Curriculum Vitae

David Gamarnik
Nanyang Technological University Professor of Operations Research

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Research interests

Discrete probability, algorithms and optimization, statistics, machine learning and data science, quantum computing and quantum information science, stochastic processes and queueing 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.

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

- Fellow of the Institute of Mathematical Statistics 2023
- Fellow of the American Mathematical Society 2021
- Fellow of Institute for Operations Research and the Management Sciences, 2021
- INFORMS Franz Edelman Prize Laureate, 2014
- INFORMS Applied Probability Society Best Publication Award, 2011
- IBM Faculty Award, 2006
- Erlang Prize for Early Career Applied Probabilists, Applied Probability Society of INFORMS, 2004
- Hollis Cooley Memorial Prize presented for exceptional promise in mathematics Courant Institute of Mathematical Sciences, 1992
- Winner of the Quant journal competition in mathematics for high school students, 1985,1986. USSR
- Winner of several high school and college olympiads in mathematics 1985-1988. USSR

Plenary Presentations and Tutorials

10/2025	The 46th Midwest Probability Colloquium Tutorial, Evanston, US.
09/2025	Distinguished Lecture Series, Seoul National University.
06/2025	Applied Probability Society of INFORMS plenary lecture.
01/2025	Ecole de Physique les Houches. Towards a theory for typical-case algorithmic hardness.
07/2024	Plenary talk at Workshop on Randomness and Learning on Networks, Institute for Pure and Applied Mathematics, Rio-de-Janeiro, Brazil.
05/2024	Rejewski, Różycki, Zygalski lecture 2024, Poznan, Poland.
09/2024	Tutorial at Allerton Conference University of Illinois at Urbana-Champaign.

09/2022	9th Polish Combinatorial Conference.
04/2018	Oxford Distinguished Speaker Seminar, Department of Statistics, Oxford University.
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.
01/2008	Plenary lecture. 33-d Conference on the Mathematics of Operations Research, Lunteren, Netherlands. *Lecture I: Algorithmic issues and undecidability in the theory of queueing networks*, *Lecture II: Large scale queueing systems in the Quality/Efficiency driven regime and applications*,
06/2008	Plenary lecture. Sixth International Workshop on Matrix- Anlaytic Methods (MAM6), Beijing, China,

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Past and Present Teaching Experience

- Discrete Probability and Stochastic Processes
- Fundamentals of Probability
- Data Science and Big Data Analytics (Online course)
- Data, Models and Decisions
- Advanced Stochastic Processes
- Queues: Theory and Applications

- Applied Probability Seminar
- Network Science and Models

Professional Activities

- Area Editor of Mathematics of Operations Research journal in the area of Learning Theory (2023-Present)
- Area Editor of Operations Research (2011 – 2017).
- Associate Editor of Annals of Applied Probability (2007 – 2012).
- Associate Editor of Mathematics of Operations Research (2010 – 2018).
- Associate Editor of Queueing Systems: Theory and Applications (2010 – 2014).
- Associate Editor of Stochastic Systems (2010 – 2015).
- Guest editor for SIAM Journal on Discrete Mathematics Special Issue on Constraint Satisfaction Problems and Message Passing Algorithms.
- Member of the Scientific Advisory Board of Networks Program, Netherlands, (2014 – Present)
- Chair of INFORMS publication committee review for Stochastic Systems journal. (2019-2020)
- Chair of INFORMS Applied Probability Prize committee (Erlang Prize and Best Publication Award), (2016-2017).
- Member of the committee for INFORMS Lanchester Prize for the best publication in operations research and management science (2017-2018).
- Council member of Applied Probability Society of INFORMS (term 2006–2008).
- Applied Probability Cluster Chair for INFORMS 2006 conference, Pittsburgh, PA.
- Program committee:
  - Co-organizer of a workshop GRAMSIA (Graphical Models, Statistical Inference, and Algorithms 2023) at Center for Mathematical Sciences and Applications (CMSA), Harvard.
  - Conference on Learning Theory (COLT) 2019, 2024
  - ACM-SIAM Symposium on Discrete Algorithms (SODA 2015).

- Co-organizer of a workshop GRAMSIA (Graphical Models, Statistical Inference, and Algorithms 2015) at Institute for Mathematics and its Applications (IMA), University of Minnesota.
- Co-organizer of a workshop Mathematical Challenges in Graphical Models and Message-Passing Algorithms at Institute for Pure and Applied Mathematics (IPAM), UCLA, 2012.
- 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-Anlaytic Methods (MAM7), New York, NY,
- Mathematical Performance Modeling and Analysis 2001, 2003-2013.

Grants

- ONR Grant N00014-25-1-2545
- NSF Grant CISE 2233897 2023-2026
- NSF Grant DMS-2015517 2020-2023
- ONR Grant N00014-17-1-2790
- NSF Grant CMMI-024078-002 2015-2018
- 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

Visiting positions

08/2025-12/2025 Bocconi University, Department of Computing Sciences.

