

CURRICULUM VITAE

DAVID GAMARNIK

Nanyang Technological University Professor of Operations
Research

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Research interests

Probability, stochastic processes, queueing theory, random graphs and probabilistic analysis of combinatorial structures, algorithms and combinatorial optimization, statistics and learning theory.

Working Experience

2012-Present	Professor of Operations Research, Sloan School of Management, MIT.
2007-Present	Associate Professor of Operations Research, Sloan School of Management, MIT.
2005-2007	Assistant Professor of Operations Research, Sloan School of Management, MIT.
1997-2005	IBM, T.J.Watson Research Center. Department of Mathematical Sciences. Research Staff Member.

Teaching Experience

- Network Science and Models [Spring 2013].

- Data, Models and Decisions [Fall 2007, 2008, 2010, Summer 2012,2013,2014].
- Fundamentals of Probability [Fall 2006, 2009, 2014].
- Systems Optimization and Analysis for Manufacturing [Summer 2006].
- Queues: Theory and Applications [Spring 2006].
- Applied Probability Seminar [Spring 2006,2007,2009,2011,2014].
- Advanced Stochastic Processes [Fall 2005, 2009, 2013].

Education

1993-1998	Ph.D. in Operations Research, MIT.
1991-1993	B.A. in Mathematics, Courant Institute of Math. Sci., New York University.
1986-1991	Department of mathematics, State University of Georgia, USSR.

Honors and Awards

- INFORMS Franz Edelman Prize Finalist, 2014
- Stanislaw Ulam Fellow, Los Alamos National Laboratory, 2012
- INFORMS Applied Probability Society Best Publication Award, 2011
- IBM Faculty Award, 2006
- Erlang Prize, Applied Probability Society of INFORMS, 2004
- National Science Foundation Fellowship Honorable Mention List, 1993
- Hollis Cooley Memorial Prize presented for exceptional promise in mathematics Courant Institute of Mathematical Sciences, 1992
- Top 100 in Putnam Mathematical competition, 1991
- Winner of the Quant journal competition in mathematics for high school students, 1985,1986. USSR
- Winner of several high school and college olympiad in mathematics 1985-1988. USSR

Grants

- NSF Grant CMMI-1335155, 2013-2016
- NSF Grant CMMI-1031332, 2010-2013
- NSF Grant CMMI-0726733, 2007-2009
- NSF Grant DMS-0732175, 2007-2009
- Brigham and Women's Hospital-MIT Project on Scheduling First responders 2008-2010
- Buchsbaum Grant, 2006

Plenary Presentations and Tutorials

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| 06/2014 | Summer school on Graph Limits, Groups and Stochastic Processes. Renyi Institute, Budapest, Hungary. |
| 09/2013 | Ecole de Physique des Houches summer school on Statistical physics, Optimization, Inference and Message-Passing algorithms |
| 10/2013 | Correlation Decay Method for Decision, Optimization and Inference in Large Scale Networks, TutORials in Operations Research, INFORMS, 2013. |
| 11/2011 | Markov Lecture Discussant at INFORMS 2011, Applied Probability Society. |
| 10/2011 | Tutorial lecture at Young European Queueing Theorists conference, EURANDOM, Eindhoven, Netherlands. |
| 05/2011 | Plenary lecture. 15-th International Conference on Random Structures and Algorithms, Atlanta, GA. |
| 06/2008 | Plenary lecture. Sixth International Workshop on Matrix- Analytic Methods (MAM6), Beijing, China, |
| 01/2008 | Plenary lecture. 33-d Conference on the Mathematics of Operations Research, Lunteren, Netherlands.
<i>Lecture I: Algorithmic issues and undecidability in the theory of queueing networks,</i>
<i>Lecture II: Large scale queueing systems in the Quality/Efficiency driven regime and applications,</i> |

Professional Activities

- Affiliate member of the Operations Research Center, MIT.
- Affiliate member of MIT Laboratory for Information and Decision Systems (LIDS).
- Area Editor of Operations Research (2011 – Present).
- Associate Editor of Annals of Applied Probability (2007 – 2012).
- Associate Editor of Mathematics of Operations Research (2010 – Present).
- Associate Editor of Queueing Systems: Theory and Applications (2010 – Present).
- Associate Editor of Stochastic Systems (2010 – Present).
- Guest editor for SIAM Journal on Discrete Mathematics Special Issue on Constraint Satisfaction Problems and Message Passing Algorithms.
- Council member of Applied Probability Society of INFORMS (term 2006–2008).
- Applied Probability Cluster Chair for INFORMS 2006 conference, Pittsburgh, PA.
- Panel discussion participant at the MSRI workshop Phase Transition and Reconstruction, 2005.
- Program committee:
 - 27th Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC 2008).
 - ACM International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS) 2010.
 - INFORMS Applied Probability Conference, 2005, 2009, 2011.
 - 7-th International Conference on Matrix-Analytic Methods (MAM7), New York, NY,
 - Mathematical Performance Modeling and Analysis 2001, 2003-2013.
- Member of IMS (Institute of Mathematical Statistics), INFORMS (Institute for Operations Research and Management Science) AMS (American Mathematical Society), SIAM (Society for Industrial and Applied Mathematics)

