

## Scott F. Kaplan

Department of Mathematics and Computer Science      211 S. Pleasant St.  
Amherst College      Amherst, MA 01002  
Amherst, MA 01002-5000      (413) 374-6723  
Phone: (413) 542-2377  
E-Mail: [sfkaplan@cs.amherst.edu](mailto:sfkaplan@cs.amherst.edu)  
WWW: <http://www.cs.amherst.edu/~sfkaplan>

## Research Interests

Virtual memory management and file system caching, multi-programmed dynamic VMM, garbage collection and allocation interaction with VMM, reference trace collection, reference trace reduction, prefetching, page replacement policies, cluster/grid resource management, and in-memory data compression

## Degrees

Doctor of Philosophy in Computer Sciences, 1999  
The University of Texas at Austin  
Advisors: Paul R. Wilson and Donald Fussell  
Dissertation: *Compressed Caching and Modern Virtual Memory Simulation*

Bachelor of Arts, 1995  
Amherst College  
Magna cum laude in Computer Science

## Professional Experience

Amherst College, Amherst, MA. Associate Professor of Computer Science, since Fall 2006.

University of Massachusetts, Amherst, MA. Adjunct Assistant Professor of Computer Science, since September 2004.

Amherst College, Amherst, MA. Assistant Professor of Computer Science, Fall 1999 to Spring 2006.

IBM TJ Watson Research Center, Yorktown Heights, NY. Visiting Researcher, July 2002 to July 2003.

IBM TJ Watson Research Center, Hawthorne, NY. Visiting Researcher, Summer 2000.

The University of Texas at Austin, Department of Computer Science, Austin, TX. Graduate Research Assistant, Spring 1996 to Fall 1998.

Have OOP, Will Travel, Austin, TX. Teaching Assistant, Fall 1996 to Fall 1998.

The University of Texas at Austin, Department of Computer Science, Austin, TX. Assistant Instructor, CS 105 (Introduction to C++), Spring 1997.

The Santa Fe Institute, Santa Fe, NM. Intern Researcher, Summer 1994.

IBM TJ Watson Research Center, Yorktown Heights, NY. Intern Developer, Summer 1993.

### Awards and Honors

National Science Foundation, *Interdisciplinary Cluster Computing at a Liberal Arts College*. (Proposal #0521169; \$298,839; September 2005 through August 2007)

National Science Foundation, *Acquisition of a Laboratory Testbed for Networked Embedded Systems and Sensor Research*. (Proposal #0520729; \$300,000; September 2005 through August 2007)

National Science Foundation, *Collaborative Research: A Five-College Partnership for Information Assurance Education*. (Proposal #0416851; \$299,986; September 2004 through August 2006)

Faculty Research Award Program: Amherst College, January 2004

The Miner D. Crary Sabbatical Fellowship: Amherst College, July 2002

Best Paper: The USENIX Annual Technical Conference, June 1999, for, “The Case for Compressed Caching in Virtual Memory Systems”.

The Schlumberger Fellowship: The University of Texas, Department of Computer Sciences and The Schlumberger Corporation, Fall 1998

The MCD Fellowship: The University of Texas, Department of Computer Sciences, Fall 1995 to Spring 1997

### Conference Papers

“CRAMM: Virtual Memory Support for Garbage-Collected Applications,” Ting Yang, Emery D. Berger, Scott F. Kaplan, and J. Eliot B. Moss. *Proceedings of The Seventh USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, November 2006, USENIX Association.

“Autonomic Heap Sizing: Taking Real Memory Into Account,” Ting Yang, Matthew Hertz, Emery D. Berger, Scott F. Kaplan, and J. Eliot B. Moss. *Proceedings of The Fourth International Symposium on Memory Management*, pp. 61–72, October 2004, ACM Press.

“Adaptive Caching for Demand Prepaging,” Scott F. Kaplan, Lyle A. McGeoch, and Megan F. Cole. *Proceedings of The Third International Symposium on Memory Management*, pp. 114–126, June 2002, ACM Press.

“The Case for Compressed Caching in Virtual Memory,” Paul R. Wilson, Scott F. Kaplan, and Yannis Smaragdakis. *Proceedings of The USENIX Annual Technical Conference*, pp. 101–116, June 1999, USENIX Association.

“Trace Reduction for Virtual Memory Simulation,” Scott F. Kaplan, Yannis Smaragdakis, and Paul R. Wilson. *Proceedings of The ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*, pp. 47–58, May 1999, ACM Press.