02/2025-05/2025 MSRI Probability and Statistics of Discrete Structures (Scheduled for 2025)

08/2022-12/2023 Simons Institute for the Theory of Computing. Graph Limits and Processes on Networks: From Epidemics to Misinformation

08/2021-12/2022 Simons Institute for the Theory of Computing. Computational Complexity of Statistical Inference Program

08/2020-12/2020 Simons Institute for the Theory of Computing. Probability, Geometry, and Computation in High Dimensions

08/2018-06/2019 Harvard University, Center for Mathematical Sciences and Applications, MA. (Sabbatical leave)

01/2018 Simons Institute, Berkeley, CA.

04/2015 Simons Institute, Berkeley, CA.

04/2014 Microsoft Research Lab, New England.

01-05/2012 Microsoft Research Lab, New England.

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. Redmond

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

Books

1. Chapter in the book *Spin Glass Theory and Far Beyond: Replica Symmetry Breaking after 40 Years*. Edited by Patrick Charbonneau, Enzo Marinari, Giorgio Parisi, Federico Ricci-tersenghi, Gabriele Sicuro, Francesco Zamponi, and Marc Mezard. World Scientific, 2023.

2. D. Bertsimas and D. Gamarnik. *Queueing Theory: Classical and Modern Methods*. Dynamic Ideas, 2022.

Surveys and Tutorials

1. David Gamarnik. Turing in the shadows of Nobel and Abel: an algorithmic story behind two recent prizes. *AMS Notices, to appear in May issue 2025*,

2. David Gamarnik, Cristopher Moore, and Lenka Zdeborová. Disordered systems insights on computational hardness. *Journal of Statistical Mechanics: Theory and Experiment*, 2022(11):114015, 2022.

3. David Gamarnik. The overlap gap property: A topological barrier to optimizing over random structures. *Proceedings of the National Academy of Sciences*, 118(41), 2021.

4. D. Gamarnik. Correlation decay method for decision, optimization and inference in large scale networks. *TutORials in Operations Research*, 2013.

5. David Gamarnik. Fluid models of queueing networks. *Wiley Encyclopedia of Operations Research and Management Science*, 2010.

Journals and Refereed Conference Proceedings

1. David Gamarnik, Eren C Kızıldağ, and Lutz Warnke. Optimal hardness of online algorithms for large independent sets. *arXiv preprint arXiv:2504.11450*, 2025.

2. Yatin Dandi, David Gamarnik, Francisco Pernice, and Lenka Zdeborová. Sequential dynamics in ising spin glasses. *arXiv preprint arXiv:2506.09877*, 2025.

3. Houssam El Cheairi and David Gamarnik. Densest subgraphs of a dense erdös–rényi graph. asymptotics, landscape, and universality. *SIAM Journal on Discrete Mathematics*, 39(2):1013–1081, 2025.

4. Ahmed El Alaoui and David Gamarnik. Hardness of sampling solutions from the symmetric binary perceptron. *Random Structures & Algorithms*, 66(4):e70021, 2025.

5. Shankar Bhamidi, David Gamarnik, and Shuyang Gong. Finding a dense submatrix of a random matrix. sharp bounds for online algorithms. *arXiv preprint arXiv:2507.19259*, 2025.

6. Youssef Chaabouni and David Gamarnik. The price of sparsity: Sufficient conditions for sparse recovery using sparse and sparsified measurements. *arXiv preprint arXiv:2509.01809*, 2025.

7. Eric R Anschuetz, David Gamarnik, and Jonathan Z Lu. Decoded quantum interferometry requires structure. *arXiv preprint arXiv:2509.14509*, 2025.

8. Eric R Anschuetz, David Gamarnik, and Bobak T Kiani. Bounds on the ground state energy of quantum p-spin hamiltonians: Er anschuetz, d. gamarnik, bt kiani. *Communications in Mathematical Physics*, 406(10):232, 2025.

9. Houssam El Cheairi, David Gamarnik, and Rahul Mazumder. Theoretical compression bounds for wide multilayer perceptrons, December 2025. arXiv:2512.06288.

10. David Gamarnik, Aukosh Jagannath, and Eren C. Kızıldağ. Shattering in the ising p-spin glass model. *Probability Theory and Related Fields*, 193(1-2):89–141, 2025.

11. David Gamarnik and Devin Smedira. Integrating high-dimensional functions deterministically. *arXiv preprint arXiv:2402.08232*, 2024.

12. David Gamarnik, Bobak T Kiani, and Alexander Zlokapa. Slow mixing of quantum gibbs samplers. *arXiv preprint arXiv:2411.04300*, 2024.

13. Eric R Anschuetz, David Gamarnik, and Bobak Kiani. Combinatorial nlts from the overlap gap property. *Quantum*, 8:1527, 2024.

14. Houssam El Cheairi and David Gamarnik. Algorithmic universality, low-degree polynomials, and max-cut in sparse random graphs. *arXiv preprint arXiv:2412.18014*, 2024.

15. David Gamarnik, Mihyun Kang, and Paweł Prałat. Cliques, chromatic number, and independent sets in the semi-random process. *SIAM Journal on Discrete Mathematics*, 38(3):2312–2334, 2024.

16. David Gamarnik and Ilias Zadik. The landscape of the planted clique problem: Dense subgraphs and the overlap gap property. *The Annals of Applied Probability*, 34(4):3375–3434, 2024.

