Grant Schoenebeck

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Current Position

- Fall 2012 - present: Assistant Professor in the Computer Science and Engineering Division of the Department of Electrical Engineering and Computer Science at the University of Michigan

Prior Positions

- Fall 2010 - Summer 2012: Simons Foundation Postdoctoral Research Fellow in Theoretical Computer Science at Princeton University
- Fall 2011 - Summer 2012: Senior Postdoctoral Research Fellow on National Science Foundation Expedition Grant to "Understand, Cope with, and Benefit From Intractability"
- Summer 2011 - Summer 2012: Visitor at the Institute for Advanced Study School of Mathematics

Education

University of California-Berkeley

- PhD in Computer Science, 2010
- Thesis "The Limitations of Linear and Semidefinite Programs"
- Advised by Luca Trevisan
- Management of Technology certificate, joint with Haas School of Business

Oxford University

- von Clemm Fellow at Corpus Christi College, 2004-2005
- Graduate Visiting Scholar in Theology

Harvard University

- SM in Computer Science, 4.0/4.0 GPA, 2004
- AB with highest honors in Mathematics, 3.84/4.00 GPA, 2004
- Thesis "The Computational Complexity of Nash Equilibrium in Concisely Represented Games", advised by Salil Vadhan

Publications

[1] Yuqing Kong and Grant Schoenebeck. Eliciting expertise without verification. In *Proceedings of the 2018 ACM Conference on Economics and Computation (EC 2018)*, June 2018. To appear.

[2] Yuqing Kong and Grant Schoenebeck. Water from two rocks: Maximizing the mutual information. In *Proceedings of the 2018 ACM Conference on Economics and Computation (EC 2018)*, June 2018. To appear.

[3] Xingjun Ma, Bo Li, Yisen Wang, Sarah M. Erfani, Sudanthi Wijewickrema, Michael E. Houle, Grant Schoenebeck, Dawn Song, and James Bailey. Characterizing adversarial subspaces using local intrinsic dimensionality. In *Proceedings of the 6th International Conference on Learning Representations (ICLR 2018)*, April 2018. To appear.

[4] Yuqing Kong and Grant Schoenebeck. Equilibrium selection in information elicitation without verification via information monotonicity. In *Proceedings of the 9th Innovations in Theoretical Computer Science (ITCS 2018)*, January 2018.

[5] Yuqing Kong and Grant Schoenebeck. Optimizing bayesian information revelation strategy in prediction markets: the Alice Bob Alice case. In *Proceedings of the 9th Innovations in Theoretical Computer Science (ITCS 2018)*, January 2018.

[6] Grant Schoenebeck and Fang-Yi Yu. Consensus of interacting particle systems on Erdös-Rényi graphs. In *Proceedings of the Twenty-Nineth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2018)*. Society for Industrial and Applied Mathematics, January 2018.

[7] Boyu Tian, Jiamin Huang, Barzan Mozafari, and Grant Schoenebeck. Contention-aware lock scheduling for transactional databases. *Proceedings of the 44th International Conference on Very Large Data Bases (VLDB 2018)*, 11(5), January 2018.

[8] Rico Angell and Grant Schoenebeck. Don't be greedy: Leveraging community structure to find high quality seed sets for influence maximization. In *The 13th Conference on Web and Internet Economics (WINE 2017)*, December 2017.

[9] Jie Gao, Grant Schoenebeck, and Fang-Yi Yu. Cascades and myopic routing in nonhomogeneous kleinbergs small world model. In *The 13th Conference on Web and Internet Economics (WINE 2017)*, December 2017.

[10] Grant Schoenebeck and Biashuai Tao. Beyond worst-case (in)approximability of nonsubmodular influence maximization. In *The 13th Conference on Web and Internet Economics (WINE 2017)*, December 2017.

[11] R. Ebrahimi, J. Gao, G. Ghasemiesfeh, and G. Schoenebeck. How complex contagions spread quickly in the preferential attachment model and other time-evolving networks. *IEEE Transactions on Network Science and Engineering*, PP(99), June 2017.

[12] Jiamin Huang, Barzan Mozafari, Grant Schoenebeck, and Thomas F Wenisch. A top-down approach to achieving performance predictability in database systems. In *Proceedings of the 2017 ACM International Conference on Management of Data (SIGMOD 2017)*, pages 745–758. ACM, May 2017.

[13] Jie Gao, Bo Li, Grant Schoenebeck, and Fang-Yi Yu. Engineering agreement: The naming game with asymmetric and heterogeneous agents. In *In Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI 2017)*, pages 537–543, February 2017.