“EELRU: Simple and Effective Adaptive Page Replacement,” Yannis Smaragdakis, Scott F. Kaplan, and Paul R. Wilson. *Proceedings of The ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*, pp. 122–133, May 1999, ACM Press.

### Journal Papers

“Flexible Reference Trace Reduction for VM Simulations,” Scott F. Kaplan, Yannis Smaragdakis, and Paul R. Wilson. *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, pp. 1–38, January 2003, ACM Press.

“The EELRU Adaptive Replacement Algorithm,” Yannis Smaragdakis, Scott F. Kaplan, and Paul R. Wilson. *Performance Evaluation*, pp. 93–123, May 2003, Elsevier Science Publishers.

### Workshop Papers (refereed)

“Collecting Whole-System Reference Traces of Multiprogrammed and Multithreaded Workloads,” Scott F. Kaplan, *Proceedings of The ACM Workshop on Software Performance (WOSP)*, pp. 228–237, January 2004, ACM Press.

“Class-based Prioritized Resource Control in Linux,” Shailabh Nagar, Hubertus Franke, Jonghyuk Choi, Chandra Seetharaman, Scott F. Kaplan, Nivedita Singhvi, Vivek Kashyap, and Mike Kravetz. *Proceedings of The Ottawa Linux Symposium (OLS)*, pp. 161–180, July 2003, Linux Symposium.

### Posters (refereed)

“Scheduler-Aware Virtual Memory Management,” Emery Berger, Scott Kaplan, Bhuvan Uргаonkar, Pritesh Sharma, Abhishek Chandra, Prashant Shenoy. Presented at *The Symposium on Operating System Principles (SOSP)*, October 2003, Bolton Landing, New York.

### Extended Abstracts (refereed)

“Two Methods for Collecting Whole-System Reference Traces of Multiprogrammed and Multithreaded Workloads,” Scott F. Kaplan. *Proceedings of The ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*, pp. 420–421, June 2004, ACM Press.

### Technical Reports

“kVMTrace: An Efficient Reference Trace Collector of Full Workloads for Main Memory Simulations.” *Amherst College, Department of Mathematics and Computer Science, Technical Report TR-2004-02*, November 2004.

“Re-evaluating Page Replacement Policies: Why LRU Remains King,” Scott F. Kaplan, Thomas B. Jablin. *Amherst College, Department of Mathematics and Computer Science, Technical Report TR-2004-01*, October 2004.

“Autonomic Heap Sizing: Taking Real Memory into Account,” Ting Yang, Matthew Hertz, Emery Berger, Scott F. Kaplan, and J. Eliot B. Moss. *The University of Massachusetts Amherst, Department of Computer Science, Technical Report TR-04-14*, March 2004.

“EELRU: Simple and Effective Adaptive Page Replacement,” Yannis Smaragdakis, Scott F. Kaplan, and Paul R. Wilson. *The University of Texas at Austin, Department of Computer Sciences, Technical Report TR-98-23*, December 1998.

“Trace Reduction for Virtual Memory Simulations,” Scott F. Kaplan, Yannis Smaragdakis, and Paul R. Wilson. *The University of Texas at Austin, Department of Computer Sciences, Technical Report TR-98-24*, December 1998.

### Invited Talks

“Adaptive Prepaging Using Recency Information,” International Business Machines, TJ Watson Research Center, February 2002.

“How Virtual Memory Systems Can Respond to Reference Behavior,” The University of Massachusetts, Amherst, Computer Science Department, January 2001.

“Recency and Compressed Caching: How to Respond to Reference Behavior,” Lucent Technologies, Bell Labs, January 2000.

“Recency and Compressed Caching: How to Respond to Reference Behavior,” International Business Machines, TJ Watson Research Laboratories, January 2000.

### Professional Activities

Panelist, *National Science Foundation, Computer Systems Research*, March 2006.

Panelist, *National Science Foundation, Foundations of Computing Processes and Artifacts*, November 2005.

Referee, *Performance Evaluation Review*, Fall 2004.

Program Committee, *USENIX Annual Technical Conference*, 2004.

Referee, *USENIX Annual Technical Conference*, 2002.

Referee, *ACM Transactions on Design Automation of Electronic Systems (TODAES)*, 2001.

Publicity co-chair (North America), *ACM SIGMETRICS/PERFORMANCE*, 2001.

Referee, *Software: Practice and Experience*, 1999.

Member, Association for Computing Machinery.

Member, ACM Special Interest Group on Operating Systems.

