

Curriculum Vitae

ROBERT KLEINBERG

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Research Interests

Algorithm design and analysis, economic aspects of algorithms, online learning and its applications, routing and information transmission in networks, random graphs and graph processes.

Education

- *Ph.D.*, Massachusetts Institute of Technology, Cambridge, MA, USA. 2005
Department of Mathematics
Thesis: *Online Decision Problems With Large Strategy Sets*
Advisor: Tom Leighton
- *A.B.*, Cornell University, Ithaca, NY, USA. 1997
Department of Mathematics, Summa Cum Laude.

Employment History

- *Professor*, Computer Science, Cornell University *July 2019 – present*
- *Associate Professor*, Computer Science, Cornell University *July 2013 – June 2019*
- *Principal Researcher*, Microsoft Research *July 2015 – July 2016*
- *Visiting Researcher*, Microsoft Research *July 2014 – June 2015*
- *Assistant Professor*, Computer Science, Cornell University *July 2005 – June 2013*
- *NSF Postdoctoral Scholar*, Computer Science, U.C. Berkeley *Sep 2005 – Nov 2006*
Supervisor: Christos Papadimitriou
- *Senior Software Engineer and Asst. Architect*, Akamai Technologies *June 1999 – October 2004*

Awards and Honors

- Cornell College of Engineering Teaching Award, 2019.
- SIGCOMM Networking Systems Award, 2018. Awarded to a team who contributed to developing the Akamai Content Delivery Network.
- Merrill Presidential Teacher, Cornell University, 2018.

- Best reviewer award, NIPS 2017.
- Outstanding PC service award, COLT 2016.
- Best Paper Awards
 - ACM Conference on Electronic Commerce (EC), 2014. Awarded to P. Frazier, D. Kempe, J. Kleinberg, and R. Kleinberg, *Incentivizing Exploration*.
 - ACM Conference on Electronic Commerce (EC), 2010. Awarded to M. Babaioff, R. Kleinberg, and A. Slivkins, *Truthful Mechanisms with Implicit Payment Computation*.
- Tau Beta Pi Professor of the Year Award, Cornell College of Engineering, 2012.
- Faculty of the Year Award, Cornell Association of CS Undergraduates (ACSU), 2008 and 2011.
- Kenneth A. Goldman '71 Excellence in Teaching Award, Cornell College of Engineering, 2009.
- Microsoft Research New Faculty Fellowship, 2008.
- Alfred P. Sloan Research Fellowship, 2008.
- Best Student Paper Award, Conference on Learning Theory (COLT), 2008. Awarded to R. Kleinberg, A. Niculescu-Mizil, and Y. Sharma, *Regret Bounds for Sleeping Experts and Bandits*.
- NSF CAREER Award, 2007.
- NSF Mathematical Sciences Postdoctoral Research Fellowship, 2005.
- Fannie and John Hertz Foundation Fellowship, 1997.
- Putnam Fellow (awarded to six annually), William Lowell Putnam Mathematics Competition, 1996.
- Gold medalist, International Mathematics Olympiad, 1992.
- Silver medalist, International Mathematics Olympiad, 1991.

Teaching and Advising

Teaching

All courses were taught at Cornell University. An asterisk (*) marks courses introduced.

- CS 6820: *Analysis of Algorithms* Fall 2008, 2010, 2012, 2013, 2016–2018
- CS 4820: *Introduction to Analysis of Algorithms* Spring 2008–2012, 2014, 2017–2019
- CS 6822: *Advanced Algorithms — Flows, Cuts, and Sparsifiers** Fall 2011
- CS 783: *Topics in Algorithms — Information-Theoretic Aspects of Algorithms** Fall 2007
- CS 683: *Advanced Algorithms — Learning, Games, and Electronic Markets** Spring 2007

Postdocs

- *Saeed Alaei* 8/2012–08/2014
Joined Google as a Research Scientist.
- *Patrick Briest* 9/2008–8/2009
Joined University of Paderborn CS Department as junior professor; now at McKinsey & Co.
- *Shahar Dobzinski* (co-supervised with É. Tardos) 8/2009–10/2012
Joined Weizmann Institute CS Department as tenure-track faculty.
- *Thomas Kesselheim* (co-supervised with É. Tardos) 2/2013–08/2014
Joined Max-Planck-Institute für Informatik as a postdoctoral scholar.
- *Katrina Ligett* (co-supervised with É. Tardos) 8/2009–7/2011
Joined Caltech CS and Economics Department as tenure-track faculty.

Cornell Graduate Field Memberships

- Computer Science
- Applied Mathematics
- Operations Research and Information Engineering
- Information Science
- Mathematics

Graduated Ph.D. Students

- *Yang Yuan* May 2018
Thesis title: Provable and Practical Algorithms for Non-convex Problems in Machine Learning
First employment: Postdoc at MIT.
Current employment: Assistant Professor at Tsinghua University, Institute for Interdisciplinary Information Sciences (IIIS).
- *Rad Niazadeh* August 2017
Thesis title: Mechanism Design for Complex Environments: Learning and Online Mechanisms
First employment: Postdoc at Stanford University.
Current employment: Assistant Professor of Operations Management, University of Chicago Booth School of Business
- *Bruno Abrahao* August 2014
Thesis title: Extracting Hidden Structures in Social and Information Networks
First employment: Postdoc at Stanford University.
Current employment: Assistant Professor of Information Systems and Business Analytics, NYU Shanghai; Global Network Assistant Professor, NYU.

