

# Adam L. Buchsbaum

Lion Cave Capital, LLC  
295 Main St.  
Chatham, NJ 07928

Email: my-three-initials at myfirstnamelastname.com  
Web page: <http://myfirstnamelastname.com>

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## Education

- Ph.D., Computer Science 1993  
Princeton University, Princeton, NJ  
*Advisor:* Robert E. Tarjan  
*Dissertation:* Data-Structural Bootstrapping and Catenable Deques
- M.A., Computer Science 1991  
Princeton University, Princeton, NJ
- Sc.B. *magna cum laude* with departmental honors, Mathematics and Computer Science 1988  
Brown University, Providence, RI

## Professional Experience

- Lion Cave Capital, LLC, Chatham, NJ  
CEO 2022–present  
COO 2013–2022  
Member of Technical Staff 2008–2013
- AT&T Labs–Research, Florham Park, NJ  
Principal Member of Technical Staff 1999–2008  
Network Services Research Lab  
Senior Technical Staff Member 1996–1999  
Speech and Image Processing Services Research Lab and Network Services Research Lab
- AT&T Bell Laboratories, Murray Hill, NJ  
Member of Technical Staff 1993–1996  
Linguistics Research Department
- Bell Communications Research, Morristown, NJ  
Research Intern Summer 1990  
Mathematics, Information Sciences and Operations Research Division  
Research Intern Winter 1986  
Software Engineering Research Group
- AT&T Bell Laboratories, Murray Hill, NJ  
Senior Technical Associate (highest of several positions) 9 periods during 1982–1988  
Radio Physics Research Department, Acoustics Research Department, and Linguistics Research Department

## Honors and Awards

- Fannie and John Hertz Foundation Fellow, 1990–93.
- Princeton University Merit Prize, 1988.

## Research and Technical Interests

Software and algorithm design and implementation for financial trading.  
Design, analysis, implementation, and experimentation of and with algorithms and data structures, especially for graph problems, massive data sets, and data compression.

## Computing Experience

- C, since 1978; C++, since 2000; LISP, 5 years.
- UNIX scripting: sh/bash/ksh, awk, etc., since 1978.
- Linux kernel and hardware provisioning, since 1995.

## Publications

### Volumes Edited

1. A. L. Buchsbaum, ed., *ACM Transactions on Algorithms* **4**(2), 2008, special issue on invited papers from *SODA 2005*.
2. A. L. Buchsbaum and J. Snoeyink, eds. *Proc. 3rd Wks. on Algorithm Engineering and Experiments*, volume 2153 of *Lecture Notes in Computer Science*, Springer-Verlag, 2001.