17. David Gamarnik, Aukosh Jagannath, and Alexander S Wein. Hardness of random optimization problems for boolean circuits, low-degree polynomials, and langevin dynamics. *SIAM Journal on Computing*, 53(1):1–46, 2024.

18. David Gamarnik, Eren C Kızıldağ, and Ilias Zadik. Stationary points of a shallow neural network with quadratic activations and the global optimality of the gradient descent algorithm. *Mathematics of Operations Research*, 2024.

19. David Gamarnik, Elchanan Mossel, and Ilias Zadik. Sharp thresholds imply circuit lower bounds: from random 2-sat to planted clique. *arXiv preprint arXiv:2311.04204*, 2023.

20. David Gamarnik. Barriers for the performance of graph neural networks (gnn) in discrete random structures. *Proceedings of the National Academy of Sciences*, 120(46):e2314092120, 2023.

21. David Gamarnik and Devin Smedira. Computing the volume of a restricted independent set polytope deterministically. *arXiv preprint arXiv:2312.03906*, 2023.

22. Yatin Dandi, David Gamarnik, and Lenka Zdeborová. Maximally-stable local optima in random graphs and spin glasses: Phase transitions and universality. *arXiv preprint arXiv:2305.03591*, 2023.

23. David Gamarnik, Eren C Kizildağ, Will Perkins, and Changji Xu. Geometric barriers for stable and online algorithms for discrepancy minimization. In *The Thirty Sixth Annual Conference on Learning Theory*, pages 3231–3263. PMLR, 2023.

24. David Gamarnik. Correlation decay and the absence of zeros property of partition functions. *Random Structures & Algorithms*, 62:155–180, 2023.

25. David Gamarnik and Eren C Kızıldağ. Algorithmic obstructions in the random number partitioning problem. *The Annals of Applied Probability*, 33(6B):5497–5563, 2023.

26. D. Gamarnik, E. Kızıldağ, W. Perkins, and C. Xu. Algorithms and barriers in the symmetric binary perceptron model. In *FOCS 2022: 63rd IEEE Symposium on Foundations of Computer Science*, pages 576–587, 2022.

27. J. Basso, D. Gamarnik, S. Mei, and L. Zhou. Performance and limitations of the qaoa at constant levels on large sparse hypergraphs and spin glass models. In *FOCS 2022: 63rd IEEE Symposium on Foundations of Computer Science*, pages 335–343, 2022.

28. David Gamarnik, Eren C Kızıldağ, and Ilias Zadik. Self-regularity of non-negative output weights for overparameterized two-layer neural networks. *IEEE Transactions on Signal Processing*, 70:1310–1319, 2022.

29. David Gamarnik and Ilias Zadik. Sparse high-dimensional linear regression. Estimating squared error and a phase transition. *The Annals of Statistics*, 50(2):880–903, 2022.

30. David Gamarnik, John N Tsitsiklis, and Martin Zubeldia. Stability, memory, and messaging trade-offs in heterogeneous service systems. *Mathematics of Operations Research*, 47(3):1862–1874, 2022.

31. David Gamarnik and Aukosh Jagannath. The overlap gap property and approximate message passing algorithms for p-spin models. *The Annals of Probability*, 49(1):180–205, 2021.

32. David Gamarnik, Aukosh Jagannath, and Alexander S Wein. Circuit lower bounds for the p-spin optimization problem. *arXiv preprint arXiv:2109.01342*, 2021.

33. David Gamarnik, Aukosh Jagannath, and Subhabrata Sen. The overlap gap property in principal submatrix recovery. *Probability Theory and Related Fields*, pages 1–58, 2021.

34. David Gamarnik and Eren C Kızıldağ. Computing the partition function of the sherrington–kirkpatrick model is hard on average. *The Annals of Applied Probability*, 31(3):1474–1504, 2021.

35. David Gamarnik, Eren C Kızıldağ, and Ilias Zadik. Inference in high-dimensional linear regression via lattice basis reduction and integer relation detection. *IEEE Transactions on Information Theory*, 67(12):8109–8139, 2021.

36. David Gamarnik, Aukosh Jagannath, and Alexander S Wein. Low-degree hardness of random optimization problems. In *61st Annual Symposium on Foundations of Computer Science*, 2020.

37. Edward Farhi, David Gamarnik, and Sam Gutmann. The quantum approximate optimization algorithm needs to see the whole graph: A typical case. *arXiv preprint arXiv:2004.09002*, 2020.

38. Edward Farhi, David Gamarnik, and Sam Gutmann. The quantum approximate optimization algorithm needs to see the whole graph: Worst case examples. *arXiv preprint arXiv:2005.08747*, 2020.

39. Uriel Feige, David Gamarnik, Joe Neeman, Miklós Z Rácz, and Prasad Tetali. Finding cliques using few probes. *Random Structures & Algorithms*, 56(1):142–153, 2020.

40. David Gamarnik and Julia Gaudio. Estimation of monotone multi-index models. *arXiv preprint arXiv:2006.02806*, 2020.

41. David Gamarnik. Explicit construction of RIP matrices is ramsey-hard. *Communications on Pure and Applied Mathematics*, 73(9):2043–2048, 2020.