- *Ashwinkumar Badanidiyuru* August 2014
Thesis title: Sequential Decision Making with Resource Constraints
First employment: Research scientist at Google.
- *Anna Blasiak* August 2013
Thesis title: A Graph-Theoretic Approach to Network Coding
First employment: Akamai Technologies.
- *Hu Fu* August 2013
Thesis title: Simple and Approximately Optimal Mechanisms Design
First employment: Postdoc at Microsoft Research New England.
Current employment: Associate Professor in Institute for Theoretical Computer Science, Shanghai University of Finance and Economics, on leave from Computer Science Department, University of British Columbia.
- *Hyung-Chan An* (co-supervised; D. Shmoys was primary advisor) August 2012
Thesis Title: Approximation Algorithms For Traveling Salesman Problems Based On Linear Programming Relaxations
First employment: Postdoc at EPFL.
Current employment: Assistant Professor of Computer Science, Yonsei University.
- *Yogeshwer Sharma* (co-supervised; D. Williamson was primary advisor) June 2010
Thesis Title: Expressive Models In Online Learning
First employment: Postdoc at University of Waterloo.
Current employment: Research Scientist at Facebook.

Undergraduate and Masters Student Research Supervision

- *Xiang (Felix) Fu* 9/2018–12/2018
- *Qian Huang* 5/2018–5/2019
– **CRA Outstanding Undergraduate Research Award**, finalist, 2020 and 2021.
- *Dragos-Florian Ristache* 10/2016–12/2016
- *Victor Oliveira Reis* 8/2016–12/2016
- *Shiyu Wang and Seung Won Yoo* 8/2016–12/2016
- *Lisa Fawcett and Sam Park* 8/2012–12/2012
- *Christina Brandt and Gautam Kamath* 6/2011–11/2011
– Published “An analysis of one-dimensional Schelling segregation” in STOC 2012.
- *Hooyeon Haden Lee* 6/2011–8/2011
– Published “Approximating low-dimensional coverage problems” in SOCG 2012.
- *Andrew Hoelscher and David Kupiec* 2/2011–5/2011
- *Matthew Paff* 2/2010–5/2010

- *S. Matthew Weinberg* 8/2008–5/2010
 - Published “Pricing randomized allocations” in SODA 2010.
- *Di Wang* 6/2008–5/2010
 - Published “Analyzing quadratic unconstrained binary optimization problems via multicommodity flows” in *Discrete Applied Mathematics*, 2009.
 - **CRA Outstanding Undergraduate Research Award**, runner-up, 2010.
- *Rafael Frongillo* 1/2008–5/2008
- *Kareem Amin* 10/2007–12/2007

Service

Conferences

- **Steering committee**
 - *Innovations in Theoretical Computer Science (ITCS)* 2016–present
- **Program committee chair**
 - *4th Innovations in Theoretical Computer Science Conference (ITCS)* 2013
- **Program committee**
 - *ACM Symposium on Theory of Computing (STOC)* 2021, 2018, 2013, 2010, 2007
 - *IEEE Symposium on Foundations of Computer Science (FOCS)* 2014, 2007
 - Workshops and Tutorials Co-Chair 2019, 2018
 - *ACM-SIAM Symposium on Discrete Algorithms (SODA)* 2019, 2009
 - *ACM Conference on Electronic Commerce (EC)* Senior PC 2020, '19, '17, '16, '13, '12, '11
PC 2014, 2010, 2008
Workshops Chair 2014
Local Co-Chair 2018
 - *Conference on Learning Theory (COLT)* 2016, 2012, 2009
 - *International Conference on Machine Learning (ICML)* 2012
 - *Algorithmic Learning Theory (ALT)* 2018
 - *Innovations in Theoretical Computer Science Conference (ITCS)* 2018, 2012
 - *International Joint Conference on Artificial Intelligence (IJCAI)* 2011, 2009
 - *Uncertainty in Artificial Intelligence (UAI)* 2010
 - *Workshop on Internet and Network Economics (WINE)* 2010
 - *Int'l. Colloq. on Automata, Languages, and Programming (ICALP)* 2017, 2014, 2009
 - *Symposium on Parallelism in Algorithms and Architectures (SPAA)* 2006

Workshops

- **Co-founder and co-organizer**
 - *Eastern Great Lakes Theory Workshop (EaGL)* 2008–present

- *Bay Algorithmic Game Theory Symposium (BAGT)* Feb. 2006, Sept. 2006
- **Co-organizer**
 - *Optimization and Decision-Making Under Uncertainty* September 2016
 - *Cornell-MSR Workshop on Computation and the Social Sciences* June 2016
 - *Reverse AGT Workshop on Applied Econometrics* February 2016
 - *Workshop on Implementation Theory (WIT)* June 2011
 - *New York Computational Economics Day (NYCE)* Nov. 2009
- **Steering committee**
 - *New York Computational Economics Day (NYCE)* 2010–present
- **Program committee**
 - *Economics of Networks, Systems, and Computation (NetEcon)* 2013, 2012, 2010, 2009
 - *Workshop on Ad Auctions (AdAuctions)* 2010, 2009

Journals

- Board of Editors, *SIAM Journal on Computing*, 2013–2019
- Board of Editors, *Theory of Computing*
- Guest Editor, *Journal of Economic Theory*, special issue on the interface between economics and computer science. (Co-editors: Larry Blume, David Easley, Jon Kleinberg, Éva Tardos.)
- Guest Editor, *SIAM Journal on Computing*, special issue on selected papers from STOC 2010. (Co-editors: A. Frieze, C. Peikert, A. Russell, L. Schulman, A. Srinivasan.)
- Guest Editor, *Theory of Computing Systems*, special issue on selected papers from SPAA 2006. (Co-editor: Christian Scheideler.)

Programs

- Co-organizer of semester-long *Algorithms and Uncertainty* program at Simons Institute for the Theory of Computing, Berkeley, CA, Fall 2016.