[14] Yuqing Kong, Katrina Ligett, and Grant Schoenebeck. Putting peer prediction under the micro(economic)scope and making truth-telling focal. In *The 13th Conference on Web and Internet Economics (WINE 2016)*, December 2016.

[15] Grant Schoenebeck and Fang-Yi Yu. Complex contagions on configuration model graphs with a power-law degree distribution. In *The 13th Conference on Web and Internet Economics (WINE 2016)*, December 2016.

[16] Jie Gao, Golnaz Ghasemiesfeh, Grant Schoenebeck, and Fang-Yi Yu. General threshold model for social cascades: Analysis and simulations. In *Proceedings of the 2016 ACM Conference on Economics and Computation (EC 2016)*, pages 617–634, July 2016.

[17] Grant Schoenebeck, Aaron Snook, and Fang-Yi Yu. Sybil detection using latent network structure. In *Proceedings of the 2016 ACM Conference on Economics and Computation (EC 2016)*, pages 739–756. ACM, July 2016.

[18] Roozbeh Ebrahimi, Jie Gao, Golnaz Ghasemiesfeh, and Grant Schoenebeck. Complex contagions in Kleinberg's small world model. In *Proceedings of the 6th Innovations in Theoretical Computer Science (ITCS 2015)*, pages 63–72, January 2015.

[19] Arpita Ghosh, Katrina Ligett, Aaron Roth, and Grant Schoenebeck. Buying private data without verification. In *Proceedings of the 15th ACM Symposium on Economics and Computation (EC 2014)*, June 2014.

[20] Shiri Chechik, Daniel Larkin, Liam Roditty, Grant Schoenebeck, Robert Endre Tarjan, and Virginia Vassilevska Williams. Better approximation algorithms for the graph diameter. In *Proceedings of the 25th ACM-SIAM Symposium on Discrete Algorithms (SODA 2014)*, pages 1041–1052, 2014.

[21] Travis Martin, Grant Schoenebeck, and Michael P. Wellman. Characterizing strategic cascades on networks. In *Proceedings of the 15th ACM Symposium on Economics and Computation (EC 2014)*, 2014.

[22] Grant Schoenebeck. Potential networks, contagious communities, and social network structure. In *Proceedings of the 22nd International World Wide Web Conference (WWW 2013)*, 2013.

[23] Sanjeev Arora, Rong Ge, Sushant Sachdeva, and Grant Schoenebeck. Finding overlapping communities in social networks: Toward a rigorous approach. In *Proceedings of the 13th ACM conference on Electronic commerce (EC 2012)*, 2012.

[24] Aaron Roth and Grant Schoenebeck. Conducting truthful surveys, cheaply. In *Proceedings of the 13th ACM conference on Electronic commerce (EC 2012)*, 2012.

[25] Grant Schoenebeck and Salil Vadhan. The computational complexity of Nash equilibria in concisely represented games. *ACM Transactions on the Theory of Computation*, 4, 2012.

[26] Rafael M. Frongillo, Grant Schoenebeck, and Omer Tamuz. Social learning in a changing world. In *The Seventh Annual Workshop on Internet and Network Economics (WINE 2011)*, 2011.

[27] Thomas Hollenstein and Grant Schoenebeck. General hardness amplification of predicates and puzzles. In *8th Theory of Cryptography Conference (TCC 2011)*, 2011.

[28] Anupam Gupta, Aaron Roth, Grant Schoenebeck, and Kunal Talwar. Constrained non-monotone submodular maximization: Offline and secretary algoritms. In *The 6th Workshop on Internet and Network Economics (WINE 2010)*, December 2010.

[29] Arnab Bhattacharyya, Swastik Kopparty, Grant Schoenebeck, Madhu Sudan, and David Zuckerman. Optimal testing of reed-muller codes. In *Proceedings of the 51st IEEE Symposium on Foundations of Computer Science (FOCS 2010)*, October 2010. Previous version Appeared as Technical Report TR09-86 on ECCC October 2009.

[30] Elchanan Mossel and Grant Schoenebeck. Arriving at consensus in social networks. In *The First Symposium on Innovations in Computer Science (ICS 2010)*, January 2010.

[31] Sarita Yardi, Daniel M. Romero, Grant Schoenebeck, and danah boyd. Detecting spam in a twitter network. *First Monday*, 15(2), January 2010.

[32] Constantinos Daskalakis, Grant Schoenebeck, Gregory Valiant, and Paul Valiant. On the complexity of Nash equilibria of action-graph games. In *Proceedings of the 17th ACM-SIAM Symposium on Discrete Algorithms (SODA 2009)*, pages 710–719, 2009.

