

MICHAEL A. BENDER

Associate Professor
Department of Computer Science
State University of New York at Stony Brook
Stony Brook, NY 11794-4400 USA

Phone : (631) 632-7835
Fax : (631) 632-8334
Email: bender@cs.sunysb.edu
Web : <http://www.cs.sunysb.edu/~bender>

Personal Data

Married.
U.S. citizen.
Foreign languages: Fluent in French, Spanish.

Employment

Associate Professor. Dept of Computer Science, SUNY Stony Brook, 2004 – present.
Visiting Research Fellow. Dept of Computer Science, Kings College London, 2004 – 2005.
Assistant Professor. Dept of Computer Science, SUNY Stony Brook, 1998 – 2004.
Visiting Scientist. Computer Science and AI Laboratory, MIT, 2003 – 2004.
Research Associate. Bell Laboratories, Lucent Technologies, Murray Hill, summer 1996.

Education

Harvard University. PhD 1998 and SM 1995 in Computer Science.
Advisor: M. Rabin. Thesis: *New Algorithms and Metrics for Scheduling*.
Ecole Normale Supérieure de Lyon, France. Diplôme d'Etudes Approfondies (DEA)
d'Informatique Fondamentale, Magistère d'Informatique et de Modelisation. *Mention bien*, 1993.
Harvard University. AB *Magna Cum Laude*, Highest Honors in Applied Mathematics, 1992.

Honors

1. Undergraduate Teaching Award, Dept of Computer Science, SUNY Stony Brook, 2006.
2. R&D 100 Award for Compute Process Allocator, 2006. Joint award with V. Leung (Sandia Labs), D. Bunde (UIUC), K. Pedretti (Sandia Labs), C. Phillips (Sandia Labs).
3. PODS Best Newcomer Award, 2006.
4. Dean's Award for Excellence in Graduate Teaching by a Faculty Member, SUNY Stony Brook, 2005.
5. Graduate Teaching Award, Dept of Computer Science, SUNY Stony Brook, 2000.
6. United University Professionals Individual Development Award for SUNY, 2001-2003, 2005, 2006.
7. Rotary Fellowship at the Ecole Normale Supérieure de Lyon, France, 1992 – 1993.

Program Committees

1. 10th Annual Fall Workshop on Computational Geometry 2000.
2. Genetic and Evolutionary Computation Conference (GECCO) 2001.
3. 1st International Workshop on Efficient Algorithms (WEA) 2001.
4. Latin American Theoretical Informatics (LATIN) 2002.
5. Genetic and Evolutionary Computation Conference (GECCO) 2002.
6. 5th Workshop on Algorithm Engineering and Experiments (ALENEX) 2003.
7. Symposium on Discrete Algorithms (SODA) 2003.
8. 10th International Conference on High Performance Computing (HiPC) 2003.
9. Latin American Theoretical Informatics (LATIN) 2004.
10. 3rd International Conference on FUN with Algorithms (FUN) 2004.
11. 11th International Conference on High Performance Computing (HiPC) 2004.
12. Genetic and Evolutionary Computation Conference (GECCO) 2004.
13. 15th Annual International Symposium on Algorithms and Computation (ISAAC) 2004.
14. 10th Annual International Computing and Combinatorics Conference (COCOON) 2004.
15. 13th Annual European Symposium on Algorithms (ESA) 2005.
16. 2nd Multidisciplinary International Conference on Scheduling (MISTA) 2005.
17. 12th International Conference on High Performance Computing (HiPC) 2005 (Vice-Chair, Algorithms Track).
18. 11th European Conference on Parallel Processing (Euro-Par) 2005 (Vice-Chair, Scheduling and Load Balancing).
19. 20th IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2006.
20. 12th International Conference on Parallel and Distributed Systems (ICPADS), 2006.
21. 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA) 2006.
22. 13th String Processing and Information Retrieval (SPIRE) 2006.
23. 21st IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2007.
24. Workshop on Programming Models for Grid Computing (PMGC) 2007.
25. Latin American Theoretical Informatics (LATIN) 2008.
26. 9th Workshop on Algorithm Engineering and Experiments (ALENEX) 2008.
27. 35th International Colloquium on Automata, Languages, and Programming (ICALP), 2008.

Other Selected Professional Activities

1. Co-organizer. Dagstuhl Seminar 04301: Cache-Oblivious and Cache-Aware Algorithms, 2004.
2. Publicity Chair. Symposium on Parallelism in Algorithms and Architectures (SPAA), 2000-2007.
3. Guest editor. *Journal of Algorithms* Special Issue on SODA 2003.
4. Editor. *Journal of Discrete Algorithms*, 2004-present.
5. Co-organizer. CIRM Center at Marseille-Luminy: Scheduling Algorithms for New Emerging Applications, 2006.

Patents

United States Patent 6,112,221. A System and Method for Scheduling Webservers with a Quality-of-Service Guarantee for Each User. M. A. Bender, S. Chakrabarti, and S. Muthukrishnan.

United States Patent Application Serial No. 11/110,466. Fault Tolerant, Deadlock-Free Routing, and Routing-Based Processor Allocation in a Multiple Processor Computing Apparatus. V. J Leung, M. A. Bender, D. P. Bunde, and C. A. Phillips.