Professional Societies

- ACM SIGACT Executive Committee 2018-2021
- ACM SIGecom Test of Time Award Committee 2018

Cornell CIS College

- CIS Faculty/Staff Engagement Committee 2016-17
- DSS faculty recruiting committee 2018

Cornell CS Department

- Director of Graduate Studies 2017–2021
- Curriculum Committee 2018–2021
- Graduate Distinction Committee 2018–present (chair, 2018–2021)
- Committee on Ithaca-NYC Interactions 2018–19
- Committee to revise the CS Ph.D. requirements (chair) 2018
- Faculty recruiting committee 2009, 2007
- Graduate admissions committee 2017, 2012, 2010, 2008
- Colloquium committee 2012, 2013
- Committee to revise the CS undergraduate curriculum 2008
- Organizer, 50th Anniversary Celebration for Cornell CS Department October 2014
- Organizer, Brazil-Cornell Computer Science Workshop (Co-organizers: John Hopcroft, Nivio Ziviani) May 2012
- Organizer, CS Theory Seminar 2007–2014, 2017–present (Co-organizers: Rafael Pass, 2007–12; Éva Tardos, 2011–12, 2017–present; David Steurer, 2012–14; Eshan Chattopadhyay, 2018–present; Noah Stephens-Davidowitz, 2020–present.)

Publications

Journal Papers

- [J1] H.-C. An, R. D. Kleinberg, and D. B. Shmoys. Approximation algorithms for the bottleneck asymmetric traveling salesman problem. *ACM Trans. Algorithms*. To appear.
- [J2] S. Dughmi, J. Hartline, R. Kleinberg, and R. Niazadeh. Bernoulli factories and black-box reductions in mechanism design. *J. ACM*, 68(2):10:1–10:30, 2021.
- [J3] H. Fu, N. Haghpanah, J. Hartline, and R. Kleinberg. Full surplus extraction from samples. *J. Economic Theory*, 193:105230, 2021.
- [J4] R. Kleinberg, A. Slivkins, and E. Upfal. Bandits and experts in metric spaces. *J. ACM*, 66(4):30:1–30:77, 2019.
- [J5] J. Banks, R. Kleinberg, and C. Moore. The Lovász theta function for random regular graphs and community detection in the hard regime. *SIAM J. Computing*, 48(3):1098–1119, 2019.
- [J6] P. Azar, R. Kleinberg, and S. M. Weinberg. Prior independent mechanisms via prophet inequalities with limited information. *Games and Economic Behavior*, 118:511–532, 2019. Special issue on selected algorithmic game theory papers from STOC, FOCS, and SODA 2014–2015.

- [J7] R. Kleinberg and S. M. Weinberg. Matroid prophet inequalities and applications to multi-dimensional mechanism design. *Games and Economic Behavior*, 113:97–115, 2019. Special issue on selected algorithmic game theory papers from STOC, FOCS, and SODA 2012.
- [J8] E. Tremel, K. Birman, R. Kleinberg, and M. Jelasity. Anonymous, fault-tolerant distributed queries for smart devices. *ACM Transactions on Cyberphysical Systems (TCPS)*, 3(2):16:1–16:29, 2019.
- [J9] R. Soulé, S. Basu, P. J. Marandi, F. Pedone, R. Kleinberg, E. G. Sirer, and N. Foster. Merlin: A language for provisioning network resources. *IEEE/ACM Transactions on Networking*, 26(5):2188–2201, 2018.
- [J10] R. Kleinberg, D. E. Speyer, and W. Sawin. The growth rate of tri-colored sum-free sets. *Discrete Analysis*, 2018(12), 2018.
- [J11] M. Babaioff, N. Immorlica, D. Kempe, and R. Kleinberg. Matroid secretary problems. *J. ACM*, 65(6):35:1–35:26, 2018.
- [J12] A. Badanidiyuru, R. Kleinberg, and A. Slivkins. Bandits with knapsacks. *J. ACM*, 65(3):13:1–13:55, 2018.
- [J13] J. Kallenberg, R. Kleinberg, and S. D. Kominers. Orienteering for electioneering. *Operations Research Letters*, 46(2):205–210, 2018.
- [J14] H. Fu, R. Kleinberg, R. Lavi, and R. Smorodinsky. Job security, stability and production efficiency. *Theoretical Economics*, 12(1):1–24, 2017.
- [J15] A. Ghosh and R. Kleinberg. Optimal contest design for simple agents. *ACM Trans. Economics and Computation*, 4(4):22:1–22:41, 2016. Special issue on EC’14.
- [J16] H.-C. An, R. Kleinberg, and D. B. Shmoys. Improving Christofides’ algorithm for the s-t path TSP. *J. ACM*, 62(5):34:1–34:28, Nov. 2015.
- [J17] M. Babaioff, R. Kleinberg, and A. Slivkins. Truthful mechanisms with implicit payment computation. *J. ACM*, 62(2):10:1–10:37, May 2015.
- [J18] P. Briest, S. Chawla, R. Kleinberg, and S. M. Weinberg. Pricing lotteries. *Journal of Economic Theory*, 156:144–174, 2015.
- [J19] J. D. Hartline, R. Kleinberg, and A. Malekian. Bayesian incentive compatibility via matchings. *Games and Economic Behavior*, 92:401–429, July 2015. Special issue on selected algorithmic game theory papers from STOC, FOCS, and SODA 2011.
- [J20] S. Dobzinski, H. Fu, and R. D. Kleinberg. Approximately optimal auctions for correlated bidders. *Games and Economic Behavior*, 92:349–369, July 2015. Special issue on selected algorithmic game theory papers from STOC, FOCS, and SODA 2011.
- [J21] M. Babaioff, S. Dughmi, R. Kleinberg, and A. Slivkins. Dynamic pricing with limited supply. *ACM Trans. Econ. Comput.*, 3(1):4:1–4:26, Mar. 2015.
- [J22] K. Birman, M. Jelasity, R. Kleinberg, and E. Tremel. Building a secure and privacy-preserving smart grid. *Operating Systems Review*, 49(1):131–136, 2015.