Member, ACM Special Interest Group on Measurement and Evaluation.

Member, USENIX Advanced Computing Systems Association.

### Classes Taught at Amherst College

Spring 2006:	CS 14, Introduction to Computer Systems (lectures and labs)
Fall 2005:	CS 11, Introduction to Computer Science I CS 39, Principles of Operating System Design
Spring 2005:	CS 14, Introduction to Computer Systems (lectures and labs)
Fall 2004:	CS 11, Introduction to Computer Science I CS 29, Networks ( <i>new course</i> )
Spring 2004:	CS 12, Introduction to Computer Science II CS 40, Seminar in Computer Science: Runtime Resource Management
Fall 2003:	CS 12, Introduction to Computer Science II ( <i>new course</i> ) CS 39, Principles of Operating System Design
Spring 2002:	CS 14, Introduction to Computer Systems (lectures and labs)
Fall 2001:	CS 29, Networks and Concurrent Computing ( <i>new course</i> ) CS 39, Principles of Operating System Design
Spring 2001:	CS 14, Introduction to Computer Systems (lectures and labs)
Fall 2000:	CS 11, Introduction to Computer Science (lectures and labs) CS 39, Principles of Operating System Design
Spring 2000:	CS 11, Introduction to Computer Science (lectures and labs)
Fall 1999:	CS 11, Introduction to Computer Science (lectures and labs) (co-taught with C. McGeoch) CS 40, Seminar in Computer Science: Virtual Memory and Data Representations

### Advising of Honors Theses at Amherst College

- Owen S. Hofmann 2006 (*in progress*). Reference Trace Reduction via Reference Distribution Sampling.
- Thomas B. Jablin 2006 (*in progress*). The Effects of Hard Disk Caches on Prefetching and Clustering.
- Blair A. Trump 2005. A Modular Memory Manager in Simulation.
- Deborah S. Katz 2004. Controlling The Overhead and Accuracy of Online Recency Information Gathering.
- Isuru M. Seneviratne 2004. Page-level Reference Locality and User-level Memory Allocators.
- Stephen B. Thomas 2002. Auction: A New Approach to Cache Partitioning.

### **Independent Study Courses**

Thomas B. Jablin, Fall 2004. Prefetching and Clustering.  
Jared R. White, Spring 2002. Strategies of Computational Biology.  
George C. Shaw, Fall 2001. Lossless Compression of Floating Point Data.  
Matthew B. Bevers, Spring 2001. Auctioning in Variable Space Allocation.  
Rachel L. Rubin, Spring 2000 and Fall 2000. Variable Space Allocation.

### **Advising of Summer Interns**

Laura M. Strickman and Xin Zheng, Summer 2005. Achieving high utilization under memory pressure for CPU-bound workloads with working set scheduling.  
Thomas B. Jablin, Blair A. Trump, and Lisa M. Wallmark, Summer 2004. Experimental evaluation and comparison of page replacement policies using realistic main memories and workloads.  
Ana M. Mocanu, Summer 2003. Development and evaluation of whole-system reference trace collection for memory management simulation.  
Megan F. Cole, Albree Fellow, Summer 2001. Development and experimentation on demand prepaging.  
Stephen B. Thomas, Hughes Fellow, Summer 2000. Development of dynamic memory management policy simulators.

### **Advising of Graduate Students**

Matthew Hertz, Department of Computer Science, University of Massachusetts Amherst, expected Ph.D. in Fall 2005. Dissertation committee member.  
Mel Gorman, University of Limerick, Department of Computer Science and Information Systems, M.S. Spring 2003. External thesis committee member.

### **Committees and College Service**

Director of Athletics Search Committee, Spring 2006.  
Faculty Liaison to Men's Squash, Fall 2004 to Spring 2006.  
Athletics Committee, Chair, Fall 2003 to Spring 2005.  
Orientation Committee, Fall 2000 to Spring 2002.  
Dean of Student Activities Search Committee, Spring 2000.  
Network Administrator Search Committee, Spring 2001 to Fall 2001.  
Assistant Coach, Men's Squash, Fall 2000 to present.

### **Activities, Department of Mathematics and Computer Science**

Comprehensive examination organizer, Spring 2005 to Spring 2006.  
Co-manager of computer workstation network, Fall 2000 to present.  
ACM Chapter advisor, Fall 2003 to Spring 2004.  
ACM Chapter advisor, Fall 2001 to Spring 2002.  
Library representative for Computer Science, Fall 1999 to Spring 2000.  
November 4, 2006