

Curriculum Vitae

Grant Schoenebeck

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Current Position

- Fall 2019 - present: Assistant Professor in the School of Information at the University of Michigan

Prior Positions

- Fall 2012 - Summer 2019: Assistant Professor in the Computer Science and Engineering Division of the Department of Electrical Engineering and Computer Science at the University of Michigan
- 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] Wei Chen, Binghui Peng, Grant Schoenebeck, and Biaoshuai Tao. Adaptive greedy versus non-adaptive greedy for influence maximization. In *Thirty-Fourth AAAI Conference on Artificial intelligence*, February 2020.
- [2] Yuqing Kong, Grant Schoenebeck, Fang-Yi Yu, and Biaoshuai Tao. Information elicitation mechanisms for statistical estimation. In *Thirty-Fourth AAAI Conference on Artificial intelligence*, February 2020.
- [3] Yuqing Kong, Chris Peikert, Grant Schoenebeck, and Biaoshuai Tao. Outsourcing computation: the minimal refereed mechanism. In *The 15th Conference on Web and Internet Economics (WINE 2019)*, December 2019.
- [4] Grant Schoenebeck, Biaoshuai Tao, and Fang-Yi Yu. Think globally, act locally: On the optimal seeding for nonsubmodular influence maximization. In *International Conference on Randomization and Computation (RANDOM 2019)*, pages 39:1–39:20, September 2019.
- [5] Grant Schoenebeck and Biaoshuai Tao. Beyond worst-case (in)approximability of nonsubmodular influence maximization. *ACM Transactions on Computation Theory (ToCT)*, 11(3):12:1–12:56, June 2019. Previous version appeared in WINE ’17.
- [6] Grant Schoenebeck and Biaoshuai Tao. Influence maximization on undirected graphs: Towards closing the $(1-1/e)$ gap. In *Proceedings of the 2019 ACM Conference on Economics and Computation, (EC 2019)*, pages 423–453, June 2019.
- [7] Jie Gao, Grant Schoenebeck, and Fang-Yi Yu. The volatility of weak ties: Co-evolution of selection and influence in social networks. In *Proceedings of the 18th International Conference on Autonomous Agents and MultiAgent Systems, (AAMAS 2019)*, pages 619–627, May 2019.
- [8] Yuqing Kong and Grant Schoenebeck. An information theoretic framework for designing information elicitation mechanisms that reward truth-telling. *ACM Transactions on Economics and Computation (TEAC)*, 7(1):2:1–2:33, February 2019.

- [9] Yuqing Kong and Grant Schoenebeck. Eliciting expertise without verification. In *Proceedings of the 2018 ACM Conference on Economics and Computation (EC 2018)*, June 2018.
- [10] 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.
- [11] 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.
- [12] 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.
- [13] 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.
- [14] Grant Schoenebeck and Fang-Yi Yu. Consensus of interacting particle systems on Erdős-Rényi graphs. In *Proceedings of the Twenty-Ninth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2018)*. Society for Industrial and Applied Mathematics, January 2018.
- [15] 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.
- [16] 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.
- [17] Jie Gao, Grant Schoenebeck, and Fang-Yi Yu. Cascades and myopic routing in nonhomogeneous Kleinberg's small world model. In *The 13th Conference on Web and Internet Economics (WINE 2017)*, December 2017.
- [18] Grant Schoenebeck and Biashuai Tao. Beyond worst-case (in)approximability of non-submodular influence maximization. In *The 13th Conference on Web and Internet Economics (WINE 2017)*, December 2017.
- [19] R. Ebrahimi, J. Gao, G. Ghasemiefteh, 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.

- [20] 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.
- [21] Jie Gao, Bo Li, Grant Schoenebeck, and Fang-Yi Yu. Engineering agreement: The naming game with asymmetric and heterogeneous agents. In *Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI 2017)*, pages 537–543, February 2017.
- [22] 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.
- [23] 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.
- [24] Jie Gao, Golnaz Ghasemiefteh, 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.
- [25] 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.
- [26] Roozbeh Ebrahimi, Jie Gao, Golnaz Ghasemiefteh, 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.
- [27] 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.
- [28] 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.
- [29] 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.
- [30] Grant Schoenebeck. Potential networks, contagious communities, and social network structure. In *Proceedings of the 22nd International World Wide Web Conference (WWW 2013)*, 2013.