Visiting positions

04/2014	Microsoft Research Lab, New England.
01-05/2012	Microsoft Research Lab, New England.
03/2012	Ulam Fellow visitor of Los Alamos National Laboratory.
09-12/2011	Brown University, Division of Applied Mathematics.
05/2010	Microsoft Research Lab, Redmond.
03-04/2010	Newton Institute of Mathematical Sciences, Cambridge, UK.
07/2009	Los Alamos National Laboratory.
07/2009	University of Berkeley.
01/2009	Tata Institute for Fundamental Research. Mumbai.
08/2008	Google Research. New York.
07/2008	Los Alamos National Laboratory.
03/2008	Indian Statistical Institute in Delhi.
06/2007	Microsoft Research Lab.
05/2007	Swiss Federal Institute of Technology (ETH).
05/2007	Georgia Institute of Technology.
10/2005	Microsoft Research Lab, Redmond.
04/2005	EURANDOM (European research institute for the study of stochastic phenomena), Eindhoven, Netherlands.
04/2005	Department of Mathematics and Mathematical Statistics, Chalmers University, Sweden.
03/2005	Department of Mathematical Sciences, Carnegie Mellon University.

Publications

Probability, Random Graphs and Algorithms

1. David Gamarnik and Quan Li. On the max-cut over sparse random graph. *arXiv preprint arXiv:1411.1698*, 2014.
2. David Gamarnik and Madhu Sudan. Performance of the survey propagation-guided decimation algorithm for the random nae-k-sat problem. *arXiv preprint arXiv:1402.0052*, 2014.
3. D. Gamarnik. Correlation decay method for decision, optimization and inference in large scale networks. *TutORials in Operations Research*, 2013.
4. David Gamarnik. Right-convergence of sparse random graphs. *Probability Theory and Related Fields*, 160:253–278, 2014.
5. David Gamarnik and Madhu Sudan. Limits of local algorithms over sparse random graphs. In *Proceedings of the 5th conference on Innovations in theoretical computer science. Minor revision for Annals of Probability*, pages 369–376. ACM, 2014.
6. David Gamarnik and Sidhant Misra. Giant component in random multipartite graphs with given degree sequences. *arXiv preprint arXiv:1306.0597*, 2013.
7. Christian Borgs, Jennifer Chayes, and David Gamarnik. Convergent sequences of sparse graphs: A large deviations approach. *arXiv preprint arXiv:1302.4615*, 2013.
8. David Gamarnik, Dmitriy Katz, and Sidhant Misra. Strong spatial mixing of list coloring of graphs. *Random Structures & Algorithms*, 2013.
9. I. Ashlagi, D. Gamarnik, and M. Rees, and A. E. Roth. The need for (long) chains in kidney exchange. *Submitted*.
10. M. Bayati, D. Gamarnik, and P. Tetali. Combinatorial approach to the interpolation method and scaling limits in sparse random graphs. *Annals of Probability. (Conference version in Proc. 42nd Ann. Symposium on the Theory of Computing (STOC) 2010)*, 41:4080–4115, 2013.
11. David Gamarnik, David A Goldberg, and Theophane Weber. Correlation decay in random decision networks. *Mathematics of Operations Research*, 39(2):229–261, 2013.

12. D. Gamarnik and D. Katz. Correlation decay and deterministic FPTAS for counting list-colorings of a graph. *Journal of Discrete Algorithms*, pages 29–47, 2012.
13. A. Flaxman, D. Gamarnik, and G. Sorkin. First-passage percolation on a ladder graph, and the path cost in a VCG auction. *Random Structures and Algorithms*, 38:350–364, 2011.
14. D. Gamarnik, D. Goldberg, and T. Weber. PTAS for maximum weight independent set problem with random weights in bounded degree graphs. In *Proceedings of 21-st ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2010.
15. V. Chandrasekaran, M. Chertkov, D. Gamarnik, D. Shah, and J. Shin. Counting independent sets using the Bethe approximation. *SIAM Journal On Discrete Mathematics*, 25:1012–1034.
16. D. Gamarnik and D. Katz. Sequential cavity method for computing free energy and surface pressure. *Journal of Statistical Physics*, 137:205–232, 2009. Conference version in *Proceedings of 20th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2009.
17. D. Gamarnik and D. Goldberg. Randomized greedy algorithms for independent sets and matchings in regular graphs: Exact results and finite girth corrections. *Combinatorics, Probability and Computing*, 19:61–85, 2010.
18. M. Bayati, D. Gamarnik, D. Katz, C. Nair, and P. Tetali. Simple deterministic approximation algorithms for counting matchings. In *Proc. 39th Ann. Symposium on the Theory of Computing (STOC)*, 2007.
19. D. Gamarnik and D. Katz. A deterministic approximation algorithm for computing a permanent of a 0,1 matrix. *Journal of Computer and System Sciences*, 76: 879–883, 2010.
20. D. Gamarnik, T. Nowicki, and G. Swirszcz. Invariant probability measures and dynamics of exponential linear type maps. *Ergodic Theory and Dynamical Systems*, 28(1):1479–1495, 2008.
21. A. Bandyopadhyay and D. Gamarnik. Counting without sampling. Asymptotics of the log-partition function for certain statistical physics models. *Random Structures and Algorithms.*, 33(4), 2008.
22. D. Gamarnik. Expectation of the random minimal length spanning tree of a complete graph. In *Proceedings of 16th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2005.

