# Eli Upfal
## Professor of Computer Science
## Brown University

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## Summary:

Eli Upfal is a professor of computer science at Brown University; where he was also the department chair from 2002 to 2007. Prior to joining Brown in 1998, he was a researcher and project manager at the IBM Almaden Research Center in California, and a professor of Applied Mathematics and Computer Science at the Weizmann Institute of Science in Israel.

Professor Upfal's research focuses on the design and analysis of algorithms. In particular he is interested in randomized algorithms, probabilistic analysis of algorithms, and computational statistics, with applications ranging from combinatorial and stochastic optimization to routing and communication networks, computational biology, and computational finance.

Professor Upfal published over 100 research papers in scientific journals and conferences. He is co-author of a popular textbook "Probability and Computing: Randomized Algorithms and Probabilistic Analysis" (with M. Mitzenmacher, Cambridge University Press 2005).

Professor Upfal is the inventor of 13 US patents. His patents related to sequencing by hybridizations (with F. Preparata) were licensed to GeneSpectrum Inc., a bio-tech startup (acquired by NABsys inc. in 2006).

Professor Upfal is a fellow of the IEEE and the Association for Computing Machinery (ACM). He received the IBM Outstanding Innovation Award, and the IBM Research Division Award, His work at Brown has been funded in part by the National Science Foundation (NSF), The Defense Advanced Research Projects Agency (DARPA), The office of Naval Research (ONR), and the National Institute of Health (NIH).

Professor Upfal has had consulting and research collaborations with a number of companies including IBM, Goldman Sachs, Yahoo!, Huawei Technologies, eHarmony, NABsys, and more. Occasionally he provides expert opinion in intellectual property litigations.

## Education:

**July, 1983**
Ph.D. in Computer Science. The Hebrew University, Jerusalem, Israel. Dissertation Topic - "Distributed Probabilistic Algorithms for Problems in Graph Theory, Communication, Synchronization, and Scheduling".

**September, 1980**
M.Sc. in Computer Science. The Feinberg Graduate School of the Weizmann Institute of Science, Rehovot, Israel.

**June, 1978**
B.Sc. Cum Laude, in Mathematics and Statistics. The Hebrew University, Jerusalem, Israel.

## Professional appointments:

**1998 - present**
Professor of Computer Science, Brown University.

**2007 - 2008**
Sabbatical at Dipartimento di Ingegneria dell'Informazione, Universita degli Studi di Padova.

**2002 - 2007**
Chair of the Computer Science Department, Brown University.

**1996 - 1997**
Manager, Foundations of Computer Science Group, IBM Research Division, Almaden Center.

**1995 - 1997**
Professor, The Weizmann Institute of Science (on leave from IBM).

**1989 - 1995**
Associate Professor, The Weizmann Institute of Science (on leave from IBM).

**1985 - 1996**
Research Staff Member, IBM Research Division, Almaden Center.

**1984 - 1985**
Post-Doctoral Research Fellow, Stanford University.

**1983 - 1984**
Research Fellow, University of California, Berkeley.

## Editorial boards:

- Journal of Discrete Algorithms (Editor in Chief) (2003 - ).

- Journal of the ACM (2007 - ).

- SIAM J. on Computing (2001-2004).

- SIAM J. on Discrete Algorithms (1999-2003).

- Web Intelligence and Agent Systems (2002-2004).

- Journal on Interconnection Networks (2000 - ).

- Computational Complexity (1990-2004).

- Random Structures & Algorithms (2002 - ).

- IEEE Transactions on Parallel and Distributed Computing (1998-2000).

## Post-Doctorate and Graduate students at Brown University (1998 – present):

- Post-Doctorate students:

  - Fabio Vandin (2009-present)
  - Milos Hauskrecht (1998-2000)
  - Irit Katriel (2007-2008)
  - Alex Slivkin (2007 - 2008)

- Ph.D. Students:

  - Gopal Pandurangan (1998 - 2002)
  - Aris Anagnostopoulos (2000 - 2006)
  - Matteo Riondato (2009 - )
  - Ahmad Mahmoody (2013 - )

- M.Sc. Students:
    - Harsh Kumar (1999 - 2001)
    - Jasminka Hasic (1999 - 2001)
    - Adi Ganz (2001 -2002)
    - William Sheffler (2002-2004)

## Honors:

- Best Paper Award, RECOMB 2013.