- [31] 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.
- [32] Aaron Roth and Grant Schoenebeck. Conducting truthful surveys, cheaply. In *Proceedings of the 13th ACM conference on Electronic commerce (EC 2012)*, 2012.
- [33] Grant Schoenebeck and Salil Vadhan. The computational complexity of Nash equilibria in concisely represented games. *ACM Transactions on the Theory of Computation (ToTC)*, 4, 2012. A previous version appeared in EC '06.
- [34] 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.
- [35] Thomas Hollenstein and Grant Schoenebeck. General hardness amplification of predicates and puzzles. In *8th Theory of Cryptography Conference (TCC 2011)*, 2011.
- [36] Anupam Gupta, Aaron Roth, Grant Schoenebeck, and Kunal Talwar. Constrained non-monotone submodular maximization: Offline and secretary algorithms. In *The 6th Workshop on Internet and Network Economics (WINE 2010)*, December 2010.
- [37] 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 ECCO October 2009.
- [38] Elchanan Mossel and Grant Schoenebeck. Arriving at consensus in social networks. In *The First Symposium on Innovations in Computer Science (ICS 2010)*, January 2010.
- [39] Sarita Yardi, Daniel M. Romero, Grant Schoenebeck, and danah boyd. Detecting spam in a twitter network. *First Monday*, 15(2), January 2010.
- [40] 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.
- [41] 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 Autonomous Agents and Multiagent systems (AAMAS 2006)*.
- [42] 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.
- [43] 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.

- [44] 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.
- [45] 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.
- [46] 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.

Working Papers and Tech Reports

- [1] Grant Schoenebeck and Fang-Yi Yu. Escaping saddle points: from agent-based models to stochastic gradient descent. Submitted, 2019.
- [2] Grant Schoenebeck and Fang-Yi Yu. Robust and strongly truthful multi-task peer prediction mechanisms for heterogeneous agents. submitted, 2019.
- [3] Jie Gao, Golnaz Ghsemisefeh, Jason Jones, and Grant Schoenebeck. Penny for the poor: Complex contagions in charitable donations (working paper). submitted, June 2019.
- [4] Shih-Tang Su, Vijay G. Subramanian, and Grant Schoenebeck. Social learning with questions. In *Proceedings of the 14th Workshop on the Economics of Networks, Systems and Computation, (NetEcon 2019)*, page 9:1, June 2019. arXiv, 2018.
- [5] 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. 2020. 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

PhD Students:

- Yuqing Kong. Graduation: May 2018. (Tenure-track position at Peking University)
- Fang-Yi Yu. Graduation: May 2019. (Postdoc at University of Michigan)
- Biaoshuai Tao. Expected Graduation: May 2020.
- Noah Burrell. Expected Graduation: May 2023.
- Yichi Zhang. Expected Graduation: May 2024.

Postdocs:

- Fang-Yi Yu: 2019-present.
- Bo Li: 2016-2017. (Tenure-track position at UIUC)

Masters Students Advised:

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

Undergraduate research projects directed:

- Yunsoo Kim—“Ideological Turing Test,” Summer, Fall 2019.
- Josh Kavner—“Detecting the Overton Window,” Summer 2019.
- Andong Luiz Li Zhao—“Peer Prediction,” SURE, Summer 2017. (Next position: PhD Northwestern University).
- Rico Angell— “Nonsubmodular Influence Maximization,” SURE, Summer 2015; Independent Study, Fall 2015. (Next position: PhD UMass Amhearst)
- Luum Habtermariam—“Threshold Homophily in Network Cascades,” UROP Summer 2014. (Next position: Google)
- Viknesh Krishnan—“Modelling the Cost of Disagreement,” Mathematics Honors Thesis, Winter 2014. (Next position: 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. (Professor at UC-Santa Cruz, Postdoc at Harvard Computer Science)
- Hsin-hao Su. July 2015 (CSE). “Algorithms for Fundamental Problems in Computer Networks” (Professor at Boston College; 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 *SI 670: Applied Machine Learning*; University of Michigan, Fall 2019.
- Professor *EECS 547 / SI 652: Electronic Commerce*; University of Michigan, Fall 2019, Fall 2017.
 - A completely revamped graduate course introducing algorithmic game theory topics. Fall 2017 included 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 about theoretical computer science topics for high school students in New Jersey Governor’s School of Engineering and Technology, Summers 2011, 2012.

Service

Program Committees:

- ACM Economics and Computation (EC): 2017, 2016, 2015, 2014, 2013. Senior PC: 2019, 2018.
- World Wide Web Conference (Social Networks and Graph Analysis track): 2019, 2018, 2017, 2016, 2015.
- Autonomous Agents and Multiagent Systems (AAMAS): 2020, 2019, 2018, 2017.
- Workshop on Information and Network Economics (WINE): 2019, 2012.
- NetEcon (Workshop): 2019, 2018, 2017.
- Complex Networks: 2019
- Association for the Advancement of Artificial Intelligence (AAAI): 2018
- NetSciCom (Workshop): 2017.

Panels:

- National Science Foundation panelist: 2019, 2018 (2 panels), 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.
- 18 of 28 papers that I have published since arriving at UMich have URM or female coauthors.
- My joint grant is with a female PI (Jie Gao). My only former postdoc (Li Bo), 1 of 2 graduated 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. Ludlaw's 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-M's computer science program. 2017.