[33] Halldor Gylfason, Omar Khan, and Grant Schoenebeck. Chora: Expert-based p2p web search. *Agents and Peer-to-Peer Computing*, 4461:74–85, 2008. First appeared in *Workshop on Agents and Peer to Peer Computing (AP2PC) at Automous Agents and Multiagent systems (AAMAS 2006)*.

[34] Grant Schoenebeck. Linear level Lasserre lower bounds for certain k-CSPs. In *Proceedings of the 49th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2008)*, pages 593–692. IEEE Computer Society, 2008.

[35] Grant Schoenebeck, Luca Trevisan, and Madhur Tulsiani. A linear round lower bound for Lovasz-Schrijver SDP relaxations of Vertex Cover. In *Proceedings of the 22nd IEEE Conference on Computational Complexity (CCC 2007)*, 2007. Earlier version appeared as Technical Report TR06-098 on Electronic Colloquium on Computational Complexity.

[36] Grant Schoenebeck, Luca Trevisan, and Madhur Tulsiani. Tight integrality gaps for Lovasz-Schrijver LP relaxations of Vertex Cover and Max Cut. In *Proceedings of the 39th ACM Symposium on Theory of Computing (STOC 2007)*, 2007. Earlier version appeared as Technical Report TR06-132 on Electronic Colloquium on Computational Complexity.

[37] Grant Schoenebeck and Salil Vadhan. The computational complexity of Nash equilibria in concisely represented games. In *Proceedings of the 7th ACM conference on Electronic commerce (EC 2006)*, pages 270–279, 2006. Originally appeared as Technical Report TR05-052 on ECCC in May 2005.

[38] David C. Parkes and Grant Schoenebeck. Growrange: Anytime VCG-based mechanisms. In *Proceedings of the 19th National Conference on Artificial Intelligence (AAAI 2004)*, pages 34–41, 2004.

Tech Reports

[1] Yuqing Kong and Grant Schoenebeck. A framework for designing information elicitation mechanisms that reward truth-telling. arXiv, 2016.

[2] Paolo Codenotti, Grant Schoenebeck, and Aaron Snook. Graph isomorphism and the Lasserre hierarchy. arXiv, 2013.

Grants/Gifts

- National Science Foundation, "AF: Small: Eliciting Accurate and Useful Information from Heterogeneous Agents," $400,000. Sep. 2016 - Aug. 2019. PI Grant Schoenebeck.
- National Science Foundation, "AitF: FULL: Collaborative Research: Modeling and Understanding Complex Influence in Social Networks," $363,154. Sep. 2015 - Jul. 2018. Collaborative award with PI Jie Gao; co-PI Jason Jones from SUNY Stony Brook, who received an additional $356,845. There is an additional $16,000 REU supplement for this award (at UMich).
- National Science Foundation, "CAREER: Social Networks - Processes, Structures, and Algorithms," $505,000. Jul. 2015-Jun. 2020. PI Grant Schoenebeck.
- Facebook Faculty Award. "Complex Contagions on Social Networks." $25,000. Gift. July, 2014.
- Google Faculty Award. "Discovering Underlying Social Structure Using Online Social Network Data." $76,722. Gift. Feb. 2013.

Awards

- NSF CAREER Award
- Facebook Faculty Award
- Google Faculty Award
- ACM Computing Reviews "Best of 2012" award for article "The computational complexity of Nash equilibria in concisely represented games." ACM Transactions on Computation Theory 4, 2 (May 2012), Article No. 4.
- National Science Foundation Graduate Student Fellowship, 2005-2010.
- University of California Berkeley Computer Science Department, Departmental Fellowship, 2005-2006.
- von Clemm Fellow, 2004-2005.
- Computing Research Association Outstanding Undergraduate - Honorable Mention, 2004.
- Phi Beta Kappa, 2004.
- John Harvard Scholarship, 2001, 2002, and 2003.
- Detur Prize, 2001.

Mentorship

Current PhD Students:

- Yuqing Kong. Expected Graduation: May 2018 (has tenure-track faculty offer from Peking University).
- Fang-Yi Yu. Expected Graduation: May 2019.
- Biaoshuai Tao. Expected Graduation: May 2020.

Postdocs Advised:

- Bo Li: 2016-2017. (Faculty at UIUC starting Fall 2018).