23. D. Gamarnik and M. Sviridenko. Hamiltonian completion of sparse random graphs. *Discrete Applied Mathematics*, 152:139–158, 2005.
24. D. Gamarnik, T. Nowicki, and G. Swirszcz. Maximum weight independent sets and matchings in sparse random graphs. Exact results using the local weak convergence method. *Random Structures and Algorithms*, 28(1):76–106, 2006.
25. A. Flaxman, D. Gamarnik, and G. Sorkin. Embracing the giant component. *Random Structures and Algorithms*, 27(3):277–289, 2005.
26. D. Gamarnik. Linear phase transition in random linear constraint satisfaction problems. *Probability Theory and Related Fields.*, 129(3):410–440, 2004.
27. D. Coppersmith, D. Gamarnik, M. Hajiaghayi, and G. Sorkin. Random MAXSAT, random MAXCUT, and their phase transitions. *Random Structures and Algorithms*, 24(4):502–545, 2004.
28. B. Bollobás, D. Gamarnik, O. Riordan, and B. Sudakov. On the value of a random minimum length Steiner tree. *Combinatorica*, 24(2):187–207, 2004.
29. D. Coppersmith, D. Gamarnik, and M. Sviridenko. The diameter of a long-range percolation graph. *Random Structures and Algorithms*, 21:1–13, 2002.

Stochastic Processes, Queueing Theory and Applications

1. P. Eschenfeldt and D. Gamarnik. Join the shortest queue with many servers. The heavy traffic asymptotics. *Submitted*.
2. Ross Anderson, Itai Ashlagi, David Gamarnik, and Yash Kanoria. A dynamic model of barter exchange. In *Proceedings of the Twenty-Sixth Annual ACM-SIAM Symposium on Discrete Algorithms*, 2015.
3. R. Anderson and D. Gamarnik. Scheduling interns at hospitals: Queueing models and fluid approximations. *Preprint*.
4. David Gamarnik and Dmitriy Katz. The stability of the deterministic Skorokhod problem is undecidable. *Queueing Systems*, pages 1–29, 2014.
5. D. Gamarnik and D. Goldberg. Convergence to stationarity of the multi-server queueing system in the Halfin-Whitt regime. *Annals of Applied Probability*, 23:1879–1912, 2013.
6. D. Gamarnik and D. Goldberg. Steady-state GI/GI/n queue in the Halfin-Whitt regime. *Annals of Applied Probability*, 23:2382–2419, 2013.

7. D. Gamarnik and A.L. Stolyar. Multiclass multiserver queueing system in the Halfin–Whitt heavy traffic regime: asymptotics of the stationary distribution. *Queueing Systems*, pages 1–27, 2012.
8. D. Bertsimas, D. Gamarnik, and A. Rikun. Performance analysis of queueing networks via robust optimization. *Operations Research*, 59:455–466, 2011.
9. D. Gamarnik and S. P. Meyn. On exponential ergodicity of multiclass queueing networks. *Queueing Systems*, 65:109–133, 2010.
10. D. Gamarnik and D. Katz-Rogozhnikov. On deciding stability of queueing networks under priority scheduling policy. *Annals of Applied Probability*, 19:2008–2037, 2009.
11. T.I.Schoenmeyr, D.Gamarnik, R.Levi, P.F.Dunn, B.J.Daily, D.L.Berger, W.C. Levine, and W.S.Sandberg. A model for understanding the impacts of demand and capacity on waitlists in a congested recovery room. *Anesthesiology*, 110:1293-1304, 2009.
12. D. Gamarnik and P. Momčilović. Steady-state analysis of a multi-server queue in the Halfin-Whitt regime. *Advances in Applied Probability*, 40:548–577, 2008.
13. F. Cheng, D. Gamarnik, N. Jengte, W. Min, and B. Ramachandran. Modeling operational risks in business processes. *Journal of Operational Risk*, 2(2), 2007.
14. D. Gamarnik and A. Zeevi. Validity of heavy traffic steady-state approximations in open queueing networks. *Ann. Appl. Probab.*, 16(1):56–90, 2006.
15. N. Bansal and D. Gamarnik. Handling load with less stress. *Queueing Systems*, 54(1):45–54, 2006.
16. D. Gamarnik and P. Momčilović. An asymptotic optimality of the transition rule for linear lists. *Journal of Applied Probability*, 42(1):235–246, 2005.
17. D. Gamarnik and M. Squillante. Analysis of stochastic online bin packing processes. *Stochastic Models*, 21:401–425, 2005.
18. D. Gamarnik and J. Hasenbein. Instability in stochastic and fluid queueing networks. *Ann. Appl. Probab.*, 15(3):1652–1690, 2005.
19. D. Gamarnik. Computing stationary probability distribution and large deviations rates for constrained homogeneous random walks. The undecidability results. *Mathematics of Operations Research*, 27(2):272–293, 2007.