- [J23] B. Abrahao, S. Soundarajan, J. Hopcroft, and R. Kleinberg. A separability framework for analyzing community structure. *ACM Transactions on Knowledge Discovery from Data*, 8(1), 2014. Special issue on Computational Aspects of Social and Information Networks.
- [J24] A. Archer and R. Kleinberg. Truthful germs are contagious: A local to global characterization of truthfulness. *Games and Economic Behavior*, 86:340–366, 2014. Special issue on selected papers from EC 2008 and EC 2009.
- [J25] A. Blasiak, R. Kleinberg, and E. Lubetzky. Broadcasting with side information: Bounding and approximating the broadcast rate. *IEEE Transactions on Information Theory*, 59(9):5811–5823, 2013.
- [J26] L. Blume, D. A. Easley, J. M. Kleinberg, R. D. Kleinberg, and É. Tardos. Network formation in the presence of contagious risk. *ACM Transactions on Economics and Computation*, 1(2), 2013.
- [J27] Y. Yue, J. Broder, R. Kleinberg, and T. Joachims. The K-armed dueling bandits problem. *J. Comput. Syst. Sci.*, 78(5):1538–1556, 2012. Special issue: Learning Theory 2009.
- [J28] S. A. Marvel, J. Kleinberg, R. D. Kleinberg, and S. H. Strogatz. Continuous-time model of structural balance. *Proceedings of the National Academy of Sciences (PNAS)*, 108(5):1771–1776, 2011.
- [J29] R. Kleinberg, G. Piliouras, and É. Tardos. Load balancing without regret in the bulletin board model. *Distributed Computing*, 24(1):21–29, 2011. Special issue on selected papers from PODC 2009.
- [J30] R. Kleinberg, A. Niculescu-Mizil, and Y. Sharma. Regret bounds for sleeping experts and bandits. *Machine Learning*, 80(2-3):245–272, 2010. Special issue on selected papers from COLT 2008.
- [J31] D. Wang and R. Kleinberg. Analyzing quadratic unconstrained binary optimization problems via multicommodity flows. *Discrete Applied Mathematics*, 157(18):3746–3753, 2009.
- [J32] M. Babaioff, R. Kleinberg, and C. H. Papadimitriou. Congestion games with malicious players. *Games and Economic Behavior*, 67(1):22–35, 2009. Special issue on selected papers from EC 2007.
- [J33] S. Butler, M. T. Hajiaghayi, R. D. Kleinberg, and T. Leighton. Hat guessing games. *SIAM J. Discrete Math.*, 22(2):592–605, 2008. Reprinted in *SIAM Review* 51 (2), 2009, pages 399–413, SIGEST section for featured articles.
- [J34] B. Awerbuch and R. Kleinberg. Competitive collaborative learning. *J. Comput. Syst. Sci.*, 74(8):1271–1288, 2008. Special issue: Learning Theory 2005.
- [J35] B. Awerbuch and R. Kleinberg. Online linear optimization and adaptive routing. *J. Comput. Syst. Sci.*, 74(1):97–114, 2008. Special issue: Learning Theory 2004.
- [J36] J. Chen, R. D. Kleinberg, L. Lovász, R. Rajaraman, R. Sundaram, and A. Vetta. (Almost) tight bounds and existence theorems for single-commodity confluent flows. *J. ACM*, 54(4), 2007.
- [J37] R. M. D’Souza, C. Borgs, J. T. Chayes, N. Berger, and R. Kleinberg. Emergence of tempered preferential attachment from optimization. *Proceedings of the National Academy of Sciences (PNAS)*, 104(15):6112–6117, 2007.
- [J38] J. Demmel, I. Dumitriu, O. Holtz, and R. Kleinberg. Fast matrix multiplication is stable. *Numerische Mathematik*, 106(2):199–224, 2007.

- [J39] B. Awerbuch, M. T. Hajiaghayi, R. Kleinberg, and T. Leighton. Localized client-server load balancing without global information. *SIAM J. Comput.*, 37(4):1259–1279, 2007.
- [J40] M. T. Hajiaghayi, R. D. Kleinberg, H. Räcke, and T. Leighton. Oblivious routing on node-capacitated and directed graphs. *ACM Transactions on Algorithms*, 3(4), 2007.
- [J41] N. J. A. Harvey, R. D. Kleinberg, and A. R. Lehman. On the capacity of information networks. *IEEE Transactions on Information Theory*, 52(6):2345–2364, 2006. Special issue on network coding.
- [J42] N. Berger, C. Borgs, J. T. Chayes, R. M. D’Souza, and R. D. Kleinberg. Degree distribution of competition-induced preferential attachment graphs. *Combinatorics, Probability, and Computing*, 14:697–721, 2005.
- [J43] L. Kontothanassis, R. Sitaraman, J. Wein, D. Hong, R. Kleinberg, B. Mancuso, D. Shaw, and D. Stodolsky. A transport layer for live streaming in a content delivery network. *Proceedings of the IEEE*, 92(9):1408–1419, 2004. Special issue on evolution of Internet technologies.

Refereed Conference Papers

- [C1] J. M. Kleinberg, R. Kleinberg, and S. Oren. Optimal stopping with behaviorally biased agents: The role of loss aversion and changing reference points. In P. Biró, S. Chawla, and F. Echenique, editors, *EC ’21: The 22nd ACM Conference on Economics and Computation, Budapest, Hungary, July 18-23, 2021*, pages 681–682. ACM, 2021.
- [C2] R. Kleinberg, O. Korten, D. Mitropolsky, and C. H. Papadimitriou. Total functions in the polynomial hierarchy. In J. R. Lee, editor, *Proceedings of the 21st Innovations in Theoretical Computer Science Conference (ITCS)*, volume 185 of *LIPICs*, pages 44:1–44:18. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021.
- [C3] M. Arsenis, O. Drosis, and R. Kleinberg. Constrained-order prophet inequalities. In *Proceedings of the 32nd ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 2034–2046. SIAM, 2021.
- [C4] M. Arsenis, O. Drosis, and R. Kleinberg. Revenue monotonicity under misspecified bidders. In X. Chen, N. Gravin, M. Hoefer, and R. Mehta, editors, *Proceedings of the 16th Workshop on Internet and Network Economics (WINE)*, volume 12495 of *Lecture Notes in Computer Science*, pages 191–205. Springer, 2020.
- [C5] M. Arsenis and R. Kleinberg. Online flow computation on unit-vertex-capacitated networks. In *1st Symposium on Algorithmic Principles of Computer Systems, APOCS@SODA 2020, Salt Lake City, UT, USA, January 8, 2020*, pages 120–132. SIAM, 2020.
- [C6] R. Kleinberg, K. Leyton-Brown, B. Lucier, and D. R. Graham. Procrastinating with confidence: Near-optimal, anytime, adaptive algorithm configuration. In *Advances in Neural Information Processing Systems (NeurIPS) 32*, pages 8881–8891, 2019.
- [C7] H. Beyhaghi and R. Kleinberg. Pandora’s problem with nonobligatory inspection. In *Proceedings of the 20th ACM Conference on Economics and Computation (EC)*, pages 131–132, 2019.
- [C8] M. Raghu, K. Blumer, J. Kleinberg, R. Kleinberg, S. Mullainathan, and Z. Obermeyer. Direct uncertainty prediction for medical second opinions. In *Proceedings of the 36th International Conference on Machine Learning (ICML)*, 2019.

