Prof. Gregory Sorkin

Curriculum Vitae, October 2017

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Employment

2010–	London School of Economics, Chair of Management Science and Mathematics
1992–2010	IBM Research (Yorktown Heights, New York), Research Staff Member
1991–92	University of Edinburgh, Research Fellow
1983–86	IBM Research (Hawthorne, New York) Senior Associate Engineer

Education

1986–91	Ph.D. in Electrical Engineering and Computer Science, Berkeley (M.S. 1987)
1979–83	A.B. in Mathematics, magna cum laude, Harvard University

Research Interests

Optimization, satisfaction, and phase transitions in discrete random structures; algorithms; applications.

Recognition, Service, and Grants

various	Grant review panelist for US National Science Foundation
2014	Co-organizer, Univ. of Warick workshop *Phase transitions in discrete structures and computational problems*
2013	Co-organizer, Dagstuhl seminar *Exponential Algorithms: Algorithms and Complexity Beyond Polynomial Time*
2010	Co-organizer, Dagstuhl seminar *Exact Complexity of NP-Hard Problems*
2006–09	Co-chair and $191,500 NSF grant co-Principal Investigator, DIMACS (Center for Discrete Mathematics and Theoretical Computer Science, Rutgers, New Jersey) *Special Focus on Discrete Random Systems*
2009	Guest editor, special issue of *SIAM Discrete Mathematics and Applications*
2007	Participant, National Institute of Standards and Technology planning workshop, *Mathematical Foundations of a Measurement Science for Information Systems*, Washington DC
2004–	DIMACS: Chair, Projects Committee (2008–10, member '07); member, Postdoctoral Fellowship Selection Committee (2006–10); DIMACS member (2004–)
2001–03	Chair, IBM Goldstine Postdoctoral Fellowship committee
1999	Co-organizer, AMS special session on *Applied Probabilistic Combinatorics*
1998	IBM Master Inventor
1986–91	IBM Resident Study program; declined Berkeley EECS top "Micro" fellowship

Service at LSE

2016–	Mathematics, Deputy Head of Department (Research)
2014–	MSc Operations Research & Analytics Programme Director (formerly MSc Management Science)
2014–15	Operations Research Faculty Group lead
2012–14	Postgraduate Management Science Exam Sub-Board Chair
2010–13	Undergraduate Management Science Exam Sub-Board Chair

Teaching

London School of Economics and Political Science:

2017	MA231: Operational Research Methods
2017	MA429: Data Mining
2012–16	MG461: Quantitative Analysis in Management
2011–16	MA430: Efficient Algorithms for Hard Optimisation Problems (a course I introduced)
2010	MA428: Combinatorial Optimisation

Polytechnic University, Hawthorne, New York:

1996–97	String and text algorithms

Doctoral Student Mentoring and Examination:

2016–	Second supervisor for Balazs Mezei (Royal Holloway)
2012	"Opponent" for public defense of dissertation, Pekka Parviainen (Univ. of Helsinki)
2002–07	Mentor to IBM Research summer interns Serge Gaspers (Univ. of Bergen), Abraham Flaxman (Carnegie Mellon), MohammadTaghi Hajiaghayi (MIT)

Selected IBM projects

High-performance basic linear algebra subroutines (BLAS), transshipment port optimisation, manufacturing optimisation for multi-layer ceramic module (MLC) fabrication, limousine fleet scheduling, IBM AntiVirus (IBM's then #1-selling PC software)

Consulting

2016–17	Mathematical consulting.
2014	Patent consulting on anti-virus technology.

Recent Invited Talks

2017	*Extremal cuts and isoperimetry in random cubic graphs* Univ. of Birmingham
2014–16	*VCG Auction Mechanism Cost Expectations and Variances* Random Structures & Algorithms conference / Friezefest, Pittsburgh; CRM workshop, Barcelona; Svante Janson 60th celebration conference, Stockholm; Two One-Day Meetings in Combinatorics, London; LSE

2011–16 *Efficient Algorithms for 3-Dimensional Axial and Planar Random Assignment*
Oberwolfach; Univ. of Birmingham; Univ. of Helsinki; Univ. of Oxford; LSE; Uppsala Univ.

2014 *The Satisfiability Threshold for k-XORSAT*
Yahoo! Research, New York; British Mathematical Colloquium, London; EURANDOM workshop, Eindhoven

2010–14 *Punch and Die Optimization*
OR Society, London; LSE

Preprints and in Preparation

[1] G.B. Sorkin. Extremal cuts and isoperimetry in cubic random graphs. In preparation.