20. D. Gamarnik. Stochastic bandwidth packing process: Stability conditions via Lyapunov function technique. *Queueing Systems*, 48:339–363, 2004.
21. D. Gamarnik. Stability of adaptive and non-adaptive packet routing policies in adversarial queueing networks. *SIAM Journal on Computing*. (Conference version in *STOC99*), pages 371–385, 2003.
22. D. Bertsimas, D. Gamarnik, and J. Tsitsiklis. Performance of multi-class Markovian queueing networks via piecewise linear Lyapunov functions. *Ann. of Appl. Prob.*, 11(4):1384–1428, 2001.
23. D. Gamarnik. On deciding stability of constrained homogeneous random walks and queueing systems. *Mathematics of Operations Research*, 27(2):272–293, 2002.
24. D. Gamarnik. Using fluid models to prove stability of adversarial queueing networks. *IEEE Transactions on Automatic Control*. (Conference version in *FOCS98*), 4:741–747, 2000.
25. D. Gamarnik. *Stability and Performance of Multiclass Queueing Networks*. MIT Thesis, 1998.
26. D. Bertsimas, D. Gamarnik, and J. Tsitsiklis. Stability conditions for multiclass fluid queueing networks. *IEEE Trans. Automat. Control*, 41:1618–1631, 1996.

Algorithms and Combinatorial Optimization

1. Ross Anderson, Itai Ashlagi, David Gamarnik, and Alvin E Roth. Finding long chains in kidney exchange using the traveling salesman problem. *Proceedings of the National Academy of Sciences*, 112(3):663–668, 2015.
2. D. Gamarnik, D. Shah, and Y. Wei. Belief propagation for min-cost network flow: Convergence and correctness. *Operations Research*, 60(2):410–428, 2012.
3. D. Gamarnik, M. Lewenstein, and M. Sviridenko. An improved upper bound for TSP in cubic 3-connected graphs. *Operations Research Letters*, 33:467–474, 2005.
4. D. Bertsimas, D. Gamarnik, and J. Sethuraman. From fluid relaxations to practical algorithms for job shop scheduling: the holding cost objective. *Operations Research*, 51(5):798–813, 2003.
5. D. Gamarnik and M. Sviridenko. Static and dynamic hot-potato packet routing in communication networks. IBM Technical Report #RC 21918, 2000.

6. D. Bertsimas and D. Gamarnik. Asymptotically optimal algorithm for job shop scheduling and packet routing. *Journal of Algorithms*, 33(2):296–318, 1999.

Statistics and Learning Theory

1. Guy Bresler, David Gamarnik, and Devavrat Shah. Structure learning of antiferromagnetic ising models. In *Advances in Neural Information Processing Systems*, pages 2852–2860, 2014.
2. Guy Bresler, David Gamarnik, and Devavrat Shah. Hardness of parameter estimation in graphical models. In *Advances in Neural Information Processing Systems*, pages 1062–1070, 2014.
3. Guy Bresler, David Gamarnik, and Devavrat Shah. Learning graphical models from the glauber dynamics. *arXiv preprint arXiv:1410.7659*, 2014.
4. D. Gamarnik. Extension of the PAC framework to finite and countable Markov chains. *IEEE Transactions on Information Theory*, 49(1):338–345, 2003.
5. D. Gamarnik. Efficient learning of monotone concepts via quadratic optimization. *Proc. 11th ACM Conf. on Computational Learning Theory*, 1998.
6. D. Bertsimas, D. Gamarnik, and J. Tsitsiklis. Estimation of time-varying parameters in statistical models: An optimization approach. Invited paper in *Machine Learning*, 35:225–245, 1999.

Topology and Group Theory

1. D. Gamarnik. Minimality of the group $AUT(C)$. *SERDICA - Bulgaricae mathematicae publicationes*, 17:197–201, 1991.

Patents

- *Method and Apparatus for Risk Assessment for a Disaster Recovery Process*. Co-inventors: J. Hosking, W.F. Kane, T. Li, I. Yashchin.
- *Methods and Apparatus for the Design and Planning of Workforce Evolution*. Co-inventors: B. Dietrich, M. Hellander, M. Squillante.
- *Method and Apparatus for Operational Risk Assessment and Mitigation*. Co-inventors: F. Chen, W. Min, B. Ramachandran, S. Takriti.
- *Method and Apparatus for Business Process Analysis & Optimization*. Co-inventors: B. Ramachandran, M. Squillante, Y. Lu, N. Jengte.

REFERENCES

Invited Presentations at universities

- 11/2014 *Limits of local algorithms for randomly generated constraint satisfaction problems* Division of Applied Mathematics, Brown University.
- 05/2014 *A Dynamic Model of Kidney Exchange Programs* Industrial Engineering and Management Sciences Seminar, North-Western University, Evanston, IL.
- 04/2014 *Limits of local algorithms for randomly generated constraint satisfaction problems* Microsoft Research Lab. Redmond, WA.
- 01/2014 *A Dynamic Model of Kidney Exchange Programs* Industrial and Systems Engineering Seminar, Penn State University, PA.
- 01/2014 *A Dynamic Model of Kidney Exchange Programs* Industrial and System Engineering Seminar, University of Illinois at Urbana-Champaign, IL.
- 12/2013 *Local Algorithms for Large Scale Networks. Power, Limitations and Applications* Department of Decision Sciences, Fuqua School of Business, Duke University, NC.
- 11/2013 *Local Algorithms for Large Scale Networks. Power, Limitations and Applications* Operations Research Center seminar, MIT.
- 09/2013 *Probabilistic Models and Optimization of Resources: Unexpected answers for expected questions* Leaders for Global Operations faculty presentations, MIT.
- 06/2013 *Hardness results for local algorithms in sparse random graphs.* Renyi Institute of Mathematics, Budapest, Hungary.
- 05/2013 *Hardness results for local algorithms in sparse random graphs.* Department of Mathematics, University of Toronto, Canada.
- 04/2013 *Statistical physics methods for optimization and inference on networks.* Coordinated Science Laboratory Colloquium, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