- [C9] N. Immorlica and R. Kleinberg. Recharging bandits. In *Proceedings of the 59th IEEE Symposium on Foundations of Computer Science (FOCS)*, 2018.
- [C10] R. Kleinberg, Y. Li, and Y. Yuan. An alternative view: When does SGD escape local minima? In *Proceedings of the 35th International Conference on Machine Learning (ICML)*, pages 2703–2712, 2018.
- [C11] M. Raghu, A. Irpan, J. Andreas, R. Kleinberg, Q. V. Le, and J. Kleinberg. Can deep reinforcement learning solve Erdős-Selfridge-Spencer games? In *Proceedings of the 35th International Conference on Machine Learning (ICML)*, pages 4235–4243, 2018.
- [C12] J. Kleinberg and R. Kleinberg. Delegated search approximates optimal search. In *Proceedings of the 19th ACM Conference on Economics and Computation (EC)*, 2018.
- [C13] P. Kumar, Y. Yuan, C. Yu, N. Foster, R. Kleinberg, P. Lapukhov, C. L. Lim, and R. Soulé. Semi-oblivious traffic engineering: The road not taken. In *Proceedings of the 15th USENIX Symposium on Networked Systems Design and Implementation (NSDI)*, 2018.
- [C14] P. Kumar, C. Yu, Y. Yuan, N. Foster, R. Kleinberg, and R. Soulé. YATES: Rapid prototyping for traffic engineering systems. In *Proceedings of the 4th Symposium on SDN Research (SOSR)*, 2018.
- [C15] J. Banks, R. Kleinberg, and C. Moore. The Lovász theta function for random regular graphs and community detection in the hard regime. In *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques, 20th International Workshop, APPROX 2017, and 21st International Workshop, RANDOM 2017*, 2017.
- [C16] R. Kleinberg, K. Leyton-Brown, and B. Lucier. Efficiency through procrastination: Approximately optimal algorithm configuration with runtime guarantees. In *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI)*, 2017.
- [C17] S. Dughmi, J. Hartline, R. Kleinberg, and R. Niazadeh. Bernoulli factories and black-box reductions in mechanism design. In *Proceedings of the 49th ACM Symposium on Theory of Computing (STOC)*, 2017.
- [C18] M. Abolhassani, S. Ehsani, H. Esfandiari, M. Hajiaghayi, R. Kleinberg, and B. Lucier. Beating $1 - 1/e$ for ordered prophets. In *Proceedings of the 49th ACM Symposium on Theory of Computing (STOC)*, 2017.
- [C19] A. Ghosh and R. Kleinberg. Inferential privacy guarantees for differentially private mechanisms. In *Proceedings of the 8th Innovations in Theoretical Computer Science Conference (ITCS)*, 2017.
- [C20] N. Immorlica, R. Kleinberg, B. Lucier, and M. Zdomighaddam. Exponential segregation in a two-dimensional schelling model with tolerant individuals. In *Proceedings of the 28th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 984–993, 2017.
- [C21] R. Kleinberg, B. Waggoner, and E. G. Weyl. Descending price optimally coordinates search. In *Proceedings of the 17th ACM Conference on Economics and Computation (EC)*, pages 23–24, 2016.
- [C22] P. Indyk, R. Kleinberg, S. Mahabadi, and Y. Yuan. Simultaneous nearest neighbor search. In *Proceedings of the 32nd Symposium on Computational Geometry (SOCG)*, pages 44:1–44:15, 2016.