### Refereed Journal Papers

3. J. S. Plank, A. L. Buchsbaum, B. T. Vander Zanden. Minimum density RAID-6 codes. *ACM Transactions on Storage*. **6**(4), 2011.
4. A. L. Buchsbaum, L. Georgiadis, H. Kaplan, A. Rogers, R. E. Tarjan, J. R. Westbrook. Linear-Time Algorithms for Dominators and Other Path-Evaluation Problems. *SIAM Journal on Computing*. **38**(4):1533–73, 2008.
5. A. L. Buchsbaum, R. Giancarlo, B. Racz. New Results for Finding Common Neighborhoods in Massive Graphs in the Data Stream Model. *Theoretical Computer Science*. **407**(1–3):302–9, 2008.
6. A. L. Buchsbaum, E. R. Gansner, C. M. Procopiuc, S. Venkatasubramanian. Rectangular Layouts and Contact Graphs. *ACM Transactions on Algorithms*. **4**(1), Article 8 (28 pp.), 2008.
7. A. Bagchi, A. L. Buchsbaum, M. T. Goodrich. Biased Skip Lists. *Algorithmica* special issue on invited papers from *ISAAC'02*. **42**(1):31–48, 2005.
8. A. L. Buchsbaum, G. S. Fowler, B. Krishnamurthy, K.-P. Vo, J. Wang. Fast Prefix Matching of Bounded Strings. *ACM J. Experimental Algorithmics* special issue on invited papers from *ALENEX'03*. <http://www.jea.acm.org>, **10**, 2005.
9. A. L. Buchsbaum, M. T. Goodrich. Three-Dimensional Layers of Maxima. *Algorithmica*. **39**(4):275–86, 2004.
10. A. L. Buchsbaum, H. Karloff, C. Kenyon, N. Reingold, M. Thorup. *OPT* versus *LOAD* in Dynamic Storage Allocation. *SIAM J. Computing*. **33**(3):632–46, 2004.
11. A. L. Buchsbaum, G. S. Fowler, R. Giancarlo. Improving Table Compression with Combinatorial Optimization. *Journal of the ACM*. **50**(6):825–51, 2003.
12. A. L. Buchsbaum, R. Giancarlo, J. R. Westbrook. On Finding Common Neighborhoods in Massive Graphs. *Theoretical Computer Science*. **299**(1–3):707–18, 2003.
13. J. Abello, A. L. Buchsbaum, J. R. Westbrook. A Functional Approach to External Graph Algorithms. *Algorithmica*. **32**(3):437–58, 2002.
14. A. L. Buchsbaum, Y. Chen, H. Huang, E. Koutsoufios, J. Mocenigo, A. Rogers, M. Jankowsky, S. Mancoridis. Visualizing and Analyzing Software Infrastructures. *IEEE Software*. **18**(5):62–70, 2001.
15. A. L. Buchsbaum, R. Giancarlo, J. R. Westbrook. An Approximate Determinization Algorithm for Weighted Finite-State Automata. *Algorithmica*. **30**(4):503–26, 2001.
16. A. L. Buchsbaum, R. Giancarlo, J. R. Westbrook. On the Determinization of Weighted Finite Automata. *SIAM Journal on Computing*. **30**(5):1502–31, 2000.
17. A. L. Buchsbaum, H. Kaplan, A. Rogers, J. R. Westbrook. A New, Simpler Linear-Time Dominators Algorithm. *ACM Transactions on Programming Languages and Systems*. **20**(6):1265–96, 1998. *Corrigendum*, **27**(3):383–7, 2005.
18. A. L. Buchsbaum, R. Giancarlo. Algorithmic Aspects in Speech Recognition: An Introduction. *ACM Journal of Experimental Algorithmics*. <http://www.jea.acm.org>, **2**, 1997.
19. A. L. Buchsbaum, R. Sundar, R. E. Tarjan. Data-Structural Bootstrapping, Linear Path Compression, and Catenable Heap-Ordered Double-Ended Queues. *SIAM Journal on Computing*. **24**(6):1190–206, 1995.
20. A. L. Buchsbaum, R. Sundar, R. E. Tarjan. Lazy Structure Sharing for Query Optimization. *Acta Informatica*. **32**:255–70, 1995.
21. A. L. Buchsbaum, R. E. Tarjan. Confluently Persistent Deques via Data-Structural Bootstrapping. *Journal of Algorithms*. **18**:513–47, 1995.

22. A. L. Buchsbaum, M. Mihail. Monte Carlo and Markov Chain Techniques for Network Reliability and Sampling. *Networks*. **25**(3):117–30, 1995.
23. A. L. Buchsbaum, M. C. Carlisle. Determining Uni-Connectivity in Directed Graphs. *Information Processing Letters*. **48**(1):9–12, 1993.
24. A. L. Buchsbaum, P. C. Kanellakis and J. S. Vitter. A Data Structure for Arc Insertion and Regular Path Finding. *Annals of Mathematics and Artificial Intelligence*. **3**(2–4):187–210, 1991.

