Curriculum Vitae   ROBERT KLEINBERG

Department of Computer Science
Cornell University
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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

- 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.

- *Rad Niazadeh*   August 2017
  Thesis title: Mechanism Design for Complex Environments: Learning and Online Mechanisms
  First employment: Postdoc at Stanford University.

- *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: Assistant Professor of Computer Science, 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

- *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)*   2018, 2013, 2010, 2007
  - *IEEE Symposium on Foundations of Computer Science (FOCS)*   2014, 2007

    Workshops and Tutorials Co-Chair   2018, 2019

  - *ACM-SIAM Symposium on Discrete Algorithms (SODA)*   2009
  - *ACM Conference on Electronic Commerce (EC)*   Senior PC   2019, '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*

- 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–present

- Curriculum Committee   2018–present

- Graduate Awards Selection Committee (chair)   2018–present

- Committee on Ithaca-NYC Interactions   2018–present

- 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

- Climate committee   2016–present

- Committee to revise the CS undergraduate curriculum   2008

- Organizer, 50th Anniversary Celebration for Cornell CS Department   October 2014

- Organizer, Brazil-Cornell Computer Science Workshop   May 2012
  (Co-organizers: John Hopcroft, Nivio Ziviani)

- Organizer, CS Theory Seminar   2007–2014, 2017–present
  (Co-organizers: Rafael Pass, 2007–12; Éva Tardos, 2011–12, 2017–present; David Steurer, 2012–14.)

Publications

Journal Papers

[J1] R. Kleinberg, A. Slivkins, and E. Upfal. Bandits and experts in metric spaces. *J. ACM*, 66(4):30:1–30:77, 2019.

[J2] 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.

[J3] P. Azar, R. Kleinberg, and S. M. Weinberg. Prior independent mechanisms via prophet inequalities with limited information. *Games and Economic Behavior*. AGT'14/'15 Special Issue, to appear.

[J4] 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.

[J5] 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.

[J6] 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.

[J7] R. Kleinberg, D. E. Speyer, and W. Sawin. The growth rate of tri-colored sum-free sets. *Discrete Analysis*, 2018(12), 2018.

[J8] M. Babaioff, N. Immorlica, D. Kempe, and R. Kleinberg. Matroid secretary problems. *J. ACM*, 65(6):35:1–35:26, 2018.

[J9] A. Badanidiyuru, R. Kleinberg, and A. Slivkins. Bandits with knapsacks. *J. ACM*, 65(3):13:1–13:55, 2018.

[J10] J. Kallenbach, R. Kleinberg, and S. D. Kominers. Orienteering for electioneering. *Operations Research Letters*, 46(2):205–210, 2018.

[J11] H. Fu, R. Kleinberg, R. Lavi, and R. Smorodinsky. Job security, stability and production efficiency. *Theoretical Economics*, 12(1):1–24, 2017.

[J12] 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.

[J13] 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.

[J14] M. Babaioff, R. Kleinberg, and A. Slivkins. Truthful mechanisms with implicit payment computation. *J. ACM*, 62(2):10:1–10:37, May 2015.

[J15] P. Briest, S. Chawla, R. Kleinberg, and S. M. Weinberg. Pricing lotteries. *Journal of Economic Theory*, 156:144–174, 2015.

[J16] 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.

[J17] 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.

[J18] 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.

[J19] 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.

[J20] 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.

[J21] 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.

[J22] 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.

[J23] 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.

[J24] 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.

[J25] 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.

[J26] 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.

[J27] 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.

[J28] D. Wang and R. Kleinberg. Analyzing quadratic unconstrained binary optimization problems via multicommodity flows. *Discrete Applied Mathematics*, 157(18):3746–3753, 2009.

[J29] 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.

[J30] 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.

[J31] B. Awerbuch and R. Kleinberg. Competitive collaborative learning. *J. Comput. Syst. Sci.*, 74(8):1271–1288, 2008. Special issue: Learning Theory 2005.

[J32] 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.

[J33] 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.

[J34] 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.

[J35] J. Demmel, I. Dumitriu, O. Holtz, and R. Kleinberg. Fast matrix multiplication is stable. *Numerische Mathematik*, 106(2):199–224, 2007.