- 03/2013 *Mathematical Modeling. Theory, practice and personal experience* A Cisco Telepresence seminar series for young Russian entrepreneurs called "Window to the Valley".
- 08/2012 *Graph limits, large deviations and algorithms for sparse graphs.* Department of Mathematics, MIT, Cambridge, MA.
- 08/2012 *Combinatorial optimization on random graphs. Insights from statistical mechanics.* Yandex School of Data Analysis, Moscow, Russia.
- 08/2012 *Algorithms for counting on graphs. Insights from statistical mechanics.* Yandex School of Data Analysis, Moscow, Russia.
- 08/2012 *Combinatorial Optimization on Sparse Random Graphs. Survey.*
Microsoft Research New England, Cambridge, MA.
Institute for Computational and Experimental Research in Mathematics (ICERM), Providence, RI.
- 04/2012 *Combinatorics of kidney exchanges. Perspectives from the random graph theory* Laboratory for Information and Decision Sciences, MIT, Cambridge, MA.
- 04/2012 *Combinatorics of kidney exchanges. Perspectives from the random graph theory.* Decisions, Risks and Operations group at Columbia University School of Management, New York, NY.
- 03/2012 *On the uniqueness of Lebesgue measure on regular trees and the problem of computing the volume of a polytope.* Los Alamos National Laboratory, Los-Alamos, NM.
- 02/2012 *Correlation decay property and the problem of computing the partition function* Department of Mathematical Sciences, University of British Columbia, Vancouver, CA.
- 02/2012 *Correlation decay property and inference in Markov Random Fields* Boston University, Center for Information and Systems Engineering, Boston, MA.
- 11/2011 *Interpolation method and scaling limits in sparse random graphs* Department of Mathematical Sciences, Carnegie-Mellon University, PA.
- 11/2011 *Correlation decay property and inference in Markov Random Fields.* Division of Applied Mathematics, Brown University.

- 10/2011 *Intractability results in the theory of queueing systems.* Department of Mechanical Engineering, University of Texas, Austin, TX.
- 06/2011 *Parallel server queueing systems in the heavy traffic regime.* Department of Electrical and Computer Engineering, University of Waterloo, Canada.
- 2010-2011 *A combinatorial approach to the interpolation method and scaling limits in sparse random graphs.* Microsoft Research Lab, New England; UCLA, Department of Mathematical Sciences; National Security Agency, Department of Mathematical Sciences; University of Maryland, College Park, Department of Statistics; IBM T.J. Watson Research Center; French National Institute for Research in Computer Science and Control (INRIA); MIT Probability Seminar; Georgia Institute of Technology;
- 04/2010 *Skorokhod problem is undecidable.* Newton Institute of Mathematical Sciences, Cambridge University, UK.
- 02/2010 *Statistical physics methods in combinatorial optimization, inference and graphical games.* Department of Industrial Engineering and Operations Research, Cornell University.
- 04/2009 *Parallel server queueing systems in the heavy traffic regime.* Industrial Engineering and Operations Research, Columbia University.
- 03/2009 *Parallel server queueing systems in the heavy traffic regime.* Industrial Engineering and Operations Research, Georgia Institute of Technology.
- 02/2009 *Correlation decay property and inference in Markov Random Fields.* Stochastic Systems Group seminar, EECS, MIT.
- 11/2008 *Queueing systems in the Halfin-Whitt regime.* Management Science and Engineering, Stanford University.
- 08/2008 *Statistical physics and algorithms for graph counting problems.* Google Research.

- 03/2008 *Correlation decay and applications to the problems of combinatorial enumeration and optimization.* Indian Statistical Institute at Delhi. India.
- 05/2007 *Correlation decay and applications to counting problems,* Department of Mathematics, Georgia Institute of Technology.
- 05/2007 *Correlation decay and applications to counting problems,* Combinatorics Seminar, Princeton University.
- 04/2006 *Asymptotic Results in Single and Multiclass Type Queueing Networks,* Electrical and Computer Engineering, University of Waterloo.
- 04/2006 *Single class type queueing networks in heavy-traffic,* Engineering Systems Division, University of Illinois at Urbana-Champaign.
- 02/2006 *Asymptotic Results in Single and Multiclass Type Queueing Networks,* Kellogg School of Management, NWU.
- 10/2005 *Correlation decay in statistical physics and applications to counting problems,* Microsoft Research Lab.
- 04/2005 *Applications of the local weak convergence method to random graph problems,* Statistics Seminar, Chalmers University, Sweden; Discrete Mathematics Seminar, Carnegie-Mellon University; Discrete Mathematics Seminar, Princeton University; Combinatorics Seminar, MIT.
- 04/2005 *Validity of Heavy Traffic Steady-State Approximations in Open Queueing Networks,* EURANDOM, Eindhoven University of Technology, Netherland.
- 01/2005 *Asymptotic Results in Single and Multiclass Type Queueing Networks ,* Probability and Statistics Seminar, Division of Applied Mathematics, Brown University.
- 10/2004 *Validity of Heavy Traffic Steady-State Approximations in Open Queueing Networks,* Stanford University.
- 10/2002 *Linear Phase Transition in Random Linear Constraint Satisfaction Problem,* Princeton University, Department of Mathematics.
- 05/2002 *Stochastic Networks, Analysis and Optimization,* MIT, Operations Research Center.