- [C23] P. Dütting and R. Kleinberg. Polymatroid prophet inequalities. In *Proceedings of the 23rd European Symposium on Algorithms*, pages 437–449, 2015.
- [C24] T. Kesselheim, R. Kleinberg, and Éva Tardos. Smooth online mechanisms: A game-theoretic problem in renewable energy markets. In *Proceedings of the 16th ACM Conference on Economics and Computation (EC)*, pages 203–220, 2015.
- [C25] T. Kesselheim, R. Kleinberg, and R. Niazadeh. Secretary problems with non-uniform arrival order. In *Proceedings of the 47th ACM Symposium on Theory of Computing (STOC)*, 2015.
- [C26] S. Dobzinski, H. Fu, and R. Kleinberg. On the complexity of computing an equilibrium in combinatorial auctions. In *Proceedings of the 26th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 110–122, 2015.
- [C27] R. Niazadeh, Y. Yuan, and R. Kleinberg. Simple and near-optimal mechanisms for market intermediation. In *Proceedings of the 10th Workshop on Internet and Network Economics (WINE)*, pages 386–399, 2014.
- [C28] R. Soulé, S. Basu, P. J. Marandi, F. Pedone, R. Kleinberg, E. G. Sirer, and N. Foster. Merlin: A language for provisioning network resources. In *Proceedings of the 10th Conference on Emerging Networking Experiments and Technologies (CoNEXT)*, pages 213–226, 2014. Preliminary version in *Proceedings of the 12th ACM Workshop on Hot Topics in Networks (HotNets-XII)*, 2013.
- [C29] H. Fu and R. Kleinberg. Improved lower bounds for testing triangle-freeness in boolean functions via fast matrix multiplication. In *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques, 17th International Workshop, APPROX 2014, and 18th International Workshop, RANDOM 2014*, pages 669–676, 2014.
- [C30] P. Frazier, D. Kempe, J. Kleinberg, and R. Kleinberg. Incentivizing exploration. In *Proceedings of the 15th ACM Conference on Economics and Computation (EC)*, pages 5–22, 2014.
- [C31] A. Ghosh and R. Kleinberg. Optimal contest design for simple agents. In *Proceedings of the 15th ACM Conference on Economics and Computation (EC)*, pages 913–930, 2014.
- [C32] H. Fu, N. Haghpanah, J. Hartline, and R. Kleinberg. Optimal auctions for correlated bidders with sampling. In *Proceedings of the 15th ACM Conference on Economics and Computation (EC)*, pages 23–36, 2014.
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- [C44] M. Babaioff, R. Kleinberg, and R. P. Leme. Optimal mechanisms for selling information. In *Proceedings of the 13th ACM Conference on Electronic Commerce (EC)*, pages 92–109, 2012.
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- [C100] B. Awerbuch and R. D. Kleinberg. Adaptive routing with end-to-end feedback: Distributed learning and geometric approaches. In *Proceedings of the 36th ACM Symposium on Theory of Computing (STOC)*, pages 45–53, 2004.
- [C101] M. T. Hajiaghayi, R. D. Kleinberg, and D. C. Parkes. Adaptive limited-supply online auctions. In *Proceedings of the 5th ACM Conference on Electronic Commerce (EC)*, pages 71–80, 2004.
- [C102] R. D. Kleinberg. Nearly tight bounds for the continuum-armed bandit problem. In *Advances in Neural Information Processing Systems (NIPS) 17*, pages 697–704, 2004.
- [C103] N. Berger, C. Borgs, J. T. Chayes, R. M. D’Souza, and R. D. Kleinberg. Competition-induced preferential attachment. In *Proceedings of the 31st International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 208–221, 2004.
- [C104] R. D. Kleinberg and F. T. Leighton. The value of knowing a demand curve: Bounds on regret for online posted-price auctions. In *Proceedings of the 44th IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 594–605, 2003.
- [C105] R. D. Kleinberg and F. T. Leighton. Consistent load balancing via spread minimization. In *Proceedings of the 35th ACM Symposium on Theory of Computing (STOC)*, pages 565–574, 2003.

Other Publications

- [O1] S. Dughmi, J. D. Hartline, R. Kleinberg, and R. Niazadeh. Bernoulli factories and black-box reductions in mechanism design. *SIGecom Exchanges*, 16(1):58–71, 2017.
- [O2] H.-C. An and R. Kleinberg. A diameter-revealing proof of the Bondy-Lovász lemma. *CoRR*, abs/1111.6561, 2011. Working paper.
- [O3] S. Dobzinski, H. Fu, and R. Kleinberg. Truthfulness via proxies. *CoRR*, abs/1011.3232, 2010. Working paper.
- [O4] R. Kleinberg and K. Ligett. Privacy-compatibility for general utility metrics. *CoRR*, abs/1010.2705, 2010. Working paper.
- [O5] P. Hersh and R. Kleinberg. A multiplicative deformation of the Möbius function for the poset of partitions of a multiset. In *Communicating Mathematics (special volume in honor of Joe Gallian's 65th birthday)*, *Contemp. Math.*, 479, pages 113–118. Amer. Math. Soc., 2009.
- [O6] M. Babaioff, J. D. Hartline, and R. Kleinberg. Selling banner ads: Online algorithms with buyback. In *Proceedings of the 4th Workshop on Ad Auctions*, 2008.
- [O7] A. Archer and R. Kleinberg. Characterizing truthful mechanisms with convex type spaces. *SIGecom Exchanges*, 7(3), 2008.
- [O8] M. Babaioff, N. Immorlica, D. Kempe, and R. Kleinberg. Online auctions and generalized secretary problems. *SIGecom Exchanges*, 7(2), 2008.
- [O9] N. J. A. Harvey, R. Kleinberg, C. Nair, and Y. Wu. A “Chicken & Egg” network coding problem. In *Proceedings of the 2007 IEEE International Symposium on Information Theory (ISIT)*, pages 131–135, 2007.
- [O10] N. J. A. Harvey and R. Kleinberg. Tighter cut-based bounds for k-pairs communication problems. In *Proceedings of the 43rd Annual Allerton Conference on Communication, Control, and Computing*, 2005.
- [O11] R. Kleinberg and W. Menasco. Train tracks and zipping sequences for pseudo-Anosov braids. *Chaos, Solitons, and Fractals*, 9(4-5):793–809, 1998. Special issue on knot theory and its applications.

Invited Talks

- Threshold Tests as Quality Signals: Optimal Strategies, Equilibria, and Price of Anarchy
 - *Israel Algorithmic Game Theory Seminar*, June 2021.
- Total Functions in the Polynomial Hierarchy
 - *IAS Theoretical Computer Science and Discrete Mathematics Seminar*, February 2021.
- Constrained-Order Prophet Inequalities
 - *INFORMS Annual Meeting*, November 2020.