42. David Gamarnik, John N Tsitsiklis, Martin Zubeldia, et al. A lower bound on the queueing delay in resource constrained load balancing. *Annals of Applied Probability*, 30(2):870–901, 2020.

43. Wei-Kuo Chen, David Gamarnik, Dmitry Panchenko, Mustazee Rahman, et al. Suboptimality of local algorithms for a class of max-cut problems. *The Annals of Probability*, 47(3):1587–1618, 2019.

44. David Gamarnik and Kavita Ramanan. Uniqueness of gibbs measures for continuous hardcore models. *The Annals of Probability*, 47(4):1949–1981, 2019.

45. Matt Emschwiller, David Gamarnik, Eren C Kızıldağ, and Ilias Zadik. Neural Networks and Polynomial Regression. Demystifying the Overparametrization Phenomena. *arXiv preprint arXiv:1912.01599*, 2019.

46. David Gamarnik and Julia Gaudio. Sparse high-dimensional isotonic regression. In *Advances in Neural Information Processing Systems*, pages 12852–12862, 2019.

47. David Gamarnik and Quan Li. On the max-cut over sparse random graph. *Random Structures and Algorithms*, 52(2):219-262, 2018.

48. Ilias Zadik and David Gamarnik. High dimensional linear regression using lattice basis reduction. In *Advances in Neural Information Processing Systems*, pages 1847–1857, 2018.

49. David Gamarnik and Quan Li. Finding a large submatrix of a gaussian random matrix. *The Annals of Statistics*, 46(6A):2511–2561, 2018.

50. Guy Bresler, David Gamarnik, and Devavrat Shah. Learning graphical models from the glauber dynamics. *IEEE Transactions on Information Theory*, 64(6):4072–4080, 2018.

51. Patrick Eschenfeldt and David Gamarnik. Join the shortest queue with many servers. the heavy-traffic asymptotics. *Mathematics of Operations Research*, 43(3):867–886, 2018.

52. David Gamarnik, John N Tsitsiklis, and Martin Zubeldia. Delay, memory, and messaging tradeoffs in distributed service systems. *Stochastic Systems*, 8(1):45–74, 2018.

53. Itai Ashlagi, Adam Bingaman, Maximilien Burq, Vahideh Manshadi, David Gamarnik, Cathi Murphey, Alvin E Roth, Marc L Melcher, and Michael A Rees. Effect of match-run frequencies on the number of transplants and waiting times in kidney exchange. *American Journal of Transplantation*, 18(5):1177–1186, 2018.

54. David Gamarnik and Madhu Sudan. Performance of sequential local algorithms for the random NAE-K-SAT problem. *SIAM Journal on Computing*, 46(2):590–619, 2017.

55. David Gamarnik and Madhu Sudan. Limits of local algorithms over sparse random graphs. *Annals of Probability*, 45:2353–2376, 2017.

56. Christian Borgs, Jennifer Chayes, and David Gamarnik. Convergent sequences of sparse graphs: A large deviations approach. *Random Structures & Algorithms*, 51(1):52–89, 2017.

57. Ross Anderson, Itai Ashlagi, David Gamarnik, and Yash Kanoria. Efficient dynamic barter exchange. *Operations Research*, 65(6):1446–1459, 2017. Conference version in *Proceedings of the Twenty-Sixth Annual ACM-SIAM Symposium on Discrete Algorithms*

58. David Gamarnik, Quan Li, and Hongyi Zhang. Matrix completion from $O(n)$ samples in linear time. In *Proceedings of Conference on Learning Theory*, 2017.

59. David Gamarnik and Ilias Zadik. High-dimensional regression with binary coefficients. Estimating squared error and a phase transition. In *Proceedings of Conference on Learning Theory*, 2017. *Journal version in Annals of Statistics, major revision*

60. Patrick Eschenfeldt and David Gamarnik. A message passing algorithm for the problem of path packing in graphs. *arXiv preprint arXiv:1603.06002*, 2016.

61. David Gamarnik and Sidhant Misra. A note on alternating minimization algorithm for the matrix completion problem. *IEEE Signal Processing Letters*, 23(10):1340–1343, 2016.

62. Patrick Eschenfeldt and David Gamarnik. Supermarket queueing system in the heavy traffic regime. short queue dynamics. *arXiv preprint arXiv:1610.03522*, 2016.

63. David Gamarnik, John N Tsitsiklis, and Martin Zubeldia. Delay, memory, and messaging tradeoffs in distributed service systems (conference version). In *SIGMETRICS*, pages 1–12, 2016.

64. David Gamarnik, Dmitriy Katz, and Sidhant Misra. Strong spatial mixing of list coloring of graphs. *Random Structures & Algorithms*, 46(4):599–613, 2015.

65. David Gamarnik, Sidhant Misra. Giant component in random multipartite graphs with given degree sequences. *Stochastic Systems*, 5(2):372–408, 2015.

66. David Gamarnik and Dmitriy Katz. The stability of the deterministic skorokhod problem is undecidable. *Queueing Systems*, 79(3-4):221–249, 2015.