### Refereed Conference Papers

25. A. L. Buchsbaum, E. R. Gansner, and S. Venkatasubramanian. Directed Graphs and Rectangular Layouts. In *Proc. Asia-Pacific Symp. on Visualisation (APVIS07)*, pp. 61–64, 2007.
26. A. L. Buchsbaum, A. Efrat, S. Jain, S. Venkatasubramanian, and K. Yi. Restricted Strip Covering and the Sensor Cover Problem. In *Proc. 18th Symp. on Discrete Algorithms*, pp. 1056–65, 2007.
27. J. S. Plank, A. L. Buchsbaum, R. L. Collins, M. G. Thomason. Small Parity-Check Erasure Codes—Exploration and Observations. in *Proc. 2005 IEEE Int'l. Conf. on Dependable Systems and Networks*, 2005.
28. A. L. Buchsbaum, H. Karloff, C. Kenyon, N. Reingold, M. Thorup. *OPT* versus *LOAD* in Dynamic Storage Allocation. In *Proc. 35th ACM Symp. on Theory of Computing*, pp. 556–64, 2003.
29. A. L. Buchsbaum, G. S. Fowler, B. Krishnamurthy, K.-P. Vo, J. Wang. Fast Prefix Matching of Bounded Strings. In *Proc. 5th Wks. on Algorithm Engineering and Experiments*, pp. 128–39, SIAM, 2003.
30. A. Bagchi, A. L. Buchsbaum, M. T. Goodrich. Biased Skip Lists. In *Proc. 13th Int'l. Symp. on Algorithms and Computation, Lecture Notes in Computer Science*, vol. 2518, pp. 1–13, 2002.
31. A. L. Buchsbaum, M. T. Goodrich. Three-Dimensional Layers of Maxima. In *Proc. 10th Euro. Symp. on Algorithms, Lecture Notes in Computer Science*, vol. 2461, pp. 257–69, 2002.
32. A. L. Buchsbaum, G. S. Fowler, R. Giancarlo. Improving Table Compression with Combinatorial Optimization. In *Proc. 13th ACM-SIAM Symp. on Discrete Algorithms*, pp. 213–22, 2002.
33. A. L. Buchsbaum, M. T. Goodrich, J. R. Westbrook. Range Searching Over Tree Cross Products. In *Proc. 8th Euro. Symp. on Algorithms, Lecture Notes in Computer Science*, vol. 1879, pp. 120–31, 2000.
34. A. L. Buchsbaum, R. Giancarlo. Algorithmic Aspects of Speech Recognition: A Synopsis. In *Proc. 11th Symp. on Combinatorial Pattern Matching, Lecture Notes in Computer Science*, vol. 1848, pp. 27–32, 2000.
35. A. L. Buchsbaum, J. R. Westbrook. Maintaining Hierarchical Graph Views. In *Proc. 11th ACM-SIAM Symp. on Discrete Algorithms*, pp. 566–75, 2000.
36. A. L. Buchsbaum, D. F. Caldwell, K. W. Church, G. S. Fowler, S. Muthukrishnan. Engineering the Compression of Massive Tables: An Experimental Approach. In *Proc. 11th ACM-SIAM Symp. on Discrete Algorithms*, pp. 175–84, 2000.
37. A. L. Buchsbaum, M. Goldwasser, S. Venkatasubramanian, J. R. Westbrook. On External Memory Graph Traversal. In *Proc. 11th ACM-SIAM Symp. on Discrete Algorithms*, pp. 859–60, 2000.
38. A. L. Buchsbaum, H. Kaplan, A. Rogers, and J. R. Westbrook. Linear-Time Pointer-Machine Algorithms for Least Common Ancestors, MST Verification, and Dominators. In *Proc. 29th ACM Symp. on the Theory of Computing*, pp. 279–88, 1998.
39. J. Abello, A. L. Buchsbaum, J. R. Westbrook. A Functional Approach to External Graph Algorithms. In *Proc. 6th Ann. Euro. Symp. on Algorithms, Lecture Notes in Computer Science*, vol. 1461, pp. 332–43, 1998.
40. A. L. Buchsbaum, R. Giancarlo, J. R. Westbrook. On the Determinization of Weighted Finite Automata. In *Proc. 25th Int'l. Coll. on Automata, Languages, and Programming, Lecture Notes in Computer Science*, vol. 1443, pp. 482–93, 1998.
41. A. L. Buchsbaum, R. Giancarlo, J. R. Westbrook. Shrinking Language Models by Robust Approximation. In *Proc. IEEE Int'l. Conf. on Acoustics, Speech, and Signal Processing (ICASSP-98)*, v. 2, pp. 685–8, Seattle, Washington, 1998.
42. A. L. Buchsbaum, J. P. H. van Santen. Methods for Optimal Text Selection. In *Proc. 5th Euro. Conf. on Speech Communication and Technology*, v. 2, pp. 553–6, Rhodes, Greece, 1997.
43. H. Alshawi, A. L. Buchsbaum. A Comparison of Head Transducers and Transfer for a Limited Domain Translation Application. In *Proc. 36th Ann. Mtg. of the Asso. for Computational Linguistics*, Madrid, Spain, 1997.
44. H. Alshawi, A. L. Buchsbaum. State-Transition Cost Functions and an Application to Language Translation. In *Proc. IEEE Int'l. Conf. on Acoustics, Speech, and Signal Processing (ICASSP-97)*, v. 1, pp. 103–6, Munich, Germany, 1997.