- Exploration, Exploitation, and a Little Bit of State
 - *UBC Computer Science Distinguished Lecture Series*, Vancouver, BC, October 2019.
- Approximately Optimal Sequential Search: Variations on a Theme by Weitzman
 - *Quarterly Theory Workshop*, Northwestern University, Evanston, IL, March 2019.
- Recharging Bandits
 - *Tsinghua University*, Beijing, China, December 2019.
 - *Columbia University IEOR-DRO Seminar*, New York, NY, December 2018.
 - *Cornell CS Theory Seminar*, Ithaca, NY, November 2018.
 - *CMU Machine Learning Seminar*, Pittsburgh, PA, January 2018.
 - Invited talk, *NIPS Workshop on Discrete Structures in Machine Learning (DISCML 2017)*, Long Beach, CA, December 2017.
 - *Stanford Theory Lunch*, Stanford, CA, December 2017.
 - *Algorithms and Uncertainty Reunion Workshop*, Simons Institute for the Theory of Computing, Berkeley, CA, December 2017.
 - *NYU Machine Learning Seminar*, New York, NY, October 2017.
 - **Invited plenary talk**, *Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM 2017)*, Toronto, CA, June 2017.
- Practical Near-Optimal Algorithm Configuration
 - *Microsoft Research ML Lunch Seminar*, Cambridge, MA, August 2018.
- Card Games, Inevitable Patterns, and Computation
 - *Cornell Math Awareness Month Public Lecture*, Ithaca, NY, April 2018.
- Explicit Sum-of-Squares Lower Bounds Via the Polynomial Method
 - *Algebraic Methods Workshop*, Harvard Center of Mathematical Sciences and Applications, Cambridge, MA, November 2017.
- A Rigorous Analysis of Schelling Segregation
 - *Yale Institute for Network Science, Distinguished Lecture Series*, New Haven, CT, October 2017.
- Sequential Experimentation: Theory and Principles
 - Guest lecture in *Yale Economics 421: Designing the Digital Economy*, New Haven, CT, October 2017.
- Incentivizing and Coordinating Exploration
 - Tutorial presented at *Algorithmic Learning Theory Conference (ALT)*, San Diego, CA, February 2020. (Co-tutor: Alexanders Slivkins.)
 - Tutorial presented at *18th ACM Conference on Economics and Computation (EC 2017)*, Cambridge, MA, June 2017. (Co-tutor: Alexanders Slivkins.)
- Descending Prices Coordinate Approximately Efficient Search
 - *Google Research Seminar*, New York, NY, January 2017.

- *Simons Institute Uncertainty Seminar*, Berkeley, CA, September 2016.
- *Harvard CRCS Seminar*, Cambridge, MA, April 2016.
- Progression-free sets, the polynomial method, and arithmetic removal lemmas
 - *São Paulo School of Advanced Science on Algorithms, Combinatorics, and Optimization*, São Paulo, Brazil, July 2016.
 - *MIT-Harvard-MSR Theory Reading Group*, Cambridge, MA, June 2016.
- Combinatorial stochastic search and selection
 - Invited tutorial at *São Paulo School of Advanced Science on Algorithms, Combinatorics, and Optimization*, São Paulo, Brazil, July 2016.
- Inference-Based Privacy Guarantees for Differentially Private Mechanisms
 - *Penn Theory Talk Series*, Philadelphia, PA, December 2018.
 - *Caltech SISL Seminar*, Pasadena, CA, March 2016.
 - *MIT-Harvard-MSR Theory Reading Group*, Cambridge, MA, March 2016.
 - *Northeastern CS Colloquium and Theory Seminar*, Boston, MA, November 2015.
- Secretary Problems with Non-Uniform Arrival Order
 - *Penn State CS Theory Seminar*, State College, PA, October 2015.
 - *Harvard Theory of Computation Seminar*, Cambridge, MA, March 2015.
 - *Simons Symposium on New Directions in Approximation Algorithms*, San Jose, Puerto Rico, February 2015.
 - *MIT Theory of Computation Colloquium*, Cambridge, MA, February 2015.
- Incentivizing Exploration
 - *MSR Theory Day*, Invited Keynote Lecture, Redmond, WA, March 2016.
 - *Penn State Microeconomic Theory Seminar*, State College, PA, October 2015.
 - *MSR Game Theory and Computation Seminar*, Cambridge, MA, November 2014.
 - *NIPS Workshop on Transactional Machine Learning and E-Commerce*, Montréal, Canada, December 2014.
 - *RAIN (Research on Algorithms and Incentives in Networks) Seminar*, Stanford, CA, April 2015.
 - *International Symposium on Mathematical Programming*, Pittsburgh, PA, July 2015.
- Multi-Armed Bandits in Economics and Computation
 - *Winedale Workshop*, Winedale, TX, October 2014.
- Explore or Exploit? Reflections on an Ancient Dilemma in the Age of the Web
 - *Microsoft Research Colloquium*, Cambridge, MA, August 2014.
 - *Brown University CS Colloquium*, Providence, RI, November 2014.
 - *UCLA Electrical Engineering Distinguished Seminar Series*, Los Angeles, CA, December 2014.
- Multi-Armed Bandits and the Web.
 - *Santa Fe Institute Colloquium*, Santa Fe, NM, September 2013.
 - *IOMS Colloquium*, NYU Stern School of Business, New York, NY, October 2013.
 - *Cornell Information Science Colloquium*, Ithaca, NY, October 2013.

