

# Anna R. Karlin

## Research Interests

Design and analysis of algorithms, on-line algorithms and competitive analysis, probabilistic methods, operating systems, distributed systems, computational complexity, performance analysis, computer music and digital audio.

## Education

1981 B.Sc. in Mathematical Sciences, Stanford University.

1987 Ph.D. in Computer Science, Stanford University.  
*Thesis Title:* Sharing Memory in Distributed Systems - Methods and Applications.  
*Thesis Advisor:* Jeffrey D. Ullman

## Employment

1988-94 Principal Scientist, Digital Equipment Corporation's Systems Research Center.  
Palo Alto, CA.

1994-98 Associate Professor (visiting for first two years), Department of Computer Science,  
University of Washington, Seattle, WA.

1998 - now Professor, Department of Computer Science,  
University of Washington, Seattle, WA.

## Patents

Patent No. 5032987, "Dynamic Hashing with Multiple Tables" (with A. Broder), 1990.

Patent Application Pending, OTT Ref # 2035-2527, "Using Global Memory Information to Manage Memory in a Computer Network" (with M. Feeley, W. Morgan, F. Pighin, H. Levy, and C. Thekkath), 1997.

## Selected Journal Publications

- "Parallel Hashing: An Efficient Implementation of Shared Memory," (with E. Upfal). *Journal of the Association for Computing Machinery*, Vol. 35, No. 4. October, 1988. (An earlier version appeared in *Proceedings of 18th Annual ACM Symposium on Theory of Computing*. May, 1986.)
- "Competitive Snoopy Caching," (with M. Manasse, L. Rudolph and D. Sleator). *Algorithmica*, Special Issue on Parallel and Distributed Computing, Number 3, pp. 79-119, 1988. (An earlier version appeared in *Proceedings of 27th IEEE Conference on Foundations of Computer Science*, October, 1986.)
- "Bounds on the Cover Time", (with A. Broder). *Journal of Theoretical Probability*, Vol. 2, No. 1, January, 1989. (An earlier version appeared in *Proceedings of 29th IEEE Foundations of Computer Science*, October, 1988. )

- “Dynamic Perfect Hashing: Upper and Lower Bounds”, (with M. Dietzfelbinger, K. Mehlhorn, F. Meyer auf der Heide, H. Rohnert and R.E. Tarjan). *SIAM Journal on Computing*, 23:4, 738–761, 1994. (An earlier version appeared in *Proceedings of 29th IEEE Foundations of Computer Science*, October, 1988.)
- “Trading Space for Time in st-Connectivity”, (with A. Broder, P. Raghavan, E. Upfal). *SIAM Journal on Computing* 23: 324–334, 1994. (An earlier version appeared in *Proceedings of 21st ACM Symposium on Theory of Computing*, May, 1989.)
- “Competitive Randomized Algorithms for Nonuniform Problems”, (with M. Manasse, L. McGeogh, S. Owicki). *Algorithmica*, Vol. 11, No. 1, January, 1994. (An earlier version appeared in *Proceedings of 1st ACM Symposium on Discrete Algorithms*, January, 1990.)
- “Strongly Competitive Algorithms for Paging with Locality of Reference”, (with S. Irani, S. Phillips). *SIAM Journal on Computing*, Volume 25, Number 3, pp. 477–497, June 1996. (An earlier version appeared in *Proceedings of 3rd ACM-SIAM Symposium on Discrete Algorithms*, January, 1992.)
- “Biased Random Walks”, (with Y. Azar, A. Broder, N. Linial and S. Phillips). *Combinatorica*, Volume 16, Number 3, pp.1–18, 1996. (An earlier version appeared in *Proceedings of 24th ACM Symposium on Theory of Computing*, May, 1992.)
- “On-line Load Balancing”, (with Y. Azar and A. Broder). *Theoretical Computer Science* special issue on Online Algorithms, 130: 73–84, 1994. (An earlier version appeared in *Proceedings of 33rd IEEE Conference on Foundations of Computer Science*, October, 1992.)
- “Balanced Allocations”, (with Y. Azar, A. Broder and E. Upfal). To appear in *SIAM Journal on Computing*. (An earlier version appeared in *Proceedings of 26th ACM Symposium on Theory of Computing*, May, 1994.)
- “Implementation and Performance of Integrated Application-Controlled Caching, Prefetching and Disk Scheduling”, (with P. Cao, E. Felten and K. Li). *ACM Transactions on Computer Systems*, Vol. 14, No. 4, November 1996.
- “Markov Paging”, (with S. Phillips and P. Raghavan). To appear in *SIAM Journal on Computing*. (An earlier version appeared in *Proceedings of 33rd IEEE Conference on Foundations of Computer Science*, October, 1992. )
- Near-Optimal Parallel Prefetching and and Caching, with T. Kimbrel. To appear in *SIAM Journal on Computing*. (An earlier version appeared in *37th IEEE Symposium on Foundations of Computer Science*, October, 1996.)

