-metrics Workshop on Information, Causal Models, and Model Diagnostics, 2018
- Discussant for “Estimating Average Causal Effects under General Interference with Applications to a Social Network Experiment”, Atlantic Causal Inference Conference (ACIC), 2018

Grants Awarded

- 1R01MH123184-01, “Computational Methods to Integrate and Interpret the Transcriptome from Single Cell and Tissue Level Data”, awarded by National Institute of Mental Health (NIMH). co-PI with Kathryn Roeder, Jing Lei, and Jiebao Wang. 4 years (5/1/20-2/28/24)

Teaching

Heinz College, Carnegie Mellon University

Exploring and Visualizing Data (95-868)

Decision Making Under Uncertainty (95-760)

Professional Activities

- Associate editor for *Journal of the American Statistical Association*, 2023-present
- Editorial board reviewer for *Journal of Machine Learning Research*, 2020-present
- Organizer/Organizing Committee Member for:
 - CMStatistics invited session, “Advances in network and matrix data analysis”, 2019
 - Workshop on Dynamic Networks, Newton Institute, 2016
 - INFORMS invited session, 2016
 - JSM invited session, “Advances and novel problems in network statistics”, 2016
 - NIPS workshop, “Networks in the social and information sciences”, 2015
 - NIPS workshop, “Networks: from graphs to rich data”, 2014
 - INFORMS invited session, 2014
 - JSM topic-contributed session, “Progress in network estimation and comparison”, 2014
 - NIPS workshop, “Frontiers of network analysis: methods, models, and applications”, 2013
 - NIPS workshop, “Social network and social media analysis: methods, models and applications”, 2012

- Reviewer for AISTATS, *Annals of Applied Statistics*, *Annals of Statistics*, COLT, *Electronic Journal of Statistics*, ICML, *IEEE Transactions on Network Science and Engineering*, *Information Systems Research*, *Journal of the American Statistical Association*, *Journal of Causal Inference*, *Journal of Computational and Graphical Statistics*, *Journal of Machine Learning Research*, *JRSS Series A*, *JRSS Series B*, *Network Science*, *Neural Computation*, *NeurIPS*, *SIAM Journal on Matrix Analysis and Applications*, *Social Networks*, *Statistics and Computing*, *WSDM*, *Proceedings of the National Academy of Sciences*