[J36] 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.

[J37] 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.

[J38] 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.

[J39] 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.

[J40] 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] H. Beyhaghi and R. Kleinberg. Pandora's problem with nonobligatory inspection. In *Proceedings of the 20th ACM Conference on Economics and Computation (EC)*, 2019.

[C2] 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.

[C3] N. Immorlica and R. Kleinberg. Recharging bandits. In *Proceedings of the 59th IEEE Symposium on Foundations of Computer Science (FOCS)*, 2018.

[C4] 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.

[C5] 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.

[C6] J. Kleinberg and R. Kleinberg. Delegated search approximates optimal search. In *Proceedings of the 19th ACM Conference on Economics and Computation (EC)*, 2018.

[C7] 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.

[C8] 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.

[C9] 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.

[C10] 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.

[C11] 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.

[C12] 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.

[C13] 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.

[C14] N. Immorlica, R. Kleinberg, B. Lucier, and M. Zadomighaddam. 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.

[C15] 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.

[C16] 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.

[C17] P. Dütting and R. Kleinberg. Polymatroid prophet inequalities. In *Proceedings of the 23rd European Symposium on Algorithms*, pages 437–449, 2015.

[C18] 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.

[C19] 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.

[C20] 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.

[C21] 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.

[C22] 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.

[C23] 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.

[C24] 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.

[C25] 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.

[C26] 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.

[C27] T. Lin, B. Abrahao, R. Kleinberg, J. C. S. Lui, and W. Chen. Combinatorial partial monitoring game with linear feedback and its applications. In *Proceedings of the 31st International Conference on Machine Learning (ICML)*, pages 901–909, 2014.

[C28] P. Azar, R. Kleinberg, and S. M. Weinberg. Prophet inequalities with limited information. In *Proceedings of the 25th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1358–1377, 2014.

[C29] A. Badanidiyuru, R. Kleinberg, and A. Slivkins. Bandits with knapsacks. In *Proceedings of the 54th IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 207–216, 2013.

[C30] B. Abrahao, F. Chierichetti, R. Kleinberg, and A. Panconesi. Trace complexity of network inference. In *Proceedings of the 19th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, pages 491–499, 2013.

[C31] M. Babaioff, R. Kleinberg, and A. Slivkins. Multi-parameter mechanisms with implicit payment computation. In *Proceedings of the 14th ACM Conference on Electronic Commerce (EC)*, pages 35–52, 2013.

[C32] R. Kleinberg and Y. Yuan. On the ratio of revenue to welfare in single-parameter mechanism design. In *Proceedings of the 14th ACM Conference on Electronic Commerce (EC)*, pages 589–602, 2013.

[C33] P. H. C. Guerra, W. M. Jr., C. Cardie, and R. Kleinberg. A measure of polarization on social media networks based on community boundaries. In *Proceedings of the 7th AAAI Conference on Weblogs and Social Media (ICWSM)*, 2013.

[C34] N. R. Devanur, K. Jain, and R. D. Kleinberg. Randomized primal-dual analysis of RANKING for online bipartite matching. In *Proceedings of the 24th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 101–107, 2013.

[C35] H.-C. An, R. Kleinberg, and D. B. Shmoys. Improving Christofides' algorithm for the s-t path TSP. In *Proceedings of the 44th ACM Symposium on Theory of Computing (STOC)*, pages 875–886, 2012.

[C36] R. Kleinberg and S. M. Weinberg. Matroid prophet inequalities. In *Proceedings of the 44th ACM Symposium on Theory of Computing (STOC)*, pages 123–136, 2012.

[C37] C. Brandt, N. Immorlica, G. Kamath, and R. Kleinberg. An analysis of one-dimensional Schelling segregation. In *Proceedings of the 44th ACM Symposium on Theory of Computing (STOC)*, pages 789–804, 2012.

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[C98] 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.

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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

- Approximately Optimal Sequential Search: Variations on a Theme by Weitzman
  - *Quarterly Theory Workshop*, Northwestern University, Evanston, IL, March 2019.

- Recharging Bandits
  - *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 Exprimentation: 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 *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 Institüt Für Informatik, Saarbrucken, 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.