45. A. L. Buchsbaum, J. P. H. van Santen. Selecting Training Inputs via Greedy Rank Covering. In *Proc. 7th ACM-SIAM Symp. on Discrete Algorithms*, pp. 288–95, 1996.
46. A. L. Buchsbaum, M. Mihail. Monte Carlo and Markov Chain Techniques for Network Reliability and Sampling. In *Proc. DIMACS Workshop on Computational Support for Discrete Mathematics, DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, **15**:199–222, 1994.
47. A. L. Buchsbaum, R. E. Tarjan. Confluently Persistent Deques via Data Structural Bootstrapping. In *Proc. 4th ACM-SIAM Symp. on Discrete Algorithms*, pp. 155–64, 1993.
48. A. L. Buchsbaum, R. Sundar, R. E. Tarjan. Data Structural Bootstrapping, Linear Path Compression, and Catenable Heap Ordered Double Ended Queues. In *Proc. 33rd IEEE Symp. on Foundations of Computer Science*, pp. 40–9, 1992.
49. A. L. Buchsbaum, P. C. Kanellakis, J. S. Vitter. A Data Structure for Arc Insertion and Regular Path Finding (Extended Abstract). In *Proc. 1st ACM-SIAM Symp. on Discrete Algorithms*, pp. 22–31, 1990.

### Unrefereed Papers/Technical Reports

50. A. L. Buchsbaum, M. Mihail. Software for Simulating and Analyzing Markov Chains. Tech. Report TM-ARH-020-376, Bellcore, 1991.

### Invited Presentations

- Restricted Strip Covering and the Sensor Cover Problem. U. Aarhus, 2006.
- Applications and Hardness of Link-Eval on a Path. Dagstuhl Data Structures Seminar, 2004.
- Rectangular Layouts and Contact Graphs. University of California, Irvine, 2003.
- Fast Prefix Matching of Bounded Strings. Dagstuhl Experimental Algorithms Seminar, 2002.
- Three-Dimensional Layers of Maxima. Dagstuhl Data Structures Seminar, 2002.
- Range Searching Over Tree Cross Products. Dagstuhl Data Structures Seminar, 2000.
- Functional External Graph Algorithms. SIAM Mini-symposium on Massive Graph Algorithmics, SIAM Annual Meeting, 1999.
- A Functional Approach to External Graph Algorithms. DIMACS Workshop on External Memory Algorithms and Visualization, 1998.

### Professional Activities

- Editorial Board memberships:
  - Theory of Computing Systems: 2008.
  - Journal of Graph Algorithms and Applications: 2005–2008.
- Program/Organizing Committees chaired
  - 16th ACM-SIAM Symp. on Discrete Algorithms (SODA): 2005.
  - DIMACS Special Focus on Data Analysis and Mining: 2001–2004.
  - DIMACS Working Group on Streaming Data Analysis: 2003, 2001.
  - 3rd Wks. on Algorithm Engineering and Experiments (ALENEX): 2001, (co-chair).
  - SIAM Mini-symposium on Massive Graph Algorithmics: 1999.
- Steering Committee member of:
  - Wks. on Algorithm Engineering and Experiments (ALENEX), 2001–2008.
- Program Committee member of:
  - Workshop on Experimental Algorithms (WEA): 2008, 2007.
  - Scandinavian Workshop on Algorithm Theory (SWAT): 2006.
  - European Symp. on Algorithms (ESA): 2005.
  - Int'l. Coll. on Automata, Languages, and Programming (ICALP): 2005.
  - ACM-SIAM Symp. on Discrete Algorithms (SODA): 2005, 2004, 2001.
  - Int'l. Symp. on Algorithms and Computation (ISAAC): 2004.
  - Workshop on Combinatorial and Algorithmic Aspects of Networking, Banff Int'l. Research Station: 2004.