- 01/2002 *The Diameter of a Long-Range Percolation Graph*, Almaden Research Center, IBM.
- 03/2000 *On Deciding Stability of Scheduling Policies in Queueing Systems*, Boston University, Department of Manufacturing Engineering.
- 10/2000 *On deciding stability of scheduling policies in queueing systems*, Dept. of Math Sciences, T.J.Watson Research Center, IBM.
- 02/2000 *On Deciding Stability of Scheduling Policies in Queueing Systems*, MIT, Operations Research Center.
- 01/1999 *Stability of Adversarial Queues via Fluid Models*, Bell Labs.
- 12/1998 *Stability of Adversarial Queues via Fluid Models*, Systems Design, Analysis & Theory seminar. T.J.Watson Research Center, IBM.
- 01/1998 *Performance Analysis of Multiclass Queueing Networks*, Dept. of Math Sciences, T.J.Watson Research Center, IBM.

Invited and Refereed Conference and Workshop Presentations

- 08/2014 *Limits of local algorithms for randomly generated constraint satisfaction problems.* Workshop on Spin Glasses and Related Topics. Banff Center, Canada.
- 06/2014 *Limits of local algorithms for random graphs*, Conference on Stochastic Networks 2014, invited presentation. University of Amsterdam, Amsterdam, Netherlands.
- 06/2014 *Convergent sequences of sparse graphs: A large deviations approach.* Graph limits, groups and stochastic processes workshop. Renyi Institute, Budapest, Hungary.
- 06/2014 *Limits of Local Algorithms for Randomly Generated Constraint Satisfaction Problems* Workshop on Extremal Graph Theory, Yandex Co, Moscow, Russia.
- 05/2014 *Limits of Local Algorithms for Randomly Generated Constraint Satisfaction Problems* Warwick EPSRC Symposium on Statistical Mechanics: Phase transitions in discrete structures and computational problems

- 03/2014 *Franz Edelman Competition Finalist Presentation. Alliance for Paired Donation.* INFORMS Conference on Business Analytics & Operations Research
- 01/2014 *Limits of Local Algorithms over Sparse Random Graphs* Innovation in Theoretical Computer Science, Princeton, NJ.
- 10/2013 *Local Algorithms for Random Networks. Lecture I: the Power of Local Algorithms. Lecture II: the Limits of Local Algorithms.* Statistical physics, Optimization, Inference and Message-Passing algorithms autumn school at Les Houches, France.
- 10/2013 *Limits of local algorithms for sparse random graphs.* Workshop on Random Graphs and Their Applications at Yandex Co., Moscow Russia.
- 06/2013 *Limits of local algorithms for sparse random graphs.* International Workshop on Statistical Learning, Moscow, Russia.
- 02/2013 *Power and Limitations of Local Algorithms for Network Optimization Problems.* Workshop on Asymptotics of Large-Scale Interacting Networks, Banff center, Canada.
- 02/2013 *Combinatorics of kidney exchanges. Perspectives from the random graph theory.* Workshop on Asymptotics of Large-Scale Interacting Networks, Banff center, Canada.
- 01/2013 *Hardness results for local algorithms in sparse random graphs.* Institute for Mathematics and Applications workshop on Extremal and Probabilistic Combinatorics, UCLA, Los Angeles, CA.
- 01/2013 *Hardness results for local algorithms in sparse random graphs.* Workshop "What is information?", University of Beer-Sheba at Sde-Boker, Israel.
- 12/2012 *Convergent sequences of sparse graphs: A large deviations approach* 2012 Winter Canadian Society Meeting, Montreal, CA.
- 07/2012 *On the uniqueness of Lebesgue measure on regular trees and the problem of computing the volume of a polytop.* 8th World Congress in Probability and Statistics, Istanbul, Turkey.
- 06/2012 *On the uniqueness of Lebesgue measure on regular trees and the problem of computing the volume of a polytop.* Workshop on Computation and Phase Transitions, Georgia Institute of Technology, Atlanta, GA.

- 02/2012 *On the uniqueness of Lebesgue measure on regular trees and the problem of computing the volume of a polytop.* Workshop on Bridging statistical physics and optimization, inference and learning, Les Houches Physics School, Le Houches, France.
- 11/2011 *Interpolation method and scaling limits in sparse random graphs.* Workshop on Counting, Inference and Optimization on Graphs, Princeton University, Princeton, NJ.
- 08/2011 *Parallel server queueing systems in the Halfin-Whitt heavy traffic regime.* 5th Conference on Limit Theorems in Probability Theory and Their Applications
- 07/2011 *Combinatorial Approach to the Interpolation Method and Scaling Limits in Sparse Random Graphs.* International Mathematical Conference "50 years of Institute for Problems of Information Transmission"
- 07/2011 *Skorokhod problem is undecidable.* 16th INFORMS/Applied Probability Society Conference, Stockholm, Sweden.
- 07/2011 *Interpolation method and scaling limits in sparse random graphs.* 16th INFORMS/Applied Probability Society Conference, Stockholm, Sweden.
- 04/2011 *Interpolation method and scaling limits in sparse random graphs.* International Conference on Probability, Statistics, and Data Analysis, Raleigh, NC.
- 01/2011 *Right-convergence of sparse random graphs and the interpolation method.* Oberwolfach workshop on Combinatorics, Obwerwolfach, Germany.
- 10/2010 *Parallel server queueing systems in the heavy traffic regime.* Oberwolfach workshop on Mathematical Challenges in Stochastic Networks, Obwerwolfach, Germany.
- 09/2010 *Interpolation method and scaling limits in sparse random graphs.* 34-th Conference on Stochastic Processes and Applications, Osaka, Japan.
- 03/2010 *A combinatorial approach to the interpolation method and scaling limits in sparse random graphs.* One-Day Meeting in Combinatorics Mathematical Institute University of Oxford, UK.
- 02/2010 *Statistical physics methods in combinatorial optimization, inference and graphical games.* Workshop on Frontiers of Controls,

Games, and Network Science with Civilian and Military Applications, University of Texas, Austin.

