

# Curriculum Vitae

ROBERT KLEINBERG

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Department of Computer Science  
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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

- *Associate Professor*, Computer Science, Cornell University *July 2013 – present*
- *Principal Researcher*, Microsoft Research *July 2015 – July 2016*
- *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

- 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.
- Best Paper Awards
  - ACM Conference on Electronic Commerce (EC), 2010. Awarded to M. Babaioff, R. Kleinberg, and A. Slivkins, *Truthful Mechanisms with Implicit Payment Computation*.
  - ACM Conference on Electronic Commerce (EC), 2014. Awarded to P. Frazier, D. Kempe, J. Kleinberg, and R. Kleinberg, *Incentivizing Exploration*.

- 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
- *CS 4820: Introduction to Analysis of Algorithms* Spring 2008–2012, 2014, 2017
- *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.

## Graduated Ph.D. Students

- *Bruno Abrahao* August 2014  
Postdoc at Stanford University.
- *Hyung-Chan An* (co-supervised with D. Shmoys) August 2012  
Postdoc at EPFL.
- *Ashwinkumar Badanidiyuru* August 2014  
Research scientist at Google.
- *Anna Blasiak* August 2013  
Akamai Technologies.
- *Hu Fu* August 2013  
Postdoc at Microsoft Research New England.
- *Yogeshwer Sharma* (co-supervised with D. Williamson) June 2010  
Postdoc at University of Waterloo; now at Facebook.

## Current Ph.D. Students

- *Rad Niazadeh* expected graduation August 2017
- *Yang Yuan* expected graduation August 2018

## Undergraduate and Masters Student Research Supervision

- *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
  - *ACM-SIAM Symposium on Discrete Algorithms (SODA)* 2009
  - *ACM Conference on Electronic Commerce (EC)* Senior PC 2017, '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

## Programs

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

## 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.)

## Cornell CIS College

- CIS Faculty/Staff Engagement Committee, 2016-17

## Cornell CS Department

- Director of Graduate Studies 2017–present
- Faculty recruiting committee 2009, 2007
- Graduate admissions committee 2017, 2012, 2010, 2008
- CS colloquium committee 2012, 2013
- CS climate committee 2016–present
- Curriculum committee 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 (Co-organizers: Rafael Pass, 2007–2012; Éva Tardos, 2011–2012; David Steurer, 2012–2014.) 2007–2014

## Publications

### Journal Papers

- [J1] M. Babaioff, N. Immorlica, D. Kempe, and R. Kleinberg. Matroid secretary problems. *J. ACM*. To appear.
- [J2] R. Kleinberg, A. Slivkins, and E. Upfal. Bandits and experts in metric spaces. *J. ACM*. To appear.
- [J3] A. Badanidiyuru, R. Kleinberg, and A. Slivkins. Bandits with knapsacks. *J. ACM*. To appear.
- [J4] R. Kleinberg, D. E. Speyer, and W. Sawin. The growth rate of tri-colored sum-free sets. *Discrete Analysis*. To appear.
- [J5] J. Kallenbach, R. Kleinberg, and S. Kominers. Orienteering for electioneering. *Operations Research Letters*. To appear.
- [J6] H. Fu, R. Kleinberg, R. Lavi, and R. Smorodinsky. Job security, stability and production efficiency. *Theoretical Economics*, 12(1):1–24, 2017.
- [J7] 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.
- [J8] 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.
- [J9] M. Babaioff, R. Kleinberg, and A. Slivkins. Truthful mechanisms with implicit payment computation. *J. ACM*, 62(2):10:1–10:37, May 2015.
- [J10] P. Briest, S. Chawla, R. Kleinberg, and S. M. Weinberg. Pricing lotteries. *Journal of Economic Theory*, 156:144–174, 2015.
- [J11] R. Kleinberg and S. M. Weinberg. Matroid prophet inequalities and applications to multi-dimensional mechanism design. *Games and Economic Behavior*, 2015. Special issue on selected algorithmic game theory papers from STOC, FOCS, and SODA 2012. In press, corrected proof.
- [J12] 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.
- [J13] 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.

- [J14] 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.
- [J15] 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.
- [J16] 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.
- [J17] 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.
- [J18] 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.
- [J19] 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.
- [J20] 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.
- [J21] 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.
- [J22] 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.
- [J23] 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.
- [J24] D. Wang and R. Kleinberg. Analyzing quadratic unconstrained binary optimization problems via multicommodity flows. *Discrete Applied Mathematics*, 157(18):3746–3753, 2009.
- [J25] 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.
- [J26] 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.
- [J27] B. Awerbuch and R. Kleinberg. Competitive collaborative learning. *J. Comput. Syst. Sci.*, 74(8):1271–1288, 2008. Special issue: Learning Theory 2005.
- [J28] 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.
- [J29] 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.