- DIMACS Working Group on Compression in Networks and Applications: 2002.
- Workshop on Algorithmic Aspects of Advanced Programming Languages, (Part of PLI'99): 1999.
- Member of DIMACS (Center for Discrete Mathematics and Theoretical Computer Science) committees:
  - Projects Committee (chair), 2007–2008; suggests topics for future DIMACS activities.
  - Volume Series Chief Editorial Committee, 2004–2008; sets policy and selects proposals for publication in the AMS-DIMACS book series.
  - Council, 2001–2008; advisory body of DIMACS leaders.
  - Postdoc Selection Committee, 2001–2008; selects from applications for post-doctoral positions.
  - Module Series Editorial Board, 1997–2007; chooses and edits modules for the educational modules series.
  - Education Committee, 1996–2008; sets policy for and devises educational programs.
- Dissertation committee member for:
  - Renato Werneck, Princeton University, 2006.
  - Loukas Georgiadis, Princeton University, 2005.
  - John Iacono, Rutgers University, 2001.
- Other panels
  - ACM *J. Experimental Algorithms* Editor-in-Chief search committee, 2008.
  - ACM SGB Task Force on the Impact of Increasing Conference Submissions, 2005.
  - NSF grant review panel (1); details upon request.
- Journal referee (from 1996):
  - IEEE Transactions on Knowledge and Data Engineering: 2008, 2007, 2002.
  - ACM Transactions on Algorithms: 2007, 2006, 2005, 2004.
  - Algorithmica: 2007, 2006, 2005, 2002.
  - IEEE Transactions on Computers: 2007, 2006, 2004.
  - ACM Journal of Experimental Algorithmics: 2006, 2005, 2004.
  - Theoretical Computer Science: 2006, 2003.
  - Journal of Discrete Algorithms: 2005.
  - Combinatorica: 2004.
  - ACM Transactions on Programming Languages & Systems: 2003, 2001, 2000.
  - Journal Automata Language & Combinatorics: 2003, 2002.
  - Journal of Algorithms: 2003, 2002, 1999, 1998, 1997.
  - SIAM Journal on Computing.: 2003, 1998, 1997.
  - Discrete Applied Mathematics: 2002.
  - Software Practice & Experience: 2002, 2001.
  - VLBD Journal: 2002.
  - Journal of the ACM: 2001.
  - Parallel Programming Letters: 2001.
  - Information Processing Letters: 2000, 1996.
  - Journal of Functional Programming: 2000.
  - Journal of Computer and System Sciences: 1996.
- Professional memberships
  - Association for Computing Machinery.
  - Society for Industrial and Applied Mathematics.

## Patents Granted

1. Preload Library for Transparent File Transformation, with K.-P. Vo, U.S. patent nos. 7,536,418, 8,065,348.

2. Method for Fast Network-Aware Clustering, with G.S. Fowler, B. Krishnamurthy, K.-P. Vo, and J. Wang, U.S. patent nos. 7,219,160, 7,627,691.
3. Fast Prefix Matching of Bounded Strings, with G.S. Fowler, B. Krishnamurthy, K.-P. Vo, and J. Wang, U.S. patent no. 7,191,168.
4. Graph Algorithm for Common Neighborhood Analysis, with R. Giancarlo and J. R. Westbrook, U.S. patent nos. 7,051,074, 7,269,628.
5. Method and Apparatus for Generating Approximate Weighted Finite-State Automata, with R. Giancarlo and J. R. Westbrook, U.S. patent nos. 6,073,098, 6,266,634.
6. System and Method for Selecting Training Text, with J. P. H. van Santen, U.S. patent no. 6,038,533.

**Patent Applications Pending**

7. Rectangular Layouts for Display of Graph-Based Information, with E. R. Gansner, C. M. Procopiuc, and S. Venkatasubramanian, filed 4/30/2003.
8. Method and Apparatus for Providing an Incrementally Deployable Enhanced Communication Protocol, with S. M. Bellovin and S. Muthukrishnan, filed 7/12/1999.

**Personal**

Born 1966. United States citizen. Married with two children.