Grants

1. CoPI: "Algorithms in Support of Scalable Tactical Imagery eXploitation," subcontract from ISX Corporation on a grant from DARPA. \$40,000 (with E. Arkin, AMS, and J. Mitchell, AMS). Award effective: 8/1/99-12/25/00.
2. CoPI: "Algorithms in Support of Pheromone Robotics," subcontract from HRL Laboratories on a grant from DARPA. \$171,062 (with E. Arkin, AMS, and J. Mitchell, AMS). Award effective: 9/1/99-9/1/2002.
3. CoPI: "ITR/SY(CISE): Cache-Oblivious Data Structures," National Science Foundation (with L. Arge, Duke, and E. Demaine, MIT). \$449,571, \$161,529 SUNY portion. Award effective: 9/1/2001-8/31/2004.
4. PI: "Algorithmic Support for Cplant Scheduling," Sandia National Laboratories. \$46,132 (with E. Arkin, AMS). Award effective: 6/11/01-9/28/01.
5. CoPI: "Nanoscale Single Electron Switching Arrays for Self-Evolving Neuromorphic Networks," National Science Foundation. \$599,980 (with K. Likarev, Physics, J. Lukens, Physics, and A. Mayr, Physics). Award effective: 7/01/01-6/30/03.
6. PI: "Data Structures and Algorithms for Maintaining Data Locality," National Science Foundation. \$149,937. Award effective: 7/15/2002-6/30/2005.
7. PI: "Algorithmic Support for Cplant Scheduling," Sandia National Laboratories. \$20,351. Award effective: 6/11/02-9/20/02.
8. PI: "Algorithmic Support for Cplant Scheduling," Sandia National Laboratories. \$34,680. Award effective: 5/1/03-1/1/03.
9. CoPI: "ITR: Transactions Everywhere," National Science Foundation (with B. Kuszmaul, MIT, and C. Leiserson, MIT). \$650,000, \$100,000 SUNY portion. Award effective: 9/03-8/04.
10. PI: "Collaborative Research: High-Performance Data Access through Memory Abstraction," National Science Foundation (with M. Farach-Colton). \$199,836 SUNY portion. Award effective: 08/01/06-07/31/09.
11. CoPI: "Authenticating Reality," National Science Foundation (with R. Johnson and D. Samaras). \$350,000. Award effective: 10/01/06-9/30/09.

12. PI: "HECURA: Collaborative Research: Techniques for Streaming File Systems and Databases," National Science Foundation (with M. Farach-Colton). \$141,378 SUNY portion. Award effective: 08/01/06-01/31/08.
13. PI: "Techniques for Massive-Data Collection in Wireless and Sensor Networks." Center of Excellence in Wireless and Information Technology (CEWIT). \$10,000. Award effective: 1/07-12/07.
14. PI: "Collaborative Research: Adversarial Contention Resolution," National Science Foundation (with M. Farach-Colton). \$166,999. SUNY portion. Award effective: 3/01/07-02/28/10.

Refereed Journal Publications

1. M. A. Bender and H. A. Stone. An Integral Equation Approach to the Study of the Steady-State Current at Surface Microelectrodes. *Journal of Electroanalytical Chemistry and Interfacial Chemistry*, 351:29–55, 1993.
2. M. A. Bender, M. Gastaldo, and M. Morvan. Parallel Interval Order Recognition and Construction of Interval Representations. *Theoretical Computer Science*, 143(1):73–91, 1995.
3. Y. Aumann, M. A. Bender, and L. Zhang. Efficient Execution of Nondeterministic Parallel Programs on Asynchronous Systems. *Information and Computation*, 139(1):1–16, 1997.
4. M. A. Bender and C. Chekuri. Performance Guarantees for the TSP with a Parameterized Triangle Inequality. *Information Processing Letters*, 73:17-21, 2000.
5. M. Sato, I. Bitter, M. A. Bender, A. E. Kaufman, and M. Nakajima. Tree-Structure Extraction Algorithm for Accurate and Robust Skeletons (in Japanese). *The Journal of the Institute of Image Information and Television Engineers*, 2000.
6. C. Chekuri and M. A. Bender. An Efficient Approximation Algorithm for Minimizing Makespan on Uniformly Related Machines. *Journal of Algorithms*, 41:212–224, 2001.
7. M. A. Bender and D. Ron. Testing Properties of Directed Graphs: Acyclicity and Connectivity. *Random Structures and Algorithms*, 20(2): 184–205, 2002.
8. M. Andrews, M. A. Bender, and L. Zhang. New Algorithms for the Disk Scheduling Problem. *Algorithmica*, 32(2): 277–301, 2002.
9. M. A. Bender and M. O. Rabin. Online Scheduling of Parallel Programs on Heterogeneous Systems with Applications to Cilk. *Theory of Computing Systems Special Issue on SPAA '00*, 35: 289–304, 2002.
10. M. A. Bender, A. Fernández, D. Ron, A. Sahai, and S. Vadhan. The Power of a Pebble: Exploring and Mapping Directed Graphs. *Information and Computation*, 176(1):1–21, 2002.
11. E. M. Arkin, M. A. Bender, J. S. B. Mitchell, and S. S. Skiena. The Lazy Bureaucrat Scheduling Problem. *Information and Computation*, 184(1):129–146, 2003.