- *USC Computer Science Colloquium*, Los Angeles, CA, December 2014.
- Optimal Stopping Meets Combinatorial Optimization.
 - Invited keynote talk, *COCOON 2013*, Hangzhou, China, June 2013.
- An Analysis of One-Dimensional Schelling Segregation.
 - *Duke CS-Econ Seminar*, Durham, NC, April 2013.
 - *ICERM Workshop on Stochastic Graph Models*, Brown University, Providence, RI, March 2014.
- Group-Theoretic Algorithms for Fast Matrix Multiplication
 - *Oliver Club (Cornell Mathematics Colloquium)*, Ithaca, NY, February 2013.
 - *URGE to Compute Seminar*, Buffalo, NY, November 2013.
- Generalized Prophet Inequalities and Their Applications.
 - *AGT Samos Summer School*, Samos, Greece, July 2012.
 - *MIT LIDS Seminar*, Cambridge, MA, May 2012.
- Learning on a Budget: Posted Price Mechanisms for Online Procurement
 - *Google Market Algorithms Workshop*, New York, NY, May 2012.
- Basics of Mechanism Design; Recent Developments in Bayesian Mechanism Design.
 - *Princeton University*, Center for Computational Intractability, Princeton, NJ, May 2012.
- Improving Christofides' Algorithm for the s-t Path TSP
 - *Theory Canal Seminar*, Rochester, NY, February 2012.
- Which Networks Are Least Susceptible to Cascading Failures?
 - *Georgia Tech ARC Colloquium*, Atlanta, GA, December 2011.
 - *Cornell CS Theory Seminar*, Ithaca, NY, November 2011.
 - *Greek Algorithmic Game Theory Week*, Paros, Greece, July 2011.
- Algorithmic Mechanism Design: Fundamental Techniques and Future Challenges
 - One-week short course taught at *ADFOCS* (Advanced Course on the Foundations of Computer Science), Max Planck Institut für Informatik, Saarbrücken, Germany, August 2011.
- Strategic Network Formation in the Presence of Contagious Risk
 - *Microsoft Research*, Mountain View, CA, June 2011.
 - *Microsoft Research*, Redmond, WA, May 2011.
- Converting Any Algorithm into an Incentive-Compatible Mechanism
 - *RIT Computer Science Colloquium*, Rochester, NY, February 2012.
 - *Microsoft New England Theory Colloquium*, Cambridge, MA, December 2010.
 - *Capital Area Theory Seminar*, University of Maryland, College Park, MD, November 2010.
 - *New York Computational Economics Day*, New York, NY, October 2010.
 - *CWI Workshop: Advances in Algorithmic Game Theory*, Amsterdam, Netherlands, Sept. 2010.
 - *Cornell CS Theory Seminar*, August 2010.

- Pricing Lotteries
 - *MIT ORC Colloquium*, Cambridge, MA, April 2010.
 - *STIET Seminar*, University of Michigan, Ann Arbor, MI, April 2010.
 - *New York Area Theory Day*, New York, NY, December 2009.
 - *Cornell Applied Math Colloquium*, Ithaca, NY, November 2009.
 - *Microsoft Research*, Mountain View, CA, July 2009.
- Game Theory, Economic Modeling, and Economic Regulation from a Computational Perspective
 - *Kavli Frontiers of Science Symposium*, Irvine, CA, November 2009.
- Some Vignettes from Learning Theory
 - *Microsoft Faculty Summit*, Redmond, WA, July 2009.
- A Learning-Theoretic Refinement of the Price of Anarchy
 - *Northwestern University*, Evanston, IL, May 2009.
 - *MIT CS Theory Colloquium*, Cambridge, MA, February 2009.
 - *Google Market Algorithms Workshop*, New York, NY, January 2009.
 - *Microsoft Research*, Cambridge, MA, August 2008.
 - *Microsoft Research*, Mountain View, CA, May 2008.
 - *Stanford iCME Colloquium*, Stanford, CA, May 2008.
- Multi-Armed Bandit Problems in Metric Spaces
 - *Information Theory and Applications Workshop*, San Diego, CA, February 2009.
 - *CMU/Google Machine Learning Seminar*, Pittsburgh, PA, November 2008.
 - *New York Machine Learning Symposium*, New York, NY, October 2008.
 - *Cornell ORIE Colloquium*, Ithaca, NY, September 2008.
 - *University at Buffalo CS Theory Seminar*, Buffalo, NY, March 2008.
- Truthful Germs Are Contagious: A Local-to-Global Characterization of Truthfulness
 - *Symposium on Economic Design*, Ann Arbor, MI, June 2008.
- Online Learning Algorithms for Searching and Ranking
 - *MIT Applied Mathematics Colloquium*, Cambridge, MA, December 2007.
 - *University of Washington CS Theory Seminar*, Seattle, WA, November 2007.
- Online Mechanisms and Optimal Stopping
 - *Penn State CS Colloquium*, University Park, PA, March 2007.
 - *University of Rochester CS Colloquium*, Rochester, NY, January 2007.
- Algorithmic Pricing Via Virtual Valuations
 - *Bay Algorithmic Game Theory Symposium*, Berkeley, CA, September 2006.
- Competitive Collaborative Learning
 - *Yahoo! Research Seminar*, Sunnyvale, CA, November 2006.
 - *USC Computer Science Colloquium*, Los Angeles, CA, September 2006.

- *Amazon.com Operations Seminar*, Seattle, WA, March 2006.
- **Approximation Algorithms for Confluent Flow**
 - *Caltech IST Seminar*, Pasadena, CA, December 2005.
 - *UCLA Algorithms Seminar*, Los Angeles, CA, December 2005.
 - *Stanford Algorithms Seminar*, Stanford, CA, November 2005.
- **On the Capacity of Information Networks**
 - *USC Computer Science Colloquium*, Los Angeles, CA, December 2005.
 - *Berkeley CS Theory Seminar*, Berkeley, CA, October 2005.
- **Adaptive Algorithms for Pricing and Overlay Routing**
 - *Cornell CS Colloquium*, Ithaca, NY, Apr. 2005.
 - *Carnegie Mellon Tepper School of Business, OR Seminar*, Pittsburgh, PA, Mar. 2005.
 - *Northeastern University CS Colloquium*, Boston, MA, March 2005.
 - *University of Washington CS Colloquium*, Seattle, WA, March 2005.
 - *Harvard CS Colloquium*, Cambridge, MA, March 2005.
 - *Caltech IST Seminar*, Pasadena, CA, February 2005.
 - *Stanford Management Science Colloquium*, Stanford, CA, February 2005.
 - *UCSD Computer Science Colloquium*, San Diego, CA, February 2005.
 - *Toyota Technological Institute Seminar Series*, Chicago, IL, February 2005.
 - *UMass Amherst CS Colloquium*, Amherst, MA, February 2005
 - *Microsoft Research*, Mountain View, CA, January 2005.

U.S. Patents

- *Network Performance Monitoring In A Content Delivery Service.*
U.S. Patent 7,717,367.
- *Global Load Balancing Across Mirrored Data Centers.*
U.S. Patent 7,111,061.
- *Method For Extending A Network Map.*
U.S. Patent 7,028,083.
- *Payment Determination in Auctions.*
Patent application submitted.