- [J30] 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.
- [J31] J. Demmel, I. Dumitriu, O. Holtz, and R. Kleinberg. Fast matrix multiplication is stable. *Numerische Mathematik*, 106(2):199–224, 2007.
- [J32] 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.
- [J33] 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.
- [J34] 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.
- [J35] 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.
- [J36] 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] 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.
- [C2] 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.
- [C3] 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.
- [C4] 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.
- [C5] 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.
- [C6] 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.



- [C7] 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.
- [C8] 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.
- [C9] 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.
- [C10] 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.
- [C11] P. Dütting and R. Kleinberg. Polymatroid prophet inequalities. In *Proceedings of the 23rd European Symposium on Algorithms*, pages 437–449, 2015.
- [C12] 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.
- [C13] 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.
- [C14] 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.
- [C15] 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.
- [C16] 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.
- [C17] 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.
- [C18] 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.
- [C19] 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.
- [C20] 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.

- [C21] 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.
- [C22] 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.
- [C23] 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.
- [C24] 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.
- [C25] 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.
- [C26] 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.
- [C27] 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.
- [C28] 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.
- [C29] 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.
- [C30] 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.
- [C31] 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.
- [C32] 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.
- [C33] H. Fu, R. Kleinberg, and R. Lavi. Conditional equilibrium outcomes via ascending price processes with applications to combinatorial auctions with item bidding. In *Proceedings of the 13th ACM Conference on Electronic Commerce (EC)*, page 586, 2012.
- [C34] A. Badanidiyuru, R. Kleinberg, and Y. Singer. Learning on a budget: Posted price mechanisms for online procurement. In *Proceedings of the 13th ACM Conference on Electronic Commerce (EC)*, pages 128–145, 2012.

- [C35] M. Babaioff, S. Dughmi, R. Kleinberg, and A. Slivkins. Dynamic pricing with limited supply. In *Proceedings of the 13th ACM Conference on Electronic Commerce (EC)*, pages 74–91, 2012.
- [C36] B. Abrahao, S. Soundarajan, J. Hopcroft, and R. Kleinberg. On the separability of structural classes of communities. In *Proceedings of the 18th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, pages 624–632, 2012.
- [C37] A. Badanidiyuru, R. Kleinberg, and H. Lee. Approximating low-dimensional coverage problems. In *Proceedings of the 28th Symposium on Computational Geometry (SOCG)*, pages 161–170, 2012.
- [C38] A. Badanidiyuru, S. Dobzinski, H. Fu, R. Kleinberg, N. Nisan, and T. Roughgarden. Sketching valuation functions. In *Proceedings of the 23rd ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1025–1035, 2012.
- [C39] L. E. Blume, D. A. Easley, J. M. Kleinberg, R. Kleinberg, and É. Tardos. Which networks are least susceptible to cascading failures? In *Proceedings of the 52nd IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 393–402, 2011.
- [C40] A. Blasiak, R. Kleinberg, and E. Lubetzky. Lexicographic products and the power of non-linear network coding. In *Proceedings of the 52nd IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 609–618, 2011.
- [C41] S. Dobzinski, H. Fu, and R. D. Kleinberg. Optimal auctions with correlated bidders are easy. In *Proceedings of the 43rd ACM Symposium on Theory of Computing (STOC)*, pages 129–138, 2011.
- [C42] L. Blume, D. A. Easley, J. M. Kleinberg, R. D. Kleinberg, and É. Tardos. Network formation in the presence of contagious risk. In *Proceedings of the 12th ACM Conference on Electronic Commerce (EC)*, pages 1–10, 2011.
- [C43] J. D. Hartline, R. Kleinberg, and A. Malekian. Bayesian incentive compatibility via matchings. In *Proceedings of the 22nd ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 734–747, 2011.
- [C44] R. D. Kleinberg, K. Ligett, G. Piliouras, and É. Tardos. Beyond the Nash equilibrium barrier. In *Proceedings of the 2nd Symposium on Innovations in Computer Science (ICS)*, pages 125–140, 2011.
- [C45] A. Blasiak and R. D. Kleinberg. The serializability of network codes. In *Proceedings of the 37th International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 100–114, 2010.
- [C46] A. Altman and R. Kleinberg. Nonmanipulable randomized tournament selections. In *Proceedings of the 24th AAAI Conference on Artificial Intelligence (AAAI)*, 2010.
- [C47] M. Babaioff, R. D. Kleinberg, and A. Slivkins. Truthful mechanisms with implicit payment computation. In *Proceedings of the 11th ACM Conference on Electronic Commerce (EC)*, pages 43–52, 2010.
- [C48] H.-C. An, R. D. Kleinberg, and D. B. Shmoys. Approximation algorithms for the bottleneck asymmetric traveling salesman problem. In *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques, 13th International Workshop, APPROX 2010, and 14th International Workshop, RANDOM 2010*, volume 6302 of *Lecture Notes in Computer Science*, pages 1–11. Springer, 2010.

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### Other Publications

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- [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

- Recharging Bandits
  - 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.
- 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 *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
  - *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.