12. C. M. Bender, M. A. Bender, E. D. Demaine, S. P. Fekete. What is the Optimal Shape of a City? *Journal of Physics A: Mathematical and General*, 37:147–159, 2004.
Journal of Physics A #1 Most Downloaded Article in 2004.
13. M. A. Bender and M. Farach-Colton. The Level Ancestor Problem Simplified. *Theoretical Computer Science Special Issue on LATIN '02*, 321(1):5–12, 2004.
14. E. M. Arkin, M. A. Bender, E. D. Demaine, M. L. Demaine, J. S. B. Mitchell, S. Sethia, and S. S. Skiena. When Can You Fold a Map? *Computational Geometry: Theory and Applications (CGTA)*, 29(1):23–46, 2004. Special issue of selected papers from the 10th Annual Fall Workshop on Computational Geometry, 2000.
15. M. Sztainberg, E. M. Arkin, M. A. Bender, and J. S. B. Mitchell. Theoretical and Experimental Analysis of Heuristics for the Freeze-Tag Robot Awakening Problem. *IEEE Transactions on Robotics and Automation*, 20(4):691–701, 2004.
16. M. A. Bender, S. Muthukrishnan, and R. Rajaraman. Approximation Algorithms for Average Stretch Scheduling. *Journal of Scheduling Special Issue on SODA 02*, 7(3):195–222, 2004.
17. M. A. Bender, Z. Duan, J. Iacono, and J. Wu. A Locality-Preserving Cache-Oblivious Dynamic Dictionary. *Journal of Algorithms*, 3(2):115–136, 2004.
Journal of Algorithms Hottest Article, #1 Most Downloaded in 2004.
18. M. A. Bender, S. Sethia, and S. Skiena. Data Structures for Maintaining Set Partitions. *Random Structures and Algorithms*, 25:43–67, 2004.
19. Y. Aumann and M. A. Bender. Efficient Low-Contention Asynchronous Consensus with the Value-Oblivious Adversary Scheduler. *Distributed Computing*, 17(3): 191–207, 2005.
20. M. A. Bender, E. Demaine, and M. Farach-Colton. Cache-Oblivious B-Trees. *SIAM Journal on Computing*, 35(2): 341–358, 2005.
21. E. M. Arkin, M. A. Bender, E. D. Demaine, S. P. Fekete, J. S. B. Mitchell, and S. Sethia. Optimal Covering Tours with Turn Costs. *SIAM Journal on Computing*, 35(3): 531–566, 2005.
22. M. A. Bender, M. Farach-Colton, G. Pemmasani, S. Skiena, P. Sumazin. Least Common Ancestors in Trees and Directed Acyclic Graphs. *Journal of Algorithms*, 57(2): 75–94, 2005.
23. M. A. Bender, M. Farach-Colton, and M. Mosteiro. Insertion Sort is $O(n \log n)$. *Theory of Computing Systems* 39(3): 391–397, 2006. Special Issue on *LATIN '04*.
24. E. M. Arkin, M. A. Bender, S. P. Fekete, J. S. B. Mitchell, and M. Skutella. The Freeze-Tag Problem: How to Wake Up a Swarm of Robots. *Algorithmica*, 46(2): 193–221, 2006.
25. L. Arge, M. A. Bender, E. D. Demaine, B. Holland-Minkley, and J. I. Munro. Cache-Oblivious Priority Queue and Graph Algorithm Applications. *SIAM Journal on Computing*, 36(6): 1672–1695, 2007.

26. M. A. Bender, B. Bradley, G. Jagannathan, and K. Pillaipakkamnatt. Sum-of-Squares Heuristics for Bin Packing and Memory Allocation. *Journal of Experimental Algorithms*, 12: 2.3, 2007.
27. C. M. Bender and M. A. Bender. Optimal Shape of a Blob. *Journal of Mathematical Physics*, 2007. 48, 073518, 2007.
28. M. A. Bender, D. P. Bunde, E. D. Demaine, S. P. Fekete, V. J. Leung, H. Meijer, and C. A. Phillips. Communication-Aware Processor Allocation for Supercomputers. *Algorithmica* Special Issue on *WADS '05*, 2007. To appear.
29. M. A. Bender, R. Clifford, and K. Tsichlas. Scheduling Algorithms for Procrastinators. *Journal of Scheduling*, 2007. To appear.
30. M. A. Bender, D. Ge, S. He, H. Hu, R. Pinter, S. Skiena, and F. Swidan. Improved Bounds on Sorting with Length-Weighted Reversals. *Journal of Computer and Systems Sciences*, 2007. To appear.
31. M. A. Bender and H. Hu. An Adaptive Packed-Memory Array. *Transactions on Database Systems* Special Issue on *PODS '06*, 2007. To appear.

Refereed Conference Publications

32. M. A. Bender and D. K. Slonim. The Power of Team Exploration: Two Robots Can Learn Unlabeled Directed Graphs. *Proceedings of the 35th Annual Symposium on Foundations of Computer Science (FOCS)*, pages 75–85, 1994.
33. Y. Aumann and M. A. Bender. Efficient Asynchronous Consensus with the Value-Oblivious Adversary Scheduler. *Proceedings of the 23rd International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 622–633, 1996.
34. M. Andrews, M. A. Bender, and L. Zhang. New Algorithms for the Disk Scheduling Problem. *Proceedings of the 37th Annual Symposium on Foundations of Computer Science (FOCS)*, pages 580–589, 1996.
35. Y. Aumann, M. A. Bender, and L. Zhang. Efficient Execution of Nondeterministic Parallel Programs on Asynchronous Systems. *Proceedings of the 8th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 270–276, 1996.
36. Y. Aumann and M. A. Bender. Fault-Tolerant Data Structures. *Proceedings of the 37th Annual Symposium on Foundations of Computer Science (FOCS)*, pages 580–589, 1996.
37. M. A. Bender, S. Chakrabarti, and S. Muthukrishnan. Flow and Stretch Metrics for Scheduling Continuous Job Streams. *Proceedings of the 9th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 270–279, 1998.
38. M. A. Bender, A. Fernández, D. Ron, A. Sahai, and S. Vadhan. The Power of a Pebble: Exploring and Mapping Directed Graphs. *Proceedings of the 30th Annual ACM Symposium on Theory of Computing (STOC)*, pages 269–278, 1998.