- ACM Fellow, 2005.

- IBM Faculty Award 2003, 2005.

- IEEE Fellow, 2002.

- IBM Research Division Award, 1997.

- The Levinson Prize in Mathematical Sciences, 1994.

- IBM Outstanding Innovation Award, 1993

- The Norman D. Cohen Professorial Chair of Computer Science at the Weizmann Institute, 1992 – 1997.

- Revson Career Development Award, 1988-1990.

- Bat-Sheva Fellow - Bat-Sheva de Rothscild Award for Young Outstanding Researchers, 1988.

- The Swig-Weiler Career Development Chair, 1987.

- IBM Outstanding Innovation Award, 1986.

- Weizmann Post-Doctoral Fellowship, 1983 – 1985.

- G. Y. Yashinsky memorial fund award for an outstanding Ph.D. thesis, 1982.

## Funding at Brown University (1998 – present):

- NSF-CCR-9731477: Design and Analysis of Dynamic Processes: A Stochastic Approach, 7/98-6/02.

- Goldman, Sachs & Co.: Computation Problems in Valuation and Management of Inventory, 9/98-9/00.

- NSF-DBI-9983081: Applying Universal Bases to Achieving the Full Potential of SBH, 7/99-6/02.

- DARPA/Air Force F30602-00-2-0599: Stochastic Models for Web Agents and the Web Environment, 7/00 - 9/02.

- NSF-CCR-0121154: ITR/SY Algorithmic Issues in Large Scale Dynamic Networks, 9/01-9/06.

- NSF-DMI-0121495: ITR/SY Stochastic Combinatorial Optimization, 9/01-8/05.

- NSF-IIS 0325838: ITR Collaborative Proposal: Aurora - Enabling Stream-Based Monitoring Applications, 10/03-10/07.

- NSF DMI-0600384: *"Online Stochastic Combinatorial Optimization"*, 7/06-7/09.

- ONR DEPSCOR Award N000140610607, *"Adaptive and Robust Resource Allocation and Scheduling"*, 7/06-7/09.

- Yahoo! Research Alliance Gift - 2006, 2008.

- NSF IIS-0905553: "III: Medium: Longview: Querying the Future Now", 8/09-7/12

- NSF IIS-1016648: "III Small: Algorithmic Approaches for Pathway and Gene Group Analysis in Genetic Studies", 8/10-7/13

- NSF IIS-1247581: "BIGDATA: Mid-Scale: DA: Analytical Approaches to Massive Data Computation with Applications to Genomics", 10/12-9/16

- NIH 1R01 CA180776: "Analytical Approaches to Massive Data Computation with Applications to Genomics", 6/13-3/17

- NIH 1R01 HG007069: "Computational Characterization of Genetic Heterogeneity", 9/13-8/16.

## CONSULTING AND BUSINESS COLLABORATIONS:

Consulting and research collaborations with a number of companies including IBM, Goldman Sachs, Yahoo!, eHarmony Inc., and more.

Currently:

- Consultant and member of the Scientific Advisory Board of NABsys Inc.

- Consultant of Huawei Technologies Co., Ltd.

- Occasionally I do legal technical consulting, such as prior art searches and providing expert opinion.

# List of Publications

## Book:

A1. M. Mitzenmacher and E. Upfal. *Probability and Computing: Randomized Algorithms and Probabilistic Analysis.* Cambridge University Press, 2005. Translations: Chinese - 2007, Japanese, Polish - 2009.

## Papers in Journals

B1. Vandin F, Upfal E, Raphael BJ. De novo discovery of mutated driver pathways in cancer. Genome Res. 2012 Feb;22(2):375-85

B2. Vandin F, Upfal E, Raphael BJ. Finding Driver Pathways in Cancer: Models and Algorithms. Algorithms Mol Biol. 2012 Sep 6;7(1):23.

B3. A. Kirsch, M. Mitzenmacher, A. Pietracaprina, G, Pucci, E. Upfal, F. Vandin: An Efficient Rigorous Approach for Identifying Statistically Significant Frequent Itemsets. J. ACM 59(3): 12 (2012)

B4. F. Vandin, E. Upfal, B. J. Raphael: Algorithms and Genome Sequencing: Identifying Driver Pathways in Cancer. IEEE Computer 45(3): 39-46 (2012)

B5. F. Vandin, E. Upfal and B. Raphael. Algorithms for Detecting Significantly Mutated Pathways in Cancer. Journal of Computational Biology. March 2011, 18(3): 507-522.

