

# Prof Gregory Sorkin

## Curriculum Vitae, August 2015

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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  
1991–1992 University of Edinburgh, Research Fellow  
1983–1986 IBM Research (Hawthorne, New York), Senior Associate Engineer

### Education

1986–1991 Ph.D. in Electrical Engineering and Computer Science, Berkeley (M.S. 1987)  
1979–1983 A.B. in Mathematics, magna cum laude, Harvard University

### Research Interests

Random structures, phase transitions, optimization, discrete mathematics, algorithms

### Recognition, Service, and Grants

various Grant review panelist for US National Science Foundation  
2014 Co-organizer, Univ. of Warwick 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*  
2006–2009 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 2007); member, Post-doctoral Fellowship Selection Committee (2006–10); DIMACS member (2004–)  
2001–2003 Chair, IBM Goldstine Postdoctoral Fellowship committee  
1999 Co-organizer, AMS special session on *Applied Probabilistic Combinatorics*  
1998 IBM Master Inventor  
1986–1991 IBM Resident Study program; declined Berkeley EECS top “Micro” fellowship

## Service at LSE

- 2014– MSc Management Science Programme Director
- 2014–2015 Operations Research Faculty Group lead
- 2012–2014 Postgraduate Management Science Exam Sub-Board Chair
- 2010–2013 Undergraduate Management Science Exam Sub-Board Chair
- 2010–2014 Research Programme Director, Management Science

## Teaching

### *London School of Economics and Political Science:*

- 2012– MG461: Quantitative Analysis in Management
- 2011– OR437: Solving Unsolvable Problems: NP-completeness and how to cope with it (new course I developed)
- 2010 OR408: Combinatorial Optimization

### *Polytechnic University, Hawthorne, New York:*

- 1996–1997 String and text algorithms

### *Doctoral Student Mentoring and Examination:*

- 2012 “Opponent” for public defense of dissertation, Pekka Parviainen, Univ. of Helsinki
- 2002–2007 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)

## Recent Invited Talks

- 2014–2015 *VCG Auction Mechanism Cost Expectations and Variances*  
Random Structures & Algorithms conference, Pittsburgh; CRM workshop, Barcelona; Svante Janson 60th celebration conference, Stockholm; Two One-Day Meetings in Combinatorics, London; LSE
- 2014 *The Satisfiability Threshold for  $k$ -XORSAT*  
Yahoo! Research, New York; British Mathematical Colloquium, London; workshop EURANDOM, Eindhoven
- 2011–2013 *Efficient Algorithms for 3-Dimensional Axial and Planar Random Assignment*  
Oberwolfach; Univ. of Birmingham; Univ. of Helsinki; Univ. of Oxford; LSE
- 2011 *Faster Solving, Counting, and Sampling*  
OR Society, London
- 2010 *The Structure of Random  $r$ -SAT Below the Pure-Literal Threshold*  
Univ. of Warwick; SIAM Annual Meeting, Pittsburgh
- 2010–2014 *Punch and Die Optimization*  
OR Society, London; LSE

## Selected Journal Articles

- [1] B. Pittel and G. B. Sorkin. The satisfiability threshold for  $k$ -XORSAT. *Comb. Probab. Comput.* Available online 31 July 2015.
- [2] 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.
- [3] 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.
- [4] 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.
- [5] 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.
- [6] A. Frieze and G. B. Sorkin. The probabilistic relationship between the assignment and traveling salesman problems. *SIAM J. Comput.*, 36(5):1435–1452, 2007.
- [7] 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.
- [8] 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.
- [9] R. Arratia, B. Bollobás, and G. B. Sorkin. A two-variable interlace polynomial. *Combinatorica*, 24(4):567–584, 2004.
- [10] 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.
- [11] L. Trevisan, G. B. Sorkin, M. Sudan, and D. P. Williamson. Gadgets, approximation, and linear programming. *SIAM J. Comput.*, 29(6):2074–2097, 2000.
- [12] M. Jerrum and G. B. Sorkin. The Metropolis algorithm for graph bisection. *Discrete Appl. Math.*, 8(1–3):155–175, 1998.
- [13] 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.