39. C. Chekuri and M. Bender. An Efficient Approximation Algorithm for Minimizing Makespan on Uniformly Related Machines. *Proceedings of the 6th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, pages 383–393, 1998.
40. E. M. Arkin, M. A. Bender, J. S. B. Mitchell, and S. S. Skiena. The Lazy Bureaucrat Scheduling Problem. *Proceedings of the 6th Workshop on Discrete Algorithms (WADS)*, pages 80–85, 1999.
41. M. A. Bender and C. Chekuri. Performance Guarantees for the TSP with a Parameterized Triangle Inequality. *Proceedings of the 6th Workshop on Discrete Algorithms (WADS)*, pages 122–133, 1999.
42. M. A. Bender and M. Farach-Colton. The LCA Problem Revisited. *Latin American Theoretical INformatics (LATIN) 2000*, pages 88–94, 2000.
43. M. A. Bender, S. Sethia, and S. Skiena. Data Structures for Maintaining Set Partitions. *Proceedings of the 7th Scandinavian Workshop on Algorithm Theory (SWAT)*, pages 83–96, 2000.
44. M. A. Bender and D. Ron. Testing Acyclicity of Directed Graphs in Sublinear Time. *Proceedings of the 27th International Colloquium on Automata, Languages, and Programming (ICALP)*, pages 809–820, 2000.
45. M. A. Bender and M. O. Rabin. Scheduling Cilk Multithreaded Computations on Processors of Different Speeds. *Proceedings of the 12th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, pages 13–21, 2000.
46. I. Bitter, M. Sato, M. A. Bender, K. T. McDonnell, A. Kaufman, and M. Wan. CEASAR: A Smooth, Accurate, and Robust Centerline Extraction Algorithm. *IEEE Visualization*, pages 45–52, 2000.
47. M. Sato, I. Bitter, M. A. Bender, and A. E. Kaufman. TEASAR: Tree-Structure Extraction Algorithm for Accurate and Robust Skeletons. *Proceedings of the 8th Pacific Conference on Computer Graphics and Applications Graphics*, pages 281–287, 2000.
48. M. A. Bender, E. D. Demaine, and M. Farach-Colton. Cache-Oblivious B-Trees. *Proceedings of the 41st Annual Symposium on Foundations of Computer Science (FOCS)*, pages 399–409, 2000.
49. E. M. Arkin, M. A. Bender, E. D. Demaine, S. P. Fekete, J. S. B. Mitchell, and S. Sethia. Optimal Covering Tours with Turn Costs. *Proceedings of the 12th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 138–147, 2001.
50. M. A. Bender, G. Pemmasani, P. Sumazin, and S. P. Skiena. Finding Least Common Ancestors in Directed Acyclic Graphs. *Proceedings of the 12th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 845–854, 2001.
51. E. M. Arkin, M. A. Bender, E. D. Demaine, M. L. Demaine, J. S. B. Mitchell, S. Sethia, and S. S. Skiena. When Can You Fold a Map? *Proceedings of the 7th Workshop on Discrete Algorithms (WADS)*, pages 401–413, 2001.

52. E. M. Arkin, M. A. Bender, S. P. Fekete, J. S. B. Mitchell, and M. Skutella. The Freeze-Tag Problem: How to Wake Up a Swarm of Robots. *Proceedings of the 13th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 568–577, 2002.
53. M. A. Bender, Z. Duan, J. Iacono, and J. Wu. A Locality-Preserving Cache-Oblivious Dynamic Dictionary. *Proceedings of the 13th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 29–38, 2002.
54. M. A. Bender, S. Muthukrishnan, and R. Rajaraman. Improved Algorithms for Stretch Scheduling. *Proceedings of the 13th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 762–771, 2002.
55. M. A. Bender and M. Farach-Colton. The Level Ancestor Problem Simplified. *Latin American Theoretical INformatics (LATIN)*, pages 508–515, 2002.
56. L. Arge, M. A. Bender, E. D. Demaine, B. Holland-Minkley, and J. I. Munro. Cache-Oblivious Priority Queue and Graph Algorithm Applications. *Proceedings of the 34th Annual ACM Symposium on Theory of Computing (STOC)*, pages 268–276, 2002.
57. M. A. Bender, R. Cole, and R. Raman. Exponential Structures for Cache-Oblivious Algorithms. *Proceedings of the 29th International Colloquium on Automata, Languages, and Programming (ICALP)*, 195–207, 2002.
58. M. Sztainberg, E. M. Arkin, M. A. Bender, and J. S. B. Mitchell. Analysis of Heuristics for the Freeze-Tag Problem. *Proceedings of the 8th Scandinavian Workshop on Algorithm Theory (SWAT)*, pages 270–279, 2002.
59. M. A. Bender, R. Cole, E. Demaine, and M. Farach-Colton. Scanning and Traversing: Maintaining Data for Traversals in a Memory Hierarchy. *Proceedings of the 10th European Symposium on Algorithms (ESA)*, pages 139–151, 2002.
60. M. A. Bender, E. Demaine, M. Farach-Colton, and J. Zito. Two Simplified Algorithms for Maintaining Order in a List. *Proceedings of the 10th European Symposium on Algorithms (ESA)*, pages 152–164, 2002.
61. M. A. Bender, E. Demaine, and M. Farach-Colton. Efficient Tree Layout in a Multilevel Memory Hierarchy. *Proceedings of the 10th European Symposium on Algorithms (ESA)*, pages 165–173, 2002.
62. V. Leung, E. M. Arkin, M. A. Bender, D. Bunde, J. Johnston, A. Lal, J. S. B. Mitchell, C. Phillips, and S. Seiden. Processor Allocation on Cplant: Achieving General Processor Locality Using One-Dimensional Allocation Strategies. *Proceedings of the 4th IEEE International Conference on Cluster Computing (CLUSTER)*, pages 296–304, 2002.
63. T.-R. Hsiang, E. M. Arkin, M. A. Bender, S. P. Fekete, J. S. B. Mitchell. Algorithms for Rapidly Dispersing Robot Swarms in Unknown Environments. *Proceedings of the 5th Workshop on Algorithmic Foundations of Robotics (WAFR)*, 77–94, 2002.
64. T.-R. Hsiang, E. M. Arkin, M. A. Bender, S. Fekete, J. S. B. Mitchell. Online Dispersion Algorithms for Swarms of Robots. *Proceedings of the 19th Annual ACM Symposium on Computational Geometry (SoCG)*, Video/DVD, pages 382–383, 2003.