B6. A. Anagnostopoulos, R. Kumar, M. Mahdian, E. Upfal: Sorting and selection on dynamic data. Theor. Comput. Sci. 412(24): 2564-2576 (2011)

B7. Roberto Grossi, Andrea Pietracaprina, Nadia Pisanti, Geppino Pucci, Eli Upfal, and Fabio Vandin. MADMX: A Strategy for Maximal Dense Motif Extraction. Journal of Computational Biology. April 2011, 18(4): 535-545

B8. A. Pietracaprina, M. Riondato, E. Upfal and F. Vandin: Mining top-K frequent itemsets through progressive sampling. Data Min. Knowl. Discov. 21(2): 310-326 (2010)

B9. M. Akdere, U. Cetintemel and E. Upfal: Database-support for Continuous Prediction Queries over Streaming Data. PVLDB 3(1): 1291-1301 (2010)

B10. A.Z. Broder, A. Kirsch, R. Kumar, M. Mitzenmacher, E. Upfal and S. Vassilvitskii. "The Hiring Problem and Lake Wobegon Strategies." *SIAM Journal on Computing*, 39(4): 1233-1255, 2009.

B11. I. Katriel, C. Kenyon-Mathieu and E. Upfal. "Commitment under uncertainty: Two-stage stochastic matching problems". *Theor. Comput. Sci.* 408(2-3): 213-223, 2008.

B12. G. Pandurangan and E. Upfal. "Entropy-Based Bounds for Online Algorithms" *ACM Transactions on Algorithms*, Vol. 3:1, 2007.

B13. G. Pandurangan, P. Raghavan, and E. Upfal. "Using PageRank to Characterize Web Structure", *Internet Mathematics*, Vol. 3:1 2006, pp. 120.

B14. A. Anagnostopoulos, I. Kontoyiannis and E. Upfal. Steady state analysis of balanced-allocation routing. *Random Structures & Algorithms*, Volume 26, 2005, pp. 446-467.

B15. A. Anagnostopoulos, A. Kirsch and E. Upfal. Stability and Efficiency of a Random Local Load Balancing Protocol. *SIAM Journal on Computing*, Vol. 34, 2005, pp. 616-639.

B16. A. Anagnostopoulos, R. Bent, E. Upfal and P. van Hentenryck. A simple and deterministic competitive algorithm for online facility locations. *Information and Computation*, Vol. 194, 2004, pp. 175–202.

B17. A. Flaxman, Alan Frieze and E. Upfal "Efficient Communication in an Ad-hoc Network". *Journal of Algorithms*, Vol. 52, pp. 1-7, 2004.

B18. F. Preparata, S.A. Heath and E. Upfal. "Sequence Construction from nucleic-acid micro-array data". in *Analytical Techniques in DNA Sequencing*, eds. B. Nunnally. Marcel Dekker Inc, 2004.

B19. C. McDiarmid, M. Luzak and E. Upfal. "On-line routing of random calls". *Probability Theory and Related Fields*, Vol. 125, 2003, pp. 457–482.

B20. G. Pandurangan, P. Raghavan and E. Upfal. "Building Low-Diameter Peer-to-Peer Networks". *IEEE Journal on Selected Areas in Communication*, Vol. 21, 995–1002, 2003.

B21. N. Shavit, E. Upfal and A. Zemach. A Wait-Free Sorting Algorithm. *Theory of Computer Systems*, Vol. 34, 2001, pp. 519-544.

B22. A.Z. Broder, A.M. Frieze, and E. Upfal. "A general approach to dynamic packet routing with bounded buffers." *J. of the ACM*, Vol. 48, 2001, pp. 324–349.

B23. M. Hauskrecht, L. Ortiz, I. Tsochantaridis, and E. Upfal. "Efficient Methods for Computing Investment Strategies for Multi-Market Commodity Trading." *Applied Artificial Intelligence*, Vol. 15, 2001, pp. 429–452.

B24. Y. Azar, A. Broder, A. Karlin, and E. Upfal. "Balanced allocations". *SIAM J. on Computing*, Vol. 29, 2000, pp. 180–200.