67. 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.

68. Ross Anderson, Itai Ashlagi, David Gamarnik, Michael Rees, Alvin E Roth, Tayfun Sönmez, and M Utku Ünver. Kidney exchange and the alliance for paired donation: Operations research changes the way kidneys are transplanted. *Interfaces*, 2015.

69. David Gamarnik. Right-convergence of sparse random graphs. *Probability Theory and Related Fields*, 160:253–278, 2014.

70. Guy Bresler, David Gamarnik, and Devavrat Shah. Structure learning of antiferromagnetic ising models. In *Advances in Neural Information Processing Systems*, pages 2852–2860, 2014.

71. 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.

72. 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.

73. David Gamarnik, David A Goldberg, and Theophane Weber. Correlation decay in random decision networks. *Mathematics of Operations Research*, 39(2):229–261, 2013.

74. D. Gamarnik and D. Goldberg. Convergence to stationarity of the multiserver queueing system in the Halfin-Whitt regime. *Annals of Applied Probability*, 23:1879–1912, 2013.

75. D. Gamarnik and D. Goldberg. Steady-state GI/GI/n queue in the Halfin-Whitt regime. *Annals of Applied Probability*, 23:2382–2419, 2013.

76. Itai Ashlagi, David Gamarnik, Michael A Rees, and Alvin E Roth. The need for (long) chains in kidney exchange. Technical report, National Bureau of Economic Research, 2012.

77. 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.

78. 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.

79. D. Gamarnik, D. Shah, and Y. Wei. Belief propagation for min-cost network flow: Convergence and correctness. *Operations Research*, 60(2):410–428, 2012.

80. 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.

81. D. Bertsimas, D. Gamarnik, and A. Rikun. Performance analysis of queueing networks via robust optimization. *Operations Research*, 59:455–466, 2011.

82. 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.

83. 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.

84. 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.

85. D. Gamarnik and S. P. Meyn. On exponential ergodicity of multiclass queueing networks. *Queueing Systems*, 65:109–133, 2010.

86. 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.

87. D. Gamarnik and D. Katz-Rogozhnikov. On deciding stability of queueing networks under priority scheduling policy. *Annals of Applied Probability*, 19:2008–2037, 2009.

88. 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.

89. 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.

90. 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.

91. 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.

92. 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.

93. F. Cheng, D. Gamarnik, N. Jengte, W. Min, and B. Ramachandran. Modeling operational risks in business processes. *Journal of Operational Risk*, 2(2), 2007.

94. 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.

95. D. Gamarnik, T. Nowicki, and G. Swirscsz. 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.

96. D. Gamarnik and A. Zeevi. Validity of heavy traffic steady-state approximations in open queueing networks. *Ann. Appl. Prob.*, 16(1):56–90, 2006.

97. N. Bansal and D. Gamarnik. Handling load with less stress. *Queueing Systems*, 54(1):45–54, 2006.

98. 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.

99. D. Gamarnik and M. Sviridenko. Hamiltonian completion of sparse random graphs. *Discrete Applied Mathematics*, 152:139–158, 2005.

100. A. Flaxman, D. Gamarnik, and G. Sorkin. Embracing the giant component. *Random Structures and Algorithms*, 27(3):277–289, 2005.

101. D. Gamarnik and P. Momčilović. An asymptotic optimality of the transposition rule for linear lists. *Journal of Applied Probability*, 42(1):235–246, 2005.

102. D. Gamarnik and M. Squillante. Analysis of stochastic online bin packing processes. *Stochastic Models*, 21:401–425, 2005.

103. D. Gamarnik and J. Hasenbein. Instability in stochastic and fluid queueing networks. *Ann. Appl. Probab.*, 15(3):1652–1690, 2005.

104. 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.

105. D. Gamarnik. Linear phase transition in random linear constraint satisfaction problems. *Probability Theory and Related Fields.*, 129(3):410–440, 2004.

106. 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.

107. 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.

108. D. Gamarnik. Stochastic bandwidth packing process: Stability conditions via Lyapunov function technique. *Queueing Systems*, 48:339–363, 2004.

109. D. Gamarnik. Extension of the PAC framework to finite and countable Markov chains. *IEEE Transactions on Information Theory*, 49(1):338–345, 2003.

110. 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.

111. D. Coppersmith, D. Gamarnik, and M. Sviridenko. The diameter of a long-range percolation graph. *Random Structures and Algorithms*, 21:1–13, 2002.

112. 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.

113. D. Bertsimas, D. Gamarnik, and J. Tsitsiklis. Performance of multiclass Markovian queueing networks via piecewise linear Lyapunov functions. *Ann. of Appl. Prob.*, 11(4):1384–1428, 2001.

114. D. Gamarnik. On deciding stability of constrained homogeneous random walks and queueing systems. *Mathematics of Operations Research*, 27(2):272–293, 2002.

115. D. Gamarnik and M. Sviridenko. Static and dynamic hot-potato packet routing in communication networks. IBM Technical Report #RC 21918, 2000.

116. 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.