65. E. M. Arkin, M. A. Bender, D. Ge, S. He, J. S. B. Mitchell. Improved Approximation Algorithms for the Freeze-Tag Problem. *Proceedings of the 15th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 295–303, 2003.
66. M. A. Bender, G. S. Brodal, R. Fagerberg, D. Ge, S. He, H. Hu, J. Iacono, and A. López-Ortiz. The Cost of Cache-Oblivious Searching. *Proceedings of the 44th Annual Symposium on Foundations of Computer Science (FOCS)*, pages 271–280, 2003.
67. M. A. Bender, D. Ge, S. He, H. Hu, R. Pinter, S. Skiena, F. Swidan. Improved Bounds on Sorting with Length-Weighted Reversals. *Proceedings of the 15th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 912–921, 2004.
68. M. A. Bender, B. Bradley, G. Jagannathan, and K. Pillaipakkamnatt. The Robustness of the Sum-of-Squares Algorithm for Bin Packing. *Proceedings of the 6th Workshop on Algorithm Engineering and Experiments (ALENEX)*, 18-30, 2004.
69. M. A. Bender, J. T. Fineman, S. Gilbert, and C. E. Leiserson. On-the-Fly Maintenance of Series-Parallel Relationships in Fork-Join Multithreaded Programs. *Proceedings of the 16th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 133–144, 2004.
70. M. A. Bender, M. Farach-Colton, and M. Mosteiro. Insertion Sort is $O(n \log n)$. *Proceedings of the 3rd International Conference on Fun with Algorithms (FUN)*, pages 16–23, 2004.
71. F. Swidan, M. A. Bender, D. Ge, S. He, H. Hu, and R. Pinter. Sorting by Length-Weighted Reversals: Dealing with Signs and Circularity. *Proceedings of the 15th Annual Combinatorial Pattern Matching Symposium (CPM)*, Volume 3109 of *Lecture Notes in Computer Science*, pages 32–46, 2004.
72. M. A. Bender, J. T. Fineman, S. Gilbert, and B. C. Kuszmaul. Concurrent Cache-Oblivious Search Trees. *Proceedings of the 17th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 228–237, 2005.
73. M. A. Bender, M. Farach-Colton, S. He, B. C. Kuszmaul, and C. E. Leiserson. Adversarial Contention Resolution for Simple Channels. *Proceedings of the 17th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 325–332, 2005.
74. M. A. Bender, D. P. Bunde, E. D. Demaine, S. P. Fekete, V. J. Leung, H. Meijer, and C. A. Phillips. Communication-Aware Processor Allocation for Supercomputers. *Proceedings of the 9th Workshop on Algorithms and Data Structures (WADS)*, Springer LNCS 3608, pages 169–181, 2005.
75. M. A. Bender and H. Hu. An Adaptive Packed-Memory Array. *Proceedings of the 25th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, pages 20–29, 2006.
Winner: *Best Newcomer Award*.
76. M. A. Bender, M. Farach-Colton, and B. C. Kuszmaul. Cache-Oblivious String B-Trees. *Proceedings of the 25th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, pages 233–242, 2006.

77. E. M. Arkin, M. A. Bender, J. S. B. Mitchell, and V. Polishchuk. The Snowblower Problem. *Proceedings of the 7th Workshop on Algorithmic Foundations of Robotics (WAFR)*, 2006.
78. M. A. Bender, J. T. Fineman, and S. Gilbert. Contention Resolution with Heterogeneous Job Sizes. *Proceedings of the 14th Annual European Symposium on Algorithms (ESA)*, pages 112–123, 2006.
79. M. A. Bender and C. A. Phillips. Scheduling DAGs on Asynchronous Processors. *Proceedings of the 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 35–45, 2007.
80. M. A. Bender, G. S. Brodal, R. Fagerberg, R. Jacob, and E. Vicari. Optimal Sparse Matrix Dense Vector Multiplication in the I/O-Model. *Proceedings of the 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 61–70 2007.
81. M. A. Bender, M. Farach-Colton, J. T. Fineman, Y. Fogel, B. C. Kuszmaul, and J. Nelson. Cache-Oblivious Streaming B-Trees. *Proceedings of the 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 81–92, 2007.
82. K. Agrawal, M. A. Bender, and J. T. Fineman. The Worst Page-Replacement Policy. *Proceedings of the 4th International Conference on Fun With Algorithms (FUN)*, pages 135–145, 2007.

Presentations

1. **Washington Univ** – St. Louis, MO Jan 1995
Invited Colloquium. *The Power of Team Exploration: Two Robots Can Learn Unlabeled Directed Graphs.*
2. **SPAA 96** – Padua, Italy June 1996
Conference Talk. *Efficient Execution of Nondeterministic Parallel Programs on Asynchronous Systems.*
3. **ICALP 96** – Paderborn, Germany July 1996
Conference Talk. *Efficient Asynchronous Consensus with the Value-Oblivious Adversary Scheduler.*
4. **Summer Institute on Parallel Discrete Algorithms** – Halifax, Nova Scotia July 1996
Invited Talk. *Efficient Asynchronous Consensus with the Value-Oblivious Adversary Scheduler.*
5. **FOCS 96** – Burlington, VT Oct 1996
Conference Talk. *Fault-Tolerant Data Structures.*
6. **Bell Labs** – Murray Hill, NJ Sept 1997
Invited Seminar. *Flow and Stretch Metrics for Scheduling Continuous Job Streams.*
7. **Carnegie Mellon** – Pittsburgh, PA Nov 1997
Invited Seminar. *The Power of a Pebble: Exploring and Mapping Directed Graphs.*

8. **DIMACS** – Princeton, NJ Dec 1997
Invited Talk. DIMACS Workshop on Randomization in Algorithm Design.
Efficient Asynchronous Consensus with the Value-Oblivious Adversary Scheduler.
9. **Michigan State** – E. Lansing, MI Feb 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
10. **Arizona State** – Phoenix, AZ Feb 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
11. **SUNY Stony Brook** – Stony Brook, NY Mar 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
12. **Polytechnic Univ** – Brooklyn, NY Mar 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
13. **Bell Labs** – Murray Hill, NJ Mar 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
14. **Case Western Reserve** – Cleveland, OH Mar 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
15. **U of Arizona** – Tucson, AZ Apr 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
16. **U of Houston** – Houston, TX Apr 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
17. **AT&T Research** – Florham Park, NJ Apr 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
18. **U of New Mexico** – Albuquerque, NM Apr 1998
Invited Seminar. *New Algorithms and Metrics for Scheduling.*
19. **STOC 98** – Dallas, TX May 1998
Conference Talk. *The Power of a Pebble: Exploring and Mapping Directed Graphs.*
20. **U of Maryland** – College Park, MD Mar 1999
Invited Seminar. *New Algorithms and Metrics for Scheduling Job Streams.*
21. **Escuela de Ciencias Informáticas 99** – U of Buenos Aires, Argentina July 1999
Week-long Course. *Advanced Data Structures.*
22. **WADS 99** – Vancouver, Canada Aug 1999
Conference Talk for K. Jansen and L. Porkolab.
General Multiprocessor Task Scheduling: Approximate Solutions in Linear Time.
23. **WADS 99** – Vancouver, Canada Aug 1999
Conference Talk. *Performance Guarantees for the TSP with a Parameterized Triangle Inequality.*