B25. F. P. Preparata and E. Upfal. "Sequencing-by-hybridization at the information-theory bound: an optimal algorithm". *Journal of Computational Biology,* Vol. 7, 2000, pp. 621–630.

B26. G. Pandurangan and E. Upfal. Static and Dynamic Evaluation of QoS Properties. *Journal of Interconnection Networks*, Vol. 1, 2000, pp. 135–150.

B27. A.Z. Broder, A.M. Frieze, and E. Upfal. "Static and dynamic path selection on expander graphs: a random walk approach". *Random Structure & Algorithms*, Vol. 14, 1999, pp. 87–109.

B28. A.M. Frieze, F.P. Preparata, E. Upfal. "Optimal reconstruction of a sequence from its probes". *Journal of Computational Biology,* Vol. 6, 1999, pp. 361-368.

B29. A.L. N. Reddy and E. Upfal. "Real-Time Communication Scheduling in a Multicomputer Video Server". *Journal of Parallel and Distributed Computing*, Vol. 58, 1999, pp. 425–445.

B30. P. Raghavan and E. Upfal. "Stochastic contention resolution with short delays". *SIAM J. on Computing*, Vol. 28, 1998, pp. 709–719.

B31. A.Z. Broder, A.M. Frieze, S. Suen, and E. Upfal. "Optimal construction of edge-disjoint paths in random graphs." *SIAM J. on Computing*, Vol. 28, 1998, pp. 541–573.

B32. N. Shavit, E. Upfal, and A. Zemach. "A steady state analysis of diffracting trees". Special issue of *Theory of Computing Systems*, Vol 31, 1998, pp. 403-423.

B33. A. Pelc and E. Upfal. "Reliable fault diagnosis with few tests".*Combinatorics, Probability and Computing*, Vol. 7, 1998, pp. 323–333.

B34. A. Borodin, P. Raghavan, B. Schieber, and E. Upfal. "How much can hardware help routing?" *J. of the ACM*, Vol. 44, 1997, pp. 726–741.

B35. J. Bruck, C.–T. Ho, S. Kipnis, E. Upfal, and D. Weathersby. "Efficient algorithms for all-to-all communication in multiport message-passing systems". *IEEE Trans. on Parallel and Distributed Computing*, Vol. 8, 1997, pp 1143–1156.

B36. E. Upfal, S. Felperin, and M. Snir. "Randomized routing with shorter paths". *IEEE Transactions on Parallel and Distributed Computing*, Vol. 7, 1996, pp. 356-362.

B37. S. Felperin, P. Raghavan, and E. Upfal, "A theory of wormhole routing in parallel computers". *IEEE Transactions on Computing*, Vol. 45, 1996, pp. 704–713.

B38. Andrei Z. Broder, Martin E. Dyer, Alan M. Frieze, Prabhakar Raghavan, and Eli Upfal. "The worst-case running time of the random simplex algorithm is exponential in the height". *Information Processing Letters*, Vol. 56, 1995, pp. 79–81.

B39. A. Broder, A. Karlin, P. Raghavan and E. Upfal, "Trading space for time in undirected $s - t$ connectivity". *SIAM J. on Computing,* Vol. 23, 1994, pp. 324–334.

B40. A. Broder, A. Frieze, E. Shamir, and E. Upfal, "Near-perfect token distribution". *Random Structure & Algorithms*, Vol. 5, 1994, pp. 559–572.

B41. U. Feige, D. Peleg, P. Raghavan and E. Upfal, "Computing with noisy information". *SIAM J. on Computing,* Vol. 23, 1994, pp. 1001–1018.

B42. A. Broder, A. Frieze, and E. Upfal, "The existence and construction of edge disjoint paths on expander graphs". *SIAM J. on Computing,* Vol. 23, 1994, pp. 976–989.

B43. E. Upfal, "Tolerating linear number of faults in networks of bounded degree". *Journal of Information and Computation*, Vol. 114, 1994, pp. 312–320.

B44. E. Upfal, "An $O(\log N)$ deterministic packet routing algorithm". *J. of the ACM,* Vol. 39, 1992, pp. 55-70.

B45. S. Assaf and E. Upfal, "Fault tolerant sorting network". *SIAM J. on Discrete Mathematics*, Vol. 4, 1991, pp. 472-480.

B46. P. Peleg and E. Upfal, "A time-randomness tradeoff for oblivious routing". *SIAM J. on Computing*, Vol. 19, 1990, pp. 256-266.

