

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

2012 - current 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 and other networks

Journal Publications

1. Global spectral clustering in dynamic networks. To appear in *Proceedings of the National Academy of Sciences*. With F. Lu, L. Xie, and K. Roeder.
2. Co-clustering of non-smooth graphons. In *The Annals of Statistics*, 45(4), 1488-1515, 2017. arxiv:1507.06352
3. Estimation of monotone treatment effects in network experiments. In *Journal of the American Statistical Association*, 112(519), 1147-1155, 2017. arxiv:1408.4102
4. Consistency of co-clustering for bipartite graph data. In *The Annals of Statistics*, 42(1), 29-63, 2014. With P.J. Wolfe. arxiv:1212.4093.
5. Asymptotic normality of maximum likelihood and its variational approximation for stochastic blockmodels. In *The Annals of Statistics*, 41(4), 1922-1943, 2013. With P.J. Bickel, X. Chang, and H. Zhang. arxiv:1207.0865

6. Stochastic blockmodels with growing numbers of classes. In *Biometrika*, 99(2), 274-284, 2012. With P.J. Wolfe and E.M. Airolidi. arxiv:1011.4644.
7. Confidence sets for network structure. In *Statistical Analysis and Data Mining*, 4(5), 461-469, 2011. With E.M. Airolidi and P.J. Wolfe. arxiv:1011.4644.
8. A Generalized Kalman Filter for Fixed Point Approximation and Efficient Temporal-Difference Learning. In *Discrete Event Dynamic Systems*, vol. 16, no. 2, pp. 207-239, 2006. With B.V. Roy.

Work in Progress

1. A Semidefinite Program for Structured Blockmodels. In progress. arxiv:1611.05407

Peer-reviewed Conference Publications

1. Confidence sets for network structure (short version). In *Advances in Neural Processing Systems* (NIPS), 2011. With E.M. Airolidi and P.J. Wolfe.
2. Learnability of Latent Position Network Models. In *Statistical Signal Processing Workshop* (SSP), 2011. With P.J. Wolfe.
3. Nonparametric Bayesian methods for Large Scale Multi-Target Tracking. In *Proceedings of the 40th Asilomar Conference on Signals, Systems, and Computers*, 2006. With E.B. Fox and A.S. Willsky.
4. Cost-optimal Dimensioning of a Large Scale Video on Demand System. *4th International Workshop on Networked Group Communication*, 2002. With E. Biersack and G. Urvoy-Keller.
5. Generalized Kalman Filter for Fixed Point Approximation and Efficient Temporal-Difference Learning (short version). In *Machine Learning: Proceedings of the Eighteenth International Conference (ICML)*, 2001. With B.V. Roy.

Invited Talks

- “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; 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; ICSA Conference on Data Science, 2016; ICSA 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 ICSA 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 Presentations

- “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

Teaching

Heinz College, Carnegie Mellon University
Exploring and Visualizing Data (95-868)
Decision Making Under Uncertainty (95-760)

Professional Activities

- Reviewer for *Annals of Applied Statistics*, *Annals of Statistics*, *Statistics and Computing*, *Electronic Journal of Statistics*, *Neural Computation*, *JRSS Series A*, *SIAM Journal on Matrix Analysis and Applications*, *AISTATS*, *NIPS*, *Social Networks*, *ICML*, *Network Science*, *IEEE Transactions on Network Science and Engineering*, *Journal of Machine Learning Research*, *WSDM*, *Journal of Causal Inference*
- Organizer/Organizing Committee Member for: Workshop on Dynamic Networks, Newton Institute, 2016; INFORMS 2016 invited session; JSM 2016 invited session, “Advances and novel problems in network statistics”; NIPS 2015 workshop, “Networks in the social and information sciences”; NIPS 2014 workshop, “Networks: from graphs to rich data”; INFORMS 2014 invited session; JSM 2014 topic-contributed session, “Progress in network estimation and comparison”; NIPS 2013 workshop, “Frontiers of network analysis: methods, models, and applications”; NIPS 2012 workshop, “Social network and social media analysis: methods, models and applications”.