[2] S. Janson and G. B. Sorkin. Successive minimum spanning trees. In preparation.

[3] A. Frieze and W. Pegden and G. Sorkin. The distribution of minimum-weight cliques and other subgraphs in graphs with random edge weights. arXiv:1606.04925.

[4] S. Janson and G. B. Sorkin. VCG auction mechanism cost expectations and variances. arXiv:1310.1777.

Selected Journal Articles

[1] S. Gaspers and G. B. Sorkin. Separate, Measure and Conquer: Faster Polynomial-Space Algorithms for MAX 2-CSP and Counting Dominating Sets. *ACM Trans. Alg.* To appear.

[2] B. Pittel and G. B. Sorkin. The satisfiability threshold for k-XORSAT. *Comb. Probab. Comput.*, 25(2):236–268, 2016.

[3] D. Galvin, J. Kahn, D. Randall, and G. B. Sorkin. Phase coexistence and torpid mixing in the 3-coloring model on $\mathbb{Z}^d$. *SIAM J. Discrete Math.*, 29(3):1223–1244, 2015.

[4] A. Frieze and G. Sorkin. Efficient algorithms for three-dimensional axial and planar random assignment problems, *Random Structures and Algorithms*, 46 (1):160-196, 2015.

[5] S. Gaspers and G. B. Sorkin. A universally fastest algorithm for Max 2-Sat, Max 2-CSP, and everything in between. *J. Comput. System Sci.*, 78:305–335, 2012.

[6] G. B. Sorkin, A. Steger, and R. Zenklusen. A tight bound on the collection of edges in MSTs of induced subgraphs. *J. Combin. Theory Ser. B*, 99(2):428–435, 2009.

[7] M.-F. Balcan, N. Bansal, A. Beygelzimer, D. Coppersmith, J. Langford, and G. B. Sorkin. Robust reductions from ranking to classification. *Machine Learning*, 72(1–2):139–153, 2008.

[8] A. Frieze and G. B. Sorkin. The probabilistic relationship between the assignment and traveling salesman problems. *SIAM J. Comput.*, 36(5):1435–1452, 2007.

[9] O. Günlük, T. Kimbrel, L. Ladanyi, B. Schieber, and G. B. Sorkin. Vehicle routing and staffing for sedan service. *Transportation Science*, 40:313–326, 2006.

[10] A. D. Scott and G. B. Sorkin. Solving sparse random instances of Max Cut and Max 2-CSP in linear expected time. *Comb. Probab. Comput.*, 15(1–2):281–315, 2006.

[11] R. Arratia, B. Bollobás, and G. B. Sorkin. A two-variable interlace polynomial. *Combinatorica*, 24(4):567–584, 2004.

[12] R. Arratia, B. Bollobás, and G. B. Sorkin. The interlace polynomial of a graph. *J. Combin. Theory Ser. B*, 92(2):199–233, 2004. Special issue dedicated to W.T. Tutte.

[13] L. Trevisan, G. B. Sorkin, M. Sudan, and D. P. Williamson. Gadgets, approximation, and linear programming. *SIAM J. Comput.*, 29(6):2074–2097, 2000.

[14] M. Jerrum and G. B. Sorkin. The Metropolis algorithm for graph bisection. *Discrete Appl. Math.*, 8(1–3):155–175, 1998.

[15] G. Sorkin. The enumeration of nonhomeomorphic graphs by edges. *Ann. Discrete Math.*, 9:249–252, 1980.

Selected Invited Articles

[1] J. O. Kephart, G. B. Sorkin, D. M. Chess, and S. R. White. Fighting computer viruses. *Scientific American*, pages 88–93, 1997.

[2] S. Kirkpatrick and G. B. Sorkin. Simulated annealing. In M. Arbib, editor, *Handbook of Brain Theory and Neural Networks*, pages 876 – 879. MIT Press, Cambridge, MA, 1995.

Selected Patents

[1] G. B. Sorkin. Punch and die optimization. U.S. Patent 7,054,798, 2006.

[2] G. B. Sorkin. Method of constructing data classifiers and classifiers constructed according to the method. U.S. Patent 6,622,134 B1, 2003.

[3] J. O. Kephart and G. B. Sorkin. Generic disinfection of programs infected with a computer virus. U.S. Patent 5,613,002, 1997.

[4] D. M. Chess, J. O. Kephart, and G. B. Sorkin. Automatic analysis of a computer virus's structure and means of attachment to its hosts. U.S. Patent 5,485,575, 1996.