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

118. D. Gamarnik. Efficient learning of monotone concepts via quadratic optimization. *Proc. 11th ACM Conf. on Computational Learning Theory*, 1998.

119. 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.

120. D. Gamarnik. *Stability and Performance of Multiclass Queueing Networks*. MIT Thesis, 1998.

121. D. Bertsimas, D. Gamarnik, and J. Tsitsiklis. Stability conditions for multiclass fluid queueing networks. *IEEE Trans. Automat. Control*, 41:1618–1631, 1996.

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

123. 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.

124. R. Anderson and D. Gamarnik. Scheduling interns at hospitals: Queueing models and fluid approximations. *Preprint*.

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

12/2025	*Overlap Gap Property: A topological barrier to optimization in random structures*, ETH, Switzerland
11/2025	*Overlap Gap Property: A topological barrier to optimization in random structures* , ENS, Lyon, France.
09-12/2025	*Overlap Gap Property: A topological barrier to optimization in random structures* Series of four lectures at Bocconi University, Milan, Italy.
05/2024	*Turing in the shadows of Nobel and Abel: an untold algorithmic story behind two recent prizes.* Rejewski, Różycki, Zygalski lecture 2024, Poznan University, Poland.
11/2023	*A curious case of the symmetric binary perceptron model. Algorithms and algorithmic barriers.* Center for Statistics and Data Sciences seminar, Columbia University, NY.
02/2023	*From spin glasses to Boolean circuits lower bounds. Algorithmic barriers from the overlap gap property* Center for Mathematical Sciences and Applications (CMSA) Colloquium, Harvard University, MA.
02/2023	*Overlap gap property: A topological barrier to optimizing over random structures* Division for Applied Mathematics, Brown University, RI.

12/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Fuqua Schools of Business, Duke University, Durham, NC.

10/2022 *A curious case of symmetric binary perceptron model. Algorithms and algorithmic barriers.* Department of Mathematics at UC Davis, Davis, CA.

05/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Department of Mathematics at University of Arizona, Tuzcon, AZ.

04/2022 *A curious case of symmetric binary perceptron model. Algorithms and algorithmic barriers.* Fundamentals of Learning and Artificial Intelligence Seminar, Swiss Federal Institute of Technology Lausanne, Switzerland.

03/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Algorithms Randomness and Optimization Seminar, Georgia Institute of Technology, Atlanta, GA.

02/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Department of Operations Research and Financial Engineering, Princeton, NJ.

11/2021 *High-dimensional statistics and the algorithmic intractability* Industrial Engineering and Management Sciences Seminar, Northwestern University, Evanston, IL.

02/2021 *Algorithmic Barriers in Random Number Partitioning Problem* Stochastic Networks, Applied Probability, and Performance (SNAPP). Online seminar.

11/2020 *Algorithmic Challenges in High-Dimensional Inference Models* London School of Business, UK.

11/2020 *Low-Degree Hardness of Random Optimization Problems* University of Minnesota, MN.

04/2020 *Overlap Gap Property: a Provable Barrier to Fast Optimization in Probabilistic Combinatorial Structures.* ETH, MAD+ Online Seminar, Zurich, Switzerland.

04/2020 *Overlap Gap Property: a Provable Barrier to Fast Optimization in Probabilistic Combinatorial Structures.* Extremal and Probabilistic Combinatorics Webinar, Prague, Czech Republic

02/2020 *Algorithmic Challenges in High-Dimensional Inference Models. Insights from Statistical Physics* University of California, Davis, CA.

03/2019 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* UMich EECS Communications & Signal Processing Seminar, University of Michigan at Ann Arbor, Michigan.

03/2019 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* ISyE Department Seminar Series, Georgia Institute of Technology, GA.

03/2019 *Two Algorithmic Hardness Results in Statistical Mechanics and High-Dimensional Statistics* ORFE Seminar Series, Princeton University, NJ.

03/2019 *Algorithmic Challenges in High-Dimensional Inference Models. Insights from Statistical Physics* IEOR-DRO Seminar, Columbia University, NY.

11/2018 *Two Algorithmic Hardness Results in Spin Glasses and Compressive Sensing* Seminar on Probability and Random Matrices, Harvard University, MA.

04/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* Oxford Department of Statistics Distinguished Speaker Seminar

01/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* Probability Seminar, Stanford University, CA.

12/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Frankfurt University, Frankfurt, Germany.

12/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Seminar on Probability and Random Matrices, Harvard University, Cambridge, MA

12/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Center for Network Sciences, Northeastern University, Boston, MA

10/2017 *Large Scale Queueing Systems. Heavy Traffic Asymptotics and Insights* Kellogg School of Management, Northwestern University, Evanston, MA

05/2017 *Large Scale Queueing Systems. Heavy Traffic Asymptotics and Insights* Booth of Management, Chicago University, Chicago, MA

03/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Seminar on Probability, Toronto University, Toronto, Canada

04/2016 *Finding a Large Submatrix of a Random Matrix, and the Overlap Gap Property* Applied Probability and Risk Seminar, Columbia University, New York, NY

02/2016 *Finding a Large Submatrix of a Random Matrix, and the Overlap Gap Property* Probability Seminar, Department of Mathematics, University of Minnesota, Minneapolis, MN

03/2015 *(Arguably) Hard on Average Constraint Satisfaction Problems and Limits of Local Algorithms* Department of Statistics, Wharton, PA.