B47. U. Feige, D. Peleg, P. Raghavan, and E. Upfal, "Randomized broadcast in networks". *Random Structures & Algorithms*, Vol. 1, 1990, pp. 447-460.

B48. D. Peleg and E. Upfal, "Constructing disjoint paths on expander graphs". *Combinatorica*, Vol. 9, 1989, pp. 289-313.

B49. D. Peleg and E. Upfal, "The token distribution problem". *SIAM J. on Computing*, Vol. 18, 1989, pp. 229-243.

B50. D. Peleg and E. Upfal, "A tradeoff between space and efficiency for routing tables". *J. the of ACM*, Vol. 36, 1989, pp. 510-530.

B51. R.M. Karp, E. Upfal and A. Wigderson, "The complexity of parallel search". In Special Issue of *J. of Computer and System Sciences*, Vol. 36, 1988, pp. 225-253.

B52. C. Dwork, D. Peleg, N. Pippenger and E. Upfal, "Fault tolerance in network of bounded degree". *SIAM J. on Computing*, Vol. 17, 1988, pp. 975-988.

B53. A. Borodin, F. Fich, F. Meyer auf der Heide, E. Upfal and A. Wigderson, "A tradeoff between search and update time for the implicit dictionary problem". *Theoretical Computer Science*, Vol. 58, 1988, pp. 57-68.

B54. A. Karlin and E. Upfal, "Parallel Hashing - an efficient implementation of shared memory". *J. of the ACM*, Vol 35, 1988, pp. 876-892.

B55. A. Borodin, F. Fich, F. Meyer auf der Heide, E. Upfal and A. Wigderson, "Time space tradeoff for element distinctness". *SIAM J. on Computing,* Vol. 16, 1987, pp. 97-99.

B56. E. Upfal and A. Wigderson, "How to share memory in a distributed system". *J. of the ACM,* Vol. 34, 1987, pp. 116-127.

B57. E. Shamir and E. Upfal, "A probabilistic approach to the load-sharing problem". *Journal of Parallel and Distributed Computing,* Vol. 4, 1987, pp. 521-530.

B58. D. Peleg and E. Upfal, "The generalized packet routing problem". *Theoretical Computer Science*, Vol. 53, 1987, pp. 281-293.

B59. D. Dolev, E. Upfal and M. Warmuth, "The parallel complexity of scheduling with precedence constrains". *Journal of Parallel and Distributed Computing*, Vol. 3, 1986, pp. 553-576.

B60. R.M. Karp, E. Upfal and A. Wigderson, "Constructing a perfect matching is in Random NC". *Combinatorica*, Vol. 6, 1986, pp. 35-48.

B61. J. Schmidt-Pruzan, E. Shamir and E. Upfal, "Random hypergraph coloring algorithms and the weak chromatic number". *Journal of Graph Theory*, Vol. 8. 1985, pp. 347-362.

B62. E. Shamir and E. Upfal, "A fast parallel construction of disjoint paths in networks". In *Topics in the Theory of Computing*, M. Karpinski and J. van Leeuwen ed. *Annals of Discrete Mathematics*, Vol 24, 1985, pp. 141-154.

B63. E. Upfal, "Efficient schemes for parallel communication". *J. of the ACM*, Vol. 31, 1984, pp. 507-517.

B64. E. Shamir and E. Upfal, "Large regular factors in random graphs". *Annals of Discrete Math*, Vol. 20, 1984, pp. 271-282.

B65. E. Shamir and E. Upfal, "Sequential and distributed graph coloring algorithms with performance analyses in random graphs spaces". *Journal of Algorithms*, Vol. 5, 1982, pp. 488-501.

B66. E. Upfal, "Formal correctness proofs of a nondeterministic program". *Information Processing Letters*, Vol. 14, 1982, pp. 86-92.

B67. E. Shamir and E. Upfal, "One-factor in random graphs based on vertex choice". *Discrete Math.* Vol. 41, 1982, pp. 281-286.

B68. E. Shamir and E. Upfal, "One factor in random graphs". *Israel Journal of Math.* Vol. 39, 1981, pp. 296-302.

