Curriculum Vitae

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Education

Ph.D.	Computer Science, Massachusetts Institute of Technology, 1981 Thesis: "Nested Transactions: An Approach to Reliable Distributed Computing"
E.E.	Computer Science, Massachusetts Institute of Technology, 1978
M.S.	Computer Science, Massachusetts Institute of Technology, 1978
B.S.	Elec. Eng. and Comp. Sci., Massachusetts Institute of Technology, 1975

Professional Experience

2007-	Professor, Computer Science, Univ. of Mass., Amherst
1992-2007	Associate Professor, Computer Science, Univ. of Mass., Amherst
1992-1993	Visiting Associate Professor, Computer Science, Carnegie Mellon Univ.
1985-1992	Assistant Professor, Computer and Information Science, Univ. of Mass., Amherst
1985	Visiting Scientist, Digital Equipment Corporation, Hudson, MA
1981-1985	Senior Analyst/Programmer, U.S. Army War College

Honors

2008	ACM ISCA Most Influential Paper Award for 1993
2007	Fellow of the ACM
2005	University of Massachusetts TEACHnology Fellowship
1991	University of Massachusetts Lilly Teaching Fellowship
1987	National Science Foundation Presidential Young Investigator Award
1975	National Science Foundation Graduate Fellow

Editorships

2000-2001	Associate Editor, ACM Transaction on Prog. Lang. & Systems

Editorships (continued)

1993-1996 Associate Editor, Data Engineering (quarterly of IEEE TC)

1992-1996 Associate Editor, IEEE Transactions on Software Engineering

Publications, Patents, and Artifacts

Patents

1. Rajesh R. Bordawekar and J. Eliot B. Moss, "Method for Providing Maximal Concurrency in a Tree Structure", Patent pending, applied 09/09/2008.

2. Richard L. Hudson and J. Eliot B. Moss, "Method for Practical Concurrent Copying Garbage Collection Offering Minimal Thread Blocking Times", Patent #6,671,707, awarded 12/30/2003.

3. Maurice P. Herlihy and J. Eliot B. Moss, "System for Achieving Atomic Non-Sequential Multi-Word Operations on Shared Memory", Patent #5,428,761, awarded 6/27/1995.

Journal Papers

1. Stephen M. Blackburn, Kathryn S. McKinley, Robin Garner, Chris Hoffman, Asjad Khan, Rotem Bentzur, Amer Diwan, Daniel Feinberg, Daniel Frampton, Samuel Z. Guyer, Martin Hirzel, Antony Hosking, Maria Jump, Han Lee, J. Eliot B. Moss, Aashish Phansalkar, Darko Stefanović, Thomas VanDrunen, Daniel von Dincklage, Benjamin Wiedermann, "Wake Up and Smell the Coffee: Evaluation Methodology for the 21st Century," *Communications of the ACM*, Volume 51, Number 8, August 2008, pp. 83–89. *http://doi.acm.org/10.1145/1378704.1378723*.

2. Edward K. Walters II, J. Eliot B. Moss, Trek Palmer, Timothy Richards, Charles C. Weems, "CASL: A Rapid-Prototyping Language for Modern Micro-architectures," *Computer Languages, Systems, and Structures*, 2008, Volume 34/4, pp. 195-211. *http://dx.doi.org/10.1016/j.cl.2007.06.001*.

3. Han B. Lee, Amer Diwan, and J. Eliot B. Moss, "Design, Implementation, and Evaluation of a Compilation Server," *ACM Transactions on Programming Languages and Systems*, Volume 29, Number 4, Article 18, 2007, 40 pp. *http://doi.acm.org/10.1145/1255450.1255451*.

4. Stephen M. Blackburn, Sharad Singhai, Matthew Hertz, Kathryn S. McKinley, J. Eliot B. Moss, and Ting Yang, "Profile-Based Pretenuring," *ACM Transactions on Programming Languages and Systems*, Volume 29, Number 1, Article 2, 2007, 57 pages. *http://www.cs.umass.edu/~moss/papers/toplas-pretenure.pdf*.

5. J. Eliot B. Moss and Antony L. Hosking, "Nested Transactional Memory: Model and Architecture Sketches," *Science of Computer Programming*, Elsevier, Volume 63, Issue 2, 1 December 2006, pp. 186–201. *http://dx.doi.org/10.1016/j.scico.2006.05.010*.