03/2015 *Limits of local algorithms for randomly generated constraint satisfaction problems* Center of Information and Systems Engineering and Statistics and Probability joint seminar, Boston University.

04/2015 *A Dynamic Model of Kidney Exchange Programs* Graduate School of Business, Stanford, Palo Alto, CA.

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, Northwestern 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

12/2025 *Barriers to online algorithms for optimization from the Overlap Gap Property.* A Journey from Spin Glasses to Neural Networks, Rome, Italy

10/2025 *Turing in the Shadows of Nobel and Abel: An Algorithmic Story Behind Two Recent Prizes* The 46th Midwest Probability Colloquium, Evanston, IL.

09/2025 *SHARP THRESHOLDS IMPLY CIRCUIT LOWER BOUNDS* 10th Cracow Conference on Graph Theory, Cracow, Poland

08/2025 *Sequential dynamics in Ising spin glasses* Statistical physics and machine learning: moving forward. Institute d'Etudes scientifiques de Cargese, Cargese, Corsica, France

04/2025 *Barriers to online algorithms for optimization from the overlap gap property. Three case studies* Detection, Estimation, and Reconstruction in Networks workshop, Simons Laufer Mathematical Sciences Institute, Berkeley, CA

01/2025 *Geometric Barriers to Classical and Quantum Computing in Random Structures.* Towards a theory for typical-case algorithmic hardness, Les Houches Physics School, France

09/2024 *Overlap Gap Property: A topological barrier to optimizing over classical and quantum random structures* Tutorial at Allerton Conference University of Illinois at Urbana-Champaign.

07/2024 *Overlap gap property: An algorithmic barrier to optimization in random structures and statistical physics.* Plenary talk at Workshop on Randomness and Learning on Networks, Institute for Pure and Applied Mathematics, Rio-de-Janeiro, Brazil.

06/2024 *A curious case of the symmetric binary perceptron model. Algorithms and algorithmic barriers.* DIMACS Workshop on Modeling Randomness in Neural Network Training: Mathematical, Statistical, and Numerical Guarantees, Rutgers University, NJ.

04/2024 *Optimizing p-spin glass model for large p* American Mathematical Society Sectional Meeting, University of San Francisco.

03/2024 *A curious case of the symmetric binary perceptron model. Algorithms and algorithmic barriers.* Conference on Information Sciences and Systems, Princeton University, NJ.

02/2024 *From Sparse Random Graphs to Mean-field Models and Back.* Computational Complexity of Statistical Inference workshop at Banff International Research Station. Alberta, Canada.

10/2023 *Overlap Gap Property: algorithmic fruits of the theory of spin glasses* Solvay Institute Conference on Physics (Congrès Solvay) 2023, Belgium

08/2023 *Combinatorial NLTS from random K-SAT and its properties* Statistical Physics meets Machine Learning Conference, Cargese, France.

06/2023 *Combinatorial NLTS from random K-SAT and its properties* Foundations of Data Science Institute (FODSI) conference, MIT, MA.

06/2023 *Overlap gap property: A topological barrier to optimizing over random structures* University of Texas Austin graduate mini-school, TX.

12/2022 *Quantum Algorithms with Shallow Depth. Probabilistic Properties and Algorithmic Barriers* Algorithmic Complexity of Statistical Inference program reunion workshop, Simons Institute for the Theory of Computing, UC Berkeley, CA.

09/2022 *Overlap gap property: A geometric barrier to optimization in random graphs.* 9th Polish Conference on Combinatorics, Bedlevo, Poland.

08/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Plenary presentation at the XII Conference of Georgian Mathematical Union, Batumi, Georgia.

05/2022 *Overlap gap property: A topological barrier to optimizing over random structures* Mathematics of Large Networks Workshop, Budapest, Hungary.

04/2022 *Improved lower bounds on the depth of polynomial size Boolean circuits for the independent set problem.* Oberwolfach workshop on Combinatorics, Probability and Computing, Obwerwolfach, Germany.

10/2021 *A curious case of symmetric binary perceptron model. Algorithms and barriers.* Workshop on Algorithmic Advances for Statistical Inference with Combinatorial Structure, Simons Institute for the Theory of Computing, UC Berkeley, CA.

10/2021 *High-dimensional statistics, algorithms, and algorithmic intractability* Tutorial at the Applied Probability Cluster, INFORMS 2021 Annual Meeting, Anaheim, CA.

11/2020 *In Search of New Algorithmic Complexity Theory for Random Structures* Presentation at FODSI Retreat (Online).

09/2020 *Low-Degree Hardness of Random Optimization Problems* Probabilistic Combinatorics Online 2020 conference, Moscow, Russia

12/2019 *Sparse High-Dimensional Isotonic Regression* Poster Presentation at NeuRIPS, Vancouver, Canada.

09/2019 *The Landscape of the Planted Clique Problem: Dense subgraphs and the Overlap Gap Property* 57th Annual Allerton Conference on Communication, Control, and Computing, Allerton, IL.