24. **WADS 99** – Vancouver, Canada Aug 1999
Conference Talk. *The Lazy Bureaucrat Scheduling Problem.*
25. **Dagstuhl Seminar: Scheduling in Computer and Manufacturing Systems** – Germany Oct 1999
Invited Talk. *Flow and Stretch Metrics for Scheduling Continuous Job Streams.*
26. **SUNY Stony Brook** – Stony Brook, NY Feb 2000
Invited Operations Research Seminar. *Algorithms for Asynchronous Consensus.*
27. **SUNY Stony Brook** – Stony Brook, NY Mar 2000
Invited Operations Research Seminar. *Algorithms for Graph Exploration.*
28. **LATIN 2000** – Punta del Este, Uruguay Apr 2000
Conference Talk. *The LCA Problem Revisited.*
29. **SPAA 2000** – Bar Harbor, ME July 2000
Conference Talk. *Scheduling Cilk Multithreaded Computations on Processors of Different Speeds.*
30. **Dagstuhl Seminar: Experimental Algorithms** – Germany Sept 2000
Invited Talk. *Cache-Oblivious Algorithms and Data Structures.*
31. **DIMACS** – Princeton, NJ Oct 2000
Invited Talk. DIMACS Workshop on Sublinear Algorithms.
Cache-Oblivious Algorithms and Data Structures.
32. **MARS/DR/SDR DARPA PI meeting** – Knoxville, TN Oct 2000
Invited Presentation. *Algorithms in Support of Pheromone Robotics.*
33. **FOCS 2000** – Redondo Beach, CA Nov 2000
Conference Talk. *Cache-Oblivious B-Trees.*
34. **Yale** – New Haven, CT Mar 2001
Invited Seminar. *Cache-Oblivious Data Structures.*
35. **SUNY Stony Brook** – Stony Brook, NY Apr 2001
Invited Operations Research Seminar. *Cache-Oblivious B-Trees.*
36. **Brookhaven National Labs** – Brookhaven, NY Mar 2001
Invited Seminar. *Cache-Oblivious Algorithms.*
37. **McGill** – Montréal, Canada Apr 2001
Invited Seminar. *The Power of a Pebble: Exploring and Mapping Directed Graphs.*
38. **IBM TJ Watson** – Yorktown Heights, NY May 2001
Invited Seminar. *Cache-Oblivious Algorithms.*
39. **MARS/DR/SDR DARPA PI meeting** – Nashville, TN July 2001
Invited Presentation. *Algorithms in Support of Pheromone Robotics.*

40. **First Arizona Workshop on Algorithms** – Tempe, AZ Nov 2001
Invited Presentation. *Cache-Oblivious Data Structures and Algorithms.*
41. **SODA 2002** – San Francisco, CA Jan 2002
Conference Talk. *The Freeze-Tag Problem: How to Wake Up a Swarm of Robots.*
42. **Dagstuhl Seminar on Data Structures** – Germany Feb 2002
Invited Talk. *Two Simplified Algorithms for Maintaining Order in a Linked List.*
43. **Brown** – Providence, RI May 2002
Invited Seminar. *Cache-Oblivious Data Structures.*
44. **Dagstuhl Seminar: Scheduling in Computer and Manufacturing Systems** – Germany June 2002
Invited Talk. *Scheduling and Resource Allocation in Commodity Supercomputers.*
45. **Sandia Petaflops Systems Workshop** – Albuquerque, NM June 2002
Invited Talk. *Cache-Oblivious Algorithms.*
46. **Bell Labs** – Murray Hill, NJ July 2002
Invited Colloquium. *Cache-Oblivious Data Structures.*
47. **AT&T Research** – Florham Park, NJ July 2002
Invited Colloquium. *Cache-Oblivious Data Structures.*
48. **Sun Microsystems Inc** – Burlington, MA Aug 2002
Invited Talk. *Cache-Oblivious Data Structures.*
49. **ESA 2002** – Rome, Italy Sept 2002
Conference Talk. *Efficient Tree Layout in a Multilevel Memory Hierarchy.*
50. **ESA 2002** – Rome, Italy Sept 2002
Conference Talk. *Two Simplified Algorithms for Maintaining Order in a List.*
51. **Polytechnic University** – Brooklyn, NY Oct 2002
Invited Seminar. *Cache-Oblivious Data Structures.*
52. **MIT** – Cambridge, MA Oct 2002
Invited Seminar. *Cache-Oblivious Data Structures.*
53. **MAPSP 2003** – Aussois, France April 2003
Workshop Talk. *The Freeze-Tag Problem: How to Awaken a Swarm of Robots.*
54. **SPAA 2003** – San Diego, CA May 2003
Conference Talk. *Improved Approximation Algorithms for the Freeze-Tag Problem.*
55. **SoCG 2003** – San Diego, CA May 2003
Conference Talk. *Online Dispersion Algorithms for Swarms of Robots.*
56. **SODA 2004** – New Orleans, LA Jan 2004
Conference Talk. *Improved Bounds on Sorting with Length-Weighted Reversals.*