## Papers in Refereed Conferences:

C1. Atish Das Sarma, Anisur Rahaman Molla, Gopal Pandurangan, Eli Upfal: Fast Distributed PageRank Computation. ICDCN 2013: 11-26

C2. Fabio Vandin, Alexandra Papoutsaki, Benjamin J. Raphael, Eli Upfal: Genome-Wide Survival Analysis of Somatic Mutations in Cancer. RECOMB 2013: 285-286

C3. John Augustine, Anisur Rahaman Molla, Ehab Morsy, Gopal Pandurangan, Peter Robinson, Eli Upfal: Storage and search in dynamic peer-to-peer networks. SPAA 2013: 53-62

C4. Vandin F, Clay P, Upfal E, Raphael BJ. Discovery of mutated subnetworks associated with clinical data in cancer. Pac Symp Biocomput. 2012:55-66.

C5. J. Augustine, G. Pandurangan, P. Robinson, E. Upfal: Towards robust and efficient computation in dynamic peer-to-peer networks. SODA 2012: 551-569

C6. M. Riondato, E. Upfal: Efficient Discovery of Association Rules and Frequent Itemsets through Sampling with Tight Performance Guarantees. ECML/PKDD (1) 2012: 25-41

C7. B. Bahmani, R, Kumar, M. Mahdian, E. Upfal: PageRank on an evolving graph. KDD 2012: 24-32

C8. A. Anagnostopoulos, R. Kumar, M. Mahdian, E. Upfal, F. Vandin: Algorithms on evolving graphs. ITCS 2012: 149-160

C9. A. Pietracaprina, G. Pucci, M. Riondato, F. Silvestri, E. Upfal: Space-round tradeoffs for MapReduce computations. ICS 2012: 235-244

C10. M. Akdere, U. etintemel, M. Riondato, E. Upfal, S. B. Zdonik: Learning-based Query Performance Modeling and Prediction. ICDE 2012: 390-401

C11. M. Riondato, J. A. DeBrabant, R. Fonseca, E. Upfal: PARMA: a parallel randomized algorithm for approximate association rules mining in MapReduce. CIKM 2012: 85-94

C12. M. Akdere, U. Cetintemel, M. Riondato, E. Upfal, S. B. Zdonik: The Case for Predictive Database Systems: Opportunities and Challenges. CIDR 2011: 167-174

C13. M. Riondato, M. Akdere, U. Cetintemel, S. B. Zdonik, E. Upfal: The VC-Dimension of SQL Queries and Selectivity Estimation through Sampling. ECML/PKDD (2) 2011: 661-676

C14. A. Pettarin, A. Pietracaprina, G. Pucci, E. Upfal: Tight bounds on information dissemination in sparse mobile networks. PODC 2011: 355-362

C15. F. Vandin, E. Upfal, B. J. Raphael: De Novo Discovery of Mutated Driver Pathways in Cancer. RECOMB 2011: 499-500

C16. J. Duggan, U. Cetintemel, O. Papaemmanouil, E. Upfal: Performance prediction for concurrent database workloads. SIGMOD Conference 2011: 337-348

C17. F. Vandin, E. Upfal, B. J. Raphael: Finding Driver Pathways in Cancer: Models and Algorithms. WABI 2011: 314-325

C18. A. Anagnostopoulos, C. Dombry, N. Guillotin-Plantard, I. Kontoyiannis, and E. Upfal. Stochastic Analysis of the k-Server Problem on the Circle. Proc. 21st International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2010), Vienna, Austria, June-July 2010.

C19. M. Akdere, U. Cetintemel and E. Upfal: Database-support for Continuous Prediction Queries over Streaming Data. VLDB 3(1): 1291-1301 (2010)

C20. F. Vandin, E. Upfal and B. Raphael. Algorithms for Detecting Significantly Mutated Pathways in Cancer. *RECOMB 2010*, 506-521.

C21. A.Anagnostopoulos, R. Kumar, M. Mahdian and E. Upfal. "Sort Me If You Can: How to Sort Dynamic Data". *36th International Colloquium on Automata, Languages and Programming (ICALP'09)* (2) 2009: 339-350, 2009.

C22. A. Kirsch, M. Mitzenmacher, A. Pietracaprina, G. Pucci, E. Upfal, F. Vandin. "An efficient rigorous approach for identifying statistically significant frequent itemsets". *ACM PODS'09*, 117-126, 2009.