- 10/2009 *A combinatorial approach to Guerra's interpolation method.* Probabilistic Techniques and Applications workshop at Institute for Pure and Applied Mathematics, UCLA, Los Angeles, CA.
- 08/2009 *Combinatorial approach to the interpolation method and scaling limits in sparse random graphs.* Physics of algorithm workshop, Santa Fe, NM.
- 07/2009 *Correlation Decay and Efficient Inference in Markov Random Fields,* 15th INFORMS/Applied Probability Society Conference, Cornell University, Ithaca, NY.
- 01/2009 *Correlation Decay and Deterministic Algorithms for Counting. Tutorial.* Tata Institute for Fundamental Research. Mumbai, India.
- 01/2009 *Sequential cavity method and applications to free energy computations,* Symposium on Discrete Algorithms (SODA2009). New York, NY.
- 10/2008 *Long-range independence and combinatorial optimization with random costs.* DIMACS Working Group on Message-Passing Algorithms. Rutgers University, NJ.
- 06/2008 *Applications of cavity method to combinatorial enumeration and optimization,* International Workshop on Phase Transitions, Hard Combinatorial Problems and Message Passing Algorithms Banff International Research Center. Alberta. CA.
- 12/2007 *Correlation decay and applications to the problems of combinatorial enumeration and optimization.* Advances in Analysis of Monte Carlo Methods. Harvard University.
- 07/2007 *Steady-state analysis of a multi-server queueing system in QED regime,* 14th INFORMS/Applied Probability Society Conference, Eindhoven, Netherlands.
- 07/2007 *Undecidability results in the theory of queueing networks and Skorokhod problem,* 14th INFORMS/Applied Probability Society Conference, Eindhoven, Netherlands.
- 07/2007 *Stability and Performance Analysis of a Feedforward Type Infinite Markov Chains,* 14th INFORMS/Applied Probability Society Conference, Eindhoven, Netherlands.

- 07/2007 *Correlation decay and counting list-colorings of a graph.* Common concepts in Statistical Physics and Computer Science, Trieste, Italy.
- 05/2007 *Correlation decay, statistical physics and applications to counting problems.* "Problems at the interface of discrete mathematics and statistical physics" minisymposium at 1st Canadian Discrete and Algorithmic Mathematics Conference, Banff, Alberta, Canada.
- 05/2007 *Correlation decay, statistical physics and applications to counting problems.* ETH Combinatorics Day, ETH, Zurich, Switzerland.
- 04/2007 *Monomer-dimer model and a new deterministic approximation algorithm for computing a permanent of a 0,1 matrix.* DIMACS Workshop on Phase Transitions in Random Structures and Algorithms. Georgia Institute of Technology.
- 01/2007 *Correlation decay and counting list-colorings of a graph,* Symposium on Discrete Algorithms (SODA2007). New Orleans, LA.
- 12/2006 *Undecidability results in the theory of queueing networks.* Bertinoro Workshop on Adversarial Modeling and Analysis of Communication Networks.
- 11/2006 *Steady-state analysis of a multi-server queueing system in QED regime.* INFORMS.
- 10/2006 *Correlation decay in statistical physics and applications to counting problems.* DIMACS Workshop on Properties of Large Graphs: From Combinatorics to Statistical Physics and Back.
- 06/2006 *Correlation Decay in Statistical Physics and Applications to Counting Problems,* SIAM Conference on Discrete Mathematics, University of Victoria, Victoria, BC.
- 06/2006 *Spatial decay of correlations and efficient methods for computing partition functions,* Conference on Stochastic Networks 2006, invited presentation. University of Illinois at Urbana-Champaign.
- 01/2006 *Counting without sampling New algorithms for enumeration problems using statistical physics,* Symposium on Discrete Algorithms (SODA2006). Miami, FL.
- 10/2005 *Exponential Ergodicity in Multi-Class Queueing Networks,* INFORMS 2005, San-Francisco, CA.