57. **SIAM PP04** – San Francisco, CA Feb 2004
Conference Talk. *Communication-Aware Processor Allocation for Supercomputers.*
58. **SIAM Workshop Combinatorial Scientific Computing** – San Francisco, CA Feb 2004
Conference Talk. *Cache-Oblivious Data Structures and Algorithms.*
59. **Boston University** – Boston, Massachusetts Mar 2004
Seminar Talk. *Cache-Oblivious B-Trees.*
60. **Harvard** – Cambridge, Massachusetts Mar 2004
Seminar Talk. *Cache-Oblivious Searching.*
61. **NSF Next Generation Software Program – PI Workshop at IPDPS** Apr 2004
Invited Presentation. *Worst-Case Analysis of Randomized Backoff.*
62. **Dagstuhl Seminar: Scheduling in Computer and Manufacturing Systems** – Germany April 2004
Invited Presentation. *Scheduling Algorithms for Transactional Memory.*
63. **Northeastern** – Boston, Massachusetts Apr 2004
Seminar Talk. *Cache-Oblivious B-Trees.*
64. **FUN with Algorithms** – Elba, Italy May 2004
Conference Talk. *Insertion Sort is $O(N \log N)$.*
65. **Dagstuhl Seminar: Cache-Oblivious and Cache-Aware Algorithms** – Germany July 2004
Invited Presentation. *Efficient Tree Layouts.*
66. **Sun Microsystems Laboratories** – Burlington, Massachusetts Aug 2004
Seminar Talk. *Concurrent Cache-Oblivious Search Trees.*
67. **3rd International Conference on Parallel Computing Systems** – Colima, Mexico Sept 2004
Plenary Talk. *Communication-Aware Processor Allocation for Supercomputers.*
68. **U of Southampton** – Southampton, UK Oct 2004
Seminar Talk. *Communication-Aware Processor Allocation for Supercomputers.*
69. **U of Durham** – Durham, UK Oct 2004
Seminar Talk. *Cache-Oblivious Data Structures.*
70. **Kings College London** – London, UK Oct 2004
Seminar Talk. *Communication-Aware Processor Allocation for Supercomputers.*
71. **U of Nottingham** – Nottingham, UK Oct 2004
Seminar Talk. *Communication-Aware Processor Allocation for Supercomputers.*
72. **U of Edinburgh** – Edinburgh, UK Nov 2004
Seminar Talk. *Cache-Oblivious Data Structures.*

73. **U of Braunschweig** – Braunschweig, Germany Nov 2004
Seminar Talk. *Cache-Oblivious Data Structures.*
74. **U of Hertfordshire** – Hatfield, UK Nov 2004
Seminar Talk. *Cache-Oblivious Data Structures.*
75. **U of Leeds** – Leeds, UK Nov 2004
Seminar Talk. *Communication-Aware Processor Allocation for Supercomputers.*
76. **Imperial College** – London, UK Dec 2004
Seminar Talk. *Cache-Oblivious Data Structures.*
77. **U de Grenoble** – Grenoble, France Dec 2004
Seminar Talk. *Communication-Aware Processor Allocation for Supercomputers* (in French).
78. **5th Haifa Workshop on Interdisciplinary Applications of Graph Theory, Combinatorics and Computing** – Haifa, Israel May 2005
Plenary Talk. *Adversarial Contention Resolution.*
79. **U of Patras** – Patras, Greece June 2005
Seminar Talk. *Cache-Oblivious B-trees.*
80. **6to. Congreso Int. de las Ciencias Computacionales** – Colima, Mexico Sept 2005
Plenary Talk. *Cache-Oblivious Data Structures* (in Spanish).
81. **Fall Workshop on Computational Geometry** – Philadelphia, PA Nov 2005
Workshop Talk. *What is the Optimal Shape of a Blob?*
82. **York U** – Toronto, CA Nov 2005
Seminar Talk. *Adversarial Contention Resolution.*
83. **U of Toronto** – Toronto, CA Nov 2005
Seminar Talk. *Cache-Oblivious B-trees.*
84. **PP06** – San Francisco, CA Feb 2006
Invited Talk. *Cache-Oblivious Algorithms for Massive Data.*
85. **Dagstuhl Seminar on Data Structures** – Germany Feb 2006
Invited Talk. *An Adaptive Packed-Memory Array.*
86. **Workshop on Parallelism in Algorithms and Architectures** – U Maryland, MD May 2006
Workshop talk. *An Adaptive Packed-Memory Array.*
87. **CIRM Workshop: Scheduling Algorithms for New Emerging Applications** – Luminy, France June 2006
Invited Presentation. *Scheduling Algorithms for Procrastinators.*
88. **U de Grenoble** – Grenoble, France June 2006
Seminar Talk. *An Adaptive Packed-Memory Array* (in French).

- | | |
|--|-----------|
| 89. PODS 2006 – Chicago, IL | June 2006 |
| Award Presentation. <i>An Adaptive Packed-Memory Array.</i> | |
| 90. HECIWG 2006 – Washington D.C. | Aug 2006 |
| Workshop Talk. <i>Streaming B-trees.</i> | |
| 91. ENC 2006 – San Luis Potosí, MX | Sept 2006 |
| Plenary Talk. <i>An Adaptive Packed-Memory Array.</i> | |
| 92. Dagstuhl Seminar on Robot Navigation – Germany | Oct 2006 |
| Invited Talk. <i>The Snowblower Problem.</i> | |
| 93. Los Alamos National Laboratories – Los Alamos, NM | Jan 2007 |
| Seminar Talk. <i>An Adaptive Packed-Memory Array.</i> | |
| 94. Columbia – New York, NY | Apr 2007 |
| Seminar Talk. <i>An Adaptive Packed-Memory Array.</i> | |
| 95. Oberwolfach Workshop on Algorithm Engineering – Germany | June 2007 |
| Invited Talk. <i>Engineering B-trees and Cache-Oblivious B-trees on Real Memory Hierarchies (Ignorance is Bliss)</i> | |
| 96. SPAA 2007 – San Diego, CA | June 2007 |
| Conference Talk. <i>Scheduling DAGs on Asynchronous Processors.</i> | |

Department and University Service

1. Member, Graduate Admissions Committee, 1998-2002, 2006-2007
2. Member, School of Engineering Scholarship Committee, 2001
3. Organizer, Theory Qualifier, 1999, 2003
4. Host, Distinguished Lecturers (Bentley, Farach-Colton, Hart, Leiserson), 2001-2003
5. CS Representative, Strategic Plan Advisory and Coordinating Committee (SPACC), 2002
6. Chair, Visibility/PR Committee, 2003-2004
7. Member, CEWIT Building Committee, 2003
8. Founder, Research Lunches, 2003
9. Judge, Graduate Student Research Conference, 2003
10. Member, Quality of Life Committee, 2005-present
11. CS Representative, Women in Science and Engineering (WISE), Course Counseling, 2002, 2005-present
12. Member, Undergraduate committee, 2005-present
13. Head, Undergraduate honors program, 2005-present
14. Member, Seawulf Cluster Management Committee, 2006-present

Teaching at Stony Brook

1. **CSE 150 Honors Foundations of Computer Science**, Fall 2005, 2006
Approximately 10-20 students per semester.