C23. R. Grossi, A. Pietracaprina, N. Pisanti, G. Pucci, E. Upfal, F. Vandin. "MADMX: A Novel Strategy for Maximal Dense Motif Extraction"'. *9th Workshop on Algorithms in Bioinformatics (WABI'09)*: 362-374, 2009.

C24. A. Slivkins and Eli Upfal. "Adapting to a Changing Environment: the Brownian Restless Bandits" *Proceedings of the 21st Annual Conference on Learning Theory (COLT)*, 2008, 343-354.

C25. F. Radlinski, D. Chakrabarti, R. Kumar, E. Upfal. "Mortal Multi-Armed Bandits". *Proceedings of the 22nd Annual Conference on Neural Information Processing Systems (NIPS 2008)*.

C26. R. Kleinberg, A. Slivkins and Eli Upfal. "Multi-armed bandits in metric spaces." *Proceedings of the 40th ACM Symposium on Theory of Computing* (STOC 2008), pp. 681-690.

C27. A. Z. Broder, A. Kirsch, R. Kumar, M. Mitzenmacher, E. Upfal and S. Vassilvitskii. "The hiring problem and Lake Wobegon strategies". *SODA '08: Proceedings of the nineteenth annual ACM-SIAM symposium on Discrete algorithms*, 2008, pp. 1184–1193.

C28. I. Katriel, M. Sellmann, E. Upfal, and P. Van Hentenryck. "Propagating Knapsack Constraints in Sublinear Time. *Proceedings of the Twenty-Second Conference on Artificial Intelligence, (AAAI07)*,Vancouver, Canada.

C29. I. Katriel, C. Kenyon and E. Upfal. "Commitment Under Uncertainty: Two-Stage Stochastic Matching Problems". *Proceedings of the 34th International Colloquium on Automata, Languages and Programming (ICALP)*, Wrocaw, Poland. Luly, 2007.

C30. F. Chierichetti, A. Panconesi, P.Raghavan, M. Sozio, A. Tiberi and E. Upfal. "Finding Near Neighbors Through Cluster Pruning". *Proceedings of the 26th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, Beijing, China. June 10-15, 2007.

C31. Will Sheffler, Eli Upfal, John Sedivy and William Stafford Noble. "A learned comparative expression measure for Affymetrix GeneChip DNA microarrays." *Proceedings of the Computational Systems Bioinformatics Conference*, August 8-11, 2005, Stanford, CA. pp. 144-154.

C32. A. Anagnostopoulos, A. Kirsch and Eli Upfal. "Stability and Efficiency of a Random Local Load Balancing Protocol." *28th Annual Symposium on Foundations of Computer Science (FOCS)*, Boston, MA, November 2003.

C33. A. Anagnostopoulos, I. Kontoyiannis and E. Upfal. "The Advantage of Balanced-Allocation Routing for ATM Networks". *2003 IEEE International Symposium on Information Theory (ISIT-2003)*, Yokohama, Japan, June 2003.

C34. G. Pandurangan, P. Raghavan, and E. Upfal. "Using PageRank to Characterize Web Structure", *Proceedings of the 8th Annual International Conference on Combinatorics and Computing (COCOON)*, Singapore, 2002, LNCS 2387, Springer-Verlag , pages 330-339.

C35. Gopal Pandurangan, Prabhakar Raghavan and Eli Upfal. "Building Low-diameter P2P Networks". *42nd Annual Symposium on Foundations of Computer Science*, Las Vegas, Nevada, 2001, pp. 492–499.

C36. M. Hauskrecht and E. Upfal. "A Clustering Approach to Solving Large Stochastic Planning Problems". *17th Conference on Uncertainty in Artificial Intelligence (UAI-2001)*, August 2001.

C37. G. Pandurangan and E. Upfal. "Can Entropy Characterize Performance of Online Algorithms?" *12th ACM-SIAM Symposium on Discrete Algorithms*, January 2001.

C38. R. Kumar, P. Raghavan, S. Rajagopalan, D. Sivakumar, A. Tomkins, and Eli Upfal. "Stochastic models for the Web graph." *Proceedings of the 41st IEEE Symp. on Foundations of Computer Science.* November 2000, pp. 57–65.

C39. F.P. Preparata and E.Upfal. "Sequencing-by-hybridization at the information-theory bound: an optimal algorithm." *Fourth Annual International Conference on Computational Molecular Biology.* April 2000.

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