Masters Students Advised:

- Aaron Snook. May 2015. (Epic Systems)
- Ture Peken. May 2013. (University of Arizona, PhD student)

Undergraduate major project directed:

- Andong Luiz Li Zhao"Peer Prediction," SURE, Summer 2017 (in progress).
- Rico Angell "Nonsubmodular Influence Maximization," SURE, Summer 2015; Independent Study, Fall 2015. (UMass Amhearst)
- Luum Habtermariam"Threshold Homophily in Network Cascades," UROP Summer 2014. (Google)
- Viknesh Krishnan " Modelling the Cost of Disagreement," Mathematics Honors Thesis, Winter 2014. (Google)

PhD Committees:

- Deepanshu Vasal. May 2016 (ECE). "Dynamic decision problems with cooperative and strategic agents and asymmetric information pattern. (Postdoc University of Wisconsin)"
- Travis Martin. June 2016 (CSE). "Theoretical tools for network analysis: Game theory, graph centrality, and statistical inference. (Google)"
- Yang Liu. December 2015 (ECE). "Harnessing the Power of Crowdsourcing and Disparate Data Sources: an Exploration of Diversity and Similarity." Member. (Started as Postdoc at Harvard Computer Science, Winter 2016.)
- Hsin-hao Su. July 2015 (CSE). "Algorithms for Fundamental Problems in Computer Networks" (Professor at University of North Carolina - Charlotte 2017; Postdoc MIT 2015).
- Bryce Taylor Wiedenbeck. May 2015 (CSE). "Approximate Analysis of Large Simulation-Based Games" (Visiting faculty, Swarthmore College).
- Mary Katherine Wootters. May 2014 (Mathematics). "Any errors in this dissertation are probably fixable: topics in probability and error correcting codes" (Faculty Stanford 2016; Postdoc Carnegie Mellon 2014).

Teaching

University of Michigan:

- Professor *EECS 547: Electronic Commerce*; University of Michigan, Fall 2017.
  - A completely revamped graduate course introducing algorithmic game theory topics, including a section focused on information elicitation mechanisms.
- Professor *EECS 376: Foundations of Computer Science*; University of Michigan, Winter 2017, Winter 2015.
- Professor *EECS 598-04: Randomness and Computation* ; University of Michigan, Fall 2015.
  - A new graduate level course on randomized algorithms and the mathematical tools require to analyze them.
- Professor *EECS 574: Computational Complexity Theory*; University of Michigan, Fall 2014, Fall 2012.
- Professor *EECS 203: Discrete Mathematics*; University of Michigan, Winter 2012.
- Professor *EECS 598-06: Social Networks–Reasoning about Structure and Processes*; University of Michigan, Fall 2012.
  - A new advanced graduate seminar course looking at Social Network research from a theoretical computer science perspective.

Short-Courses / Tutorials:

- "An Information Theoretic View of Information Elicitation." Grant Schoenebeck and Yuqing Kong. We presented an overview of much of the previous Peer prediction literature and how our work illuminates the field by understanding it through a new information theoretic lens. Tutorial, ACM Conference on Economics and Computation, June, 2017.
- Instructor *The Math Behind the Machine*; Three week course for New Jersey Governor's School of Engineering and Technology, Summers 2011, 2012.

Service

Program Committees:

- AMC Economics and Computation (EC): 2018 (Senior PC), 2017, 2016, 2015, 2014, 2013.
- World Wide Web Conference (Social Networks and Graph Analysis track): 2018, 2017, 2016, 2015.
- Autonomous Agents and Multiagent Sytems (AAMAS): 2018, 2017.
- NetEcon (Workshop): 2017.
- NetSciCom (Workshop): 2017.
- Workshop on Information and Network Economics (WINE): 2012.

Panels:

- National Science Foundation panelist: 2017 (2 panels), 2015 (2 panels).

Workshops:

- Co-organizer of the 6th Midwest Workshop on Control and Game Theory. 182 researchers across a variety disciplines including engineering, economics, mathematics, and computer science attended the workshop which involved 20 faculty speakers (17 external) and 54 poster presentations. 2017.

Diversity and Outreach

- Through the University of Michigan UROP and SURE programs I have advised three underrepresented minority (URM) undergraduates (Luum Habtemariam, Rico Angell, and Andong Luis Li Zhao) for summer long projects.
- 15 of 24 papers that I have written or published since arriving at UMich have URM or female coauthors.
- My joint grant is with a female PI (Jie Gao). My postdoc (Li Bo), 1 of my three PhD students (Yuqing Kong), and 1 of my two Masters' students (Ture Peken) are female.
- Presented a series of lectures on Social Networks to Ms. Ludlaws classroom at John Glenn High School in Westland, Michigan to illustrate how mathematics can apply to everyday problems. Majority of students were traditionally underrepresented minorities. 2017.
- Faculty Presenter at CS KickStart, a free week long summer program for incoming first-year students that aims to improve the enrollment and persistence of women in U-Ms computer science program. 2017.

References

Available upon request.