2. **CSE 303 Introduction to the Theory of Computation**, Spring 2003.
Approximately 100 students per semester.
3. **CSE 350 Theory of Computation: Honors**, Spring 2006, 2007.
Approximately 10-20 students per semester.
4. **CSE 373 Undergraduate Analysis of Algorithms**, Spring 1999, 2001, 2002, 2005.
Approximately 80-110 students per semester.
5. **CSE 548 Graduate Analysis of Algorithms**, Fall 1998–2002.
Approximately 60–90 students per semester.
6. **CSE 638 Advanced Data Structures**, Spring 2005, Spring 2007.
Approximately 25 students per semester.
7. **CSE 642 Seminar in the Analysis of Algorithms**, Spring 2005–Spring 2007.
Approximately 20 students and faculty per semester.
8. **CSE 648 Randomized Algorithms and Advanced Data Structures**, Spring 2000, 2002, 2003.
Approximately 30 students per semester.
9. **CSE 652 Seminar in the Analysis of Algorithms**, Fall 1999–Spring 2003.
Approximately 20 students and faculty per semester.

Other Teaching

1. **Advanced Topics in Data Structures** (in Spanish), July 1999.
18 hour course. Escuela de Ciencias Informáticas, U Buenos Aires, Argentina.
Approximately 110 students.
2. **MIT 6.895 Theory of Parallel Systems**, Fall 2003.
Approximately 20 students.
3. **MIT 6.896 Theory of Parallel Hardware**, Spring 2004.
Approximately 20 students.
4. **Algorithms for External Memory** (in Spanish), July 2005.
18 hour course. Escuela de Ciencias Informáticas, U Buenos Aires, Argentina.
Approximately 40 students.
5. **Theoretical Foundations of Computer Science** (in Spanish), July 2005.
8 hour workshop. Instituto Tecnológico de Colima, Mexico
Approximately 10 students.
6. **Algorithms for External Memory** (in Spanish), Sept 2006.
5 hour tutorial. 7th Encuentro Internacional de Ciencias de la Computación (ENC '06), San Luis Potosí, MX.
Approximately 30 students.

PhD Students Advised

1. Y. Fogel
2. H. Hu
3. T.-R. Hsiang (with Arkin and Mitchell), PhD Fall 02
4. N. Jovanovic (with Arkin and Mitchell), PhD Winter 02
5. M. Sztainberg (with Arkin and Mitchell), PhD Fall 03
6. M. Tchiboukdjian

Masters Students Advised

1. T. Clancy, MS Winter 99
2. Z. Dai, MS Summer 00
3. J. Danieleley, MS Summer 01
4. R. Gupta, MS Winter 06
5. G. Jagannathan, MS Fall 03
6. T. Kauffman, MS Summer 02
7. V. Mirchandani, MS Summer 03
8. S. R. K. Reddy, MS Winter 06
9. M. Tchiboukdjian, Current
10. J. Trajkovic, MS Summer 03
11. Z. Wang, MS Winter 99
12. J. Wu, MS Winter 01
13. J. Zito, MS Summer 01

Collaborators

S. Alstrup (Copenhagen), M. Andrews (Bell Labs), L. Arge (Duke), E. Arkin (SUNY Stony Brook), Y. Aumann (Bar-Ilan), C. Bender (Washington U), I. Bitter (SUNY Stony Brook), G. Brodal (BRICS), B. Bradley (Hofstra), D. Bunde (Illinois), S. Chakrabarti (IIT Bombay), C. Chekuri (Bell Labs), R. Cole (NYU), E. Demaine (MIT), M. Demaine (MIT), Z. Duan (SUNY Stony Brook), R. Faberberg (BRICS), M. Farach-Colton (Rutgers and Google), S. Fekete (TU Braunschweig), A. Fernández (Universidad Politécnica de Madrid), J. T. Fineman (MIT), Y. Fogel (SUNY Stony Brook), D. Ge (Stanford), S. He (CUHK), B. Holland-Minkley (Duke), H. Hu (SUNY Stony Brook), T.-R. Hsiang (National Chung Cheng, Taiwan), J. Iacono (Polytechnic), R. Jacob (ETH Zürich), J. Johnston (Sandia), M. Gastaldo (Xerox), S. Gilbert (MIT), A. Kaufman (SUNY Stony Brook), B. Kuszmaul (MIT), A. Lal (Tufts), C. Leiserson (MIT), V. Leung (Sandia), A. López-Ortiz (Waterloo), K. McDonnell (SUNY Stony Brook), H. Meijer (Queens), J. S. B. Mitchell (SUNY Stony Brook), M. Morvan (U of Paris), I. Munro (Waterloo), S. Muthukrishnan (Rutgers), J. Nelson (MIT), G. Pemmasani (SUNY Stony Brook), K. Pillaipakkamnatt (Hofstra), C. Phillips (Sandia), R. Pinter (Technion), M. Rabin (Harvard), R. Rajaraman (Northeastern), R. Raman (University of Leicester), T. Rauhe (Copenhagen), D. Ron (Tel Aviv), A. Sahai (Princeton), M. Sato (SUNY Stony Brook), S. Sethia (Oregon State), S. Seiden (LSU), D. Slonim (Wyeth Genetics Institute), S. Skiena (SUNY Stony Brook), M. Skutella (TU Berlin), P. Sumazin (Portland State), F. Swidan (Technion), M. Sztainberg (SUNY Stony Brook), M. Thorup (AT&T), S. Vadhan (Harvard), E. Vicari (ETH Zürich), M. Wan (SUNY Stony Brook), C. Wright (SUNY Stony Brook), J. Wu (SUNY Stony Brook), L. Zhang (Bell Labs), J. Zito (Computer Associates).