### Selected Conference Publications

- “Multilevel Adaptive Hashing”, (with A. Broder), In *Proceedings of 1st ACM Symposium on Discrete Algorithms*, January, 1990.
- “On the Parallel Complexity of Evaluating Game-Trees”, (with A. Broder, P. Raghavan, E. Upfal). In *Proceedings of 2nd ACM Symposium on Discrete Algorithms*, January, 1991.
- “Empirical Studies of Competitive Spinning for Shared Memory Multiprocessors”, (with K. Li, M. Manasse, S. Owicki). In *Proceedings of the 13th ACM Symposium on Operating System Principles*, October, 1991.

- “Factors in the Performance of the AN1 Computer Network”, (with S. Owicki), In *Proceedings of ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems*, May, 1992.
- “On the Fault Tolerance of the Butterfly”, (with G. Nelson and H. Tamaki), In *Proceedings of 26th ACM Symposium on Theory of Computing*, May, 1994.
- “A Study of Integrated Prefetching and Caching Strategies”, (with P. Cao, E. Felten and K. Li). In *Proceedings of ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems*, 1995. Recipient of “Outstanding Paper” Award.
- “Reducing TLB and Memory Overhead Using Online Superpage Promotion”, (with T. Romer, W. Ohlrich and B. Bershad). In *Proceedings of International Symposium on Computer Architecture*, Italy, June, 1995.
- “Randomized and Multipointer Paging with Locality of Reference”, (with A. Fiat). In *Proceedings of 27th ACM Symposium on Theory of Computing*, May, 1995.
- “Implementing Global Memory Management in a Workstation Cluster”, (with M. Feeley, W. Morgan, F. Pighin, H. Levy and C. Thekkath). In *Proceedings of the 15th ACM Symposium on Operating System Principles*, December 1995.
- “A Trace-Driven Comparison of Algorithms for Parallel Prefetching and Caching,” (with T. Kimbrel, A. Tomkins, R.H. Patterson, B. Bershad, P. Cao, E. Felten, G. Gibson, K. Li) In *Proceedings of Second Symposium on Operating Systems Design and Implementation*, October 1996.
- Implementing Cooperative Prefetching and Caching in a Globally-Managed Memory System, with G. Voelker, T. Kimbrel, E. Anderson, M. Feeley, J. Chase, and H. Levy. *Proc. of the ACM SIGMETRICS Conf. on Measurement and Modelling of Computer Systems*, June 1998.

### Selected Professional Activities

Editorial Board, *SIAM Journal on Computing*

Member, NRC Computer Science and Telecommunications Board

Program Chair, *IEEE Symposium on Foundations of Computer Science*, 1997.

Program Committee member: *Ninth ACM Annual Symposium on Principles of Distributed Computing* (1990), *Twenty-fifth Annual ACM Symposium on Theory of Computing* (1993), *Fourth Annual ACM Symposium on Discrete Algorithms* (1994), *Sixth Annual ACM Symposium on Discrete Algorithms* (1996), *ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems* (1997), *ACM Symposium on Parallel Algorithms and Architectures* (1997), *RANDOM'98: International Workshop on Randomization and Approximation Techniques in Computer Science* (1998), *10th ACM-SIAM Symposium on Discrete Algorithms* (1999).

### Ph.D. Students

Juan Alemany, Ph.D. Thesis: “Data Placement for Video-On-Demand Servers”, University of Washington, 1997.

Tracy Kimbrel, Ph.D. Thesis: “Parallel Prefetching and Caching”, University of Washington, 1997. (Coadvised with Martin Tompa.)