- 07/2005 *Validity of Steady-State Heavy Traffic Approximations in Generalized Jackson Networks*, 13th INFORMS/Applied Probability Society Conference, Ottawa, Canada.
- 07/2005 *Exponential Ergodicity in Multi-Class Queueing Networks*, 13th INFORMS/Applied Probability Society Conference, Ottawa, Canada.
- 07/2005 *Counting without sampling New algorithms for enumeration problems using statistical physics*, 13th INFORMS/Applied Probability Society Conference, Ottawa, Canada.
- 03/2005 *Applications of the local weak convergence method to random graph problems*, MSRI Workshop of Phase Transition and Reconstruction Problems. Berkeley, CA.
- 01/2005 *The Expected Value of a Random Minimum Length Spanning Tree of a Complete Graphs*, Symposium on Discrete Algorithms (SODA2005). Vancouver, BC.
- 10/2004 *Validity of Heavy Traffic Steady-State Approximations in Open Queueing Networks*, INFORMS 2004, Denver, CO.
- 08/2004 *Maximum Weight Independent Sets and Matchings in Sparse Random Graphs*, Approx-Random 2004 workshop, Harvard University, Cambridge, MA.
- 07/2004 *Large Deviations Principle in Constrained Homogeneous Random Walks and Queueing Systems*, 12th INFORMS/Applied Probability Society Conference, Beijing, China.
- 07/2004 *Stochastic Online Bin Packing Problem*, 12th INFORMS/Applied Probability Society Conference, Beijing, China.
- 06/2004 *Asymptotic Optimality of the Transposition Rule in Linear Lists*, Mathematical Modeling and Analysis workshop, New York, NY.
- 01/2004 *Linear Phase Transition in Random Linear Constraint Satisfaction Problem*, Symposium on Discrete Algorithms (SODA2004). New Orleans, LA.
- 10/2003 *Weak Instability in Stochastic and Fluid Queueing Networks*, INFORMS 2003, Atlanta, GA.
- 09/2003 *Linear Phase Transition in Random Linear Constraint Satisfaction Problem*, Discrete Random Walk: Theory and Applications, Institute Henri Poincare, Paris, France.

- 05/2003 *Weak Instability in Stochastic and Fluid Queueing Networks*, Mathematical Modeling and Analysis workshop, San Diego, CA.
- 09/2002 *The Diameter of a Long-Range Percolation Graph*, "Algorithms, Trees, Combinatorics and Probability" Colloquium, University of Versailles, France.
- 01/2002 *The Diameter of a Long-Range Percolation Graph*, Symposium on Discrete Algorithms (SODA2002). San-Francisco, CA.
- 07/2001 *Computing Fluid Limits and Stationary Distributions for Constrained Random Walks and Queueing Systems*, 11th INFORMS/Applied Probability Society Conference, New York, NY.
- 07/2001 *Stochastic Online Bin Packing Problem: Exact Conditions for Stability under the Best Fit Heuristic*, 11th INFORMS/Applied Probability Society Conference, New York, NY.
- 07/2001 *Static and Dynamic Packet Routing in Communications Networks*, 11th INFORMS/Applied Probability Society Conference, New York, NY.
- 06/2001 *Stochastic Online Bin Packing Problem: Exact Conditions for Stability under the Best Fit Heuristic*, Mathematical Performance Modeling and Analysis workshop. Cambridge, MA.
- 12/2000 *Performance of Multiclass Markovian Queueing Networks via Piecewise Linear Lyapunov Functions*, Conference on Decision and Control. Invited presentation. Sydney, Australia.
- 12/2000 *Static and Dynamic Packet Routing in Communications Networks*, INFORMS. Invited presentation. San-Antonio, TX.
- 06/2000 *Performance of Multiclass Markovian Queueing Networks via Piecewise Linear Lyapunov Functions*, Conference on Stochastic Networks. Madison, WI.
- 06/2000 *On Deciding Stability of Constrained Homogeneous Random Walks and Queueing Systems*, Mathematical Performance Modeling and Analysis workshop. Santa Jose, CA.
- 02/2000 *On Deciding Stability of Scheduling Policies in Queueing systems*, Symposium on Discrete Algorithms (SODA2000). San-Francisco, CA.
- 12/1999 *Asymptotically Optimal Algorithm for Job Shop Scheduling*, Conference on Decision and Control. Invited presentation. Phoenix, AZ.

- 10/1999 *On Deciding Stability of Scheduling Policies in Queueing Systems*, INFORMS. Invited presentation. Philadelphia, PA.
- 07/1999 *Performance Analysis of Multiclass Markovian Queueing Networks*, Conference on Applied Probability, Ulm, Germany.
- 07/1999 *Extension of the PAC Framework to Finite and Countable Markov Chains*, 12-th Annual Conference on Computational Learning Theory, U of Santa Cruz, CA.
- 05/1999 *Performance Analysis of Multiclass Markovian Queueing Networks*, Mathematical Performance Modeling and Analysis workshop. Invited presentation. Atlanta, GA.
- 05/1999 *Stability of Adaptive and Non-Adaptive Packet Routing Policies in Adversarial Queueing Networks*. Proc. 31st ACM Symposium on Theory of Computing (STOC1999). Atlanta, GA.
- 10/1998 *Stability of Adversarial Queues via Fluid Models*, 29th IEEE Conf. on Foundations of Computer Science (FOCS1998). San Francisco, CA.
- 07/1998 *Efficient Learning of Monotone Concepts via Quadratic Optimization*, 11-th Annual Conference on Computational Learning Theory. Madison, WI.
- 07/1997 *Estimation of Time-Varying Parameters in Statistical Models: An Optimization Approach*, 10-th Annual Conference on Computational Learning Theory. Nashville, TN.
- 08/1995 *Stability Conditions for Multiclass Fluid Queueing Networks under Priority and FIFO policies*, Stochastic Networks Workshop. Edinburgh, UK.
- 06/1995 *Stability Conditions for Multiclass Fluid Queueing Networks*, Conference on Applied Probability, Atlanta, GA.