08/2019 *Algorithmic Challenges in High-Dimensional Inference Models. Insights from Statistical Physics* Conference on BIG Data, CMSA, Harvard University, Cambridge, MA.

07/2019 *The Hidden Clique Problem. 20 years later* BennyFest conference, ETH, Zurich, Switzerland.

05/2019 *Two Algorithmic Hardness Results in Statistical Mechanics and High-Dimensional Statistics* 3d Hungarian-Russian Conference on Combinatorics, Moscow, Russia.

04/2019 *Explicit construction of RIP matrices is Ramsey-hard* Oberwolfach workshop on Combinatorics, Probability and Computing, Obwerwolfach, Germany.

09/2018 *Two Algorithmic Hardness Results in Spin Glasses and Compressive Sensing* Banff International Research Station. Conference on Spin Glasses and Related Topics. Alberta, Canada.

09/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* The international workshop on Statistical Challenges in High-dimensional and Complex Data. Columbia University, NY, NY.

07/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* 12th International Vilnius Conference on Probability Theory and Mathematical Statistics and 2018 IMS Annual Meeting on Probability and Statistics. Vilnius, Lithuania.

07/2018 *A LOWER BOUND ON THE QUEUEING DELAY IN RESOURCE CONSTRAINED LOAD BALANCING* Conference on Stochastic Networks, Edinburgh, UK.

06/2018 *Performance of local algorithms in random structures. Power and limitations.* Workshop on Local Algorithms (WoLA), MIT, Cambridge, MA.

05/2018 *Maximum Cut problem on sparse random hypergraphs . Structural results using the interpolation method and the algorithmic implications.* Workshop on Algorithms & Randomness, Georgia Institute of Technology, GA.

05/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* 50-th Workshop on Combinatorial Statistics, Centre de Recherches Mathématiques (CRM), Montreal, CA.

04/2018 *Algorithms and Algorithmic Obstacles in High-Dimensional Regression* AMS East Sectional Spring Meeting, Boston, MA.

12/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Oberwolfach workshop on Network Models: Structure and Function, Obwerwolfach, Germany.

Performance of local algorithms in random structures. Power and limitations.

12/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems*

09/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* Conference on Randomness and Graphs. Processes and Structures, Eindhoven Technical University, Eindhoven, Netherlands

08/2017 *Uniqueness of gibbs measures for continuous hardcore models* Dagstuhl workshop on Computational Counting, Dagstuhl, Germany

04/2017 *Algorithmic Obstructions in High Dimensional Regression* Conference on Statistics and Data Sciences, IDSS, MIT, Cambridge, MA.

07/2017 *Sparse high-dimensional regression with binary coefficients* International Congress on Statistics, Marrakesh, Morocco

05/2017 *(Arguably) Hard on Average Constraint Satisfaction Problems* American Institute of Mathematics workshop on Phase transitions in randomized computational problems, San Jose, CA

01/2017 *On the limits of sequential local algorithms for random NAE-K-SAT problem* Oberwolfach workshop on Combinatorics, Obwerwolfach, Germany.

10/2016 *On Limits of Local Algorithms for Solving Random Constraint Satisfaction Problems* Workshop on Local Algorithms, Microsoft Research New England, Cambridge, MA.

5/2016 *Finding a Large Submatrix of a Random Matrix, and the Overlap Gap Property* Workshop on percolation, spin glasses and random media, Northwestern University, Evanston, IL.

4/2016 *Finding a Large Submatrix of a Gaussian Random Matrix* Oberwolfach workshop on Combinatorics and Probability, Obwerwolfach, Germany.

3/2016 *Finding a Large Submatrix of a Gaussian Random Matrix* Workshop on the Classification Program of Counting Complexity, Simons Institute, Berkeley University, Berkeley, CA.

3/2016 *(Arguably) Hard on Average Optimization Problems and the Overlap Gap Property* Workshop on Inference Problems Theme, Nexus of Information and Computation Theories, Institute of Henry Poincare, Paris, France.

01/2016 *(Arguably) Hard on Average Optimization Problems and the Overlap Gap Property* Conference on Physics Informed Machine Learning, Santa Fe, NM.

10/2015 *On the Resource/Performance Tradeoff in Large Scale Queueing Systems* Institute of Mathematics and Applications Annual Program Year Workshop Analysis and Control of Network Dynamics, IMA, Minnesota, MN.

07/2015 *Large Average Submatrix Detection in Gaussian Random Matrices.* 18th INFORMS/Applied Probability Society Conference, Istanbul, Turkey.

07/2015 *Join the Shortest Queue with Many Servers The Heavy Traffic Asymptotics.* 18th INFORMS/Applied Probability Society Conference, Istanbul, Turkey.

06/2015 *Limits of local algorithms for randomly generated constraint satisfaction problems* Banff Workshop on Groups, Graphs and Stochastic Processes, Banff, Canada.

03/2015 *Power and Limits of Local Algorithms in Random Combinatorial Structures* Workshop on Probability Theory and Combinatorial Optimization in honor of J. Michael Steele, Duke University, NC.

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 Orlean, 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.