6. Han B. Lee, Daniel von Dincklage, Amer Diwan, and J. Eliot B. Moss, "Understanding the Behavior of Compiler Optimizations," *Software: Practice and Experience*, Wiley Interscience, Volume 36, Issue 8, July 2006, pp. 835–844. *http://dx.doi.org/10.1002/spe.718*.

7. Matthew Hertz, Stephen M. Blackburn, J. Eliot B. Moss, Kathryn S. McKinley, and Darko Stefanović, "Generating Object Lifetime Traces with Merlin," *ACM Transactions on Programming Languages and Systems*, Volume 28, Number 3, May 2006, pp. 476–516. *http://www.cs.umass.edu/~moss/papers/toplas-2006-merlin.pdf*.

8. J. Eliot B. Moss and Ravi Rajwar, "Atomicity as a First-Class System Provision," *Journal of Universal Computer Science*, Volume 11, Number 5, May 2005, pp. 651–660. *http://www.jucs.org/jucs_11_5/atomicity_as_a_first*. This also appeared as a section of a longer report published as *ACM SIGOPS Operating Systems Review*, Volume 39, Number 2, 2005, pp. 41–46. *http://www.cs.umass.edu/~moss/papers/os-review-2005-quarks.pdf*. This longer work also appeared as *ACM SIGMOD Record*, Volume 34, Number 1, 2005, pp. 63–69. *http://www.cs.umass.edu/~moss/papers/sigmod-record-2005-quarks.pdf*.

9. J. Eliot B. Moss, Trek Palmer, Timothy Richards, Edward K. Walters II, and Charles C. Weems, "CISL: A Class-based Machine Description Language for Co-generation of Compilers and Simulators," *International Journal of Parallel Programming*, (Springer-Verlag). Volume 33, Numbers 2-3, June 2005, pp. 231–246. *http://dx.doi.org/10.1007/s10766-005-3587-1*.

10. B. Alpern, S. Augart, S. M. Blackburn, M. Butrico, A. Cocchi, P. Cheng, J. Dolby, S. Fink, D. Grove, M. Hind, K. S. McKinley, M. Mergen, J. E. B. Moss, T. Ngo, V. Sarkar, M. Trapp, "The Jikes Research Virtual Machine project: Building an open-source research community," *IBM Systems Journal*, Volume 44, Number 2, 2005, pp. 399–417. *http://www.cs.umass.edu/~moss/papers/ibm-systems-2005-jikes-rvm-open-source.pdf*.

11. Richard L. Hudson and J. Eliot B. Moss, "Sapphire: Copying GC Without Stopping the World," *Concurrency and Computation: Practice and Experience*, Volume 15, Issue 3–5, pp. 223–261, John Wiley and Sons, 2003. *http://dx.doi.org/10.1002/cpe.712*.

12. Amy McGovern, J. Eliot B. Moss, and Andrew G. Barto, "Building a Basic Block Instruction Scheduler with Reinforcement Learning and Rollouts," *Machine Learning*, Special Issue on Reinforcement Learning, Volume 49, Numbers 2/3, 2002, pp. 141–160. *http://dx.doi.org/10.1023/A:1017976211990*.

13. Amer S. Diwan, Kathryn S. McKinley, and J. Eliot B. Moss, "Using Types to Analyze and Optimize Object-Oriented Programs," *ACM Transactions on Programming Languages and Systems*, Volume 23, Number 1, January 2001, pp. 30–72. *http://www.cs.umass.edu/~moss/papers/toplas-2001-analysis.pdf*.

14. Amer Diwan, David Tarditi, and J. Eliot B. Moss, "Memory Subsystem Performance of Programs with Intensive Heap Allocation," *ACM Transactions on Computer Systems*, Volume 13, Number 3, August 1995, pp. 244–273. *http://www.cs.umass.edu/~moss/papers/tocs-1995-alloc.pdf*.

15. J. Eliot B. Moss, "Working with Persistent Objects: To Swizzle or Not to Swizzle," *IEEE Transactions on Software Engineering*, Volume 18, Number 8, August 1992, pp. 657–673. *http://www.cs.umass.edu/~moss/papers/tse-1992-swizzle.pdf*.

16. Maurice P. Herlihy and J. Eliot B. Moss, “Lock-Free Garbage Collection for Multiprocessors” (full paper), *IEEE Transactions on Parallel and Distributed Systems*, Volume 3, Number 3, May 1992, pp. 304–311. *http://www.cs.umass.edu/~moss/papers/tpds-1992-lock-free.pdf*.

17. J. Eliot B. Moss, “Design of the Mneme Persistent Object Store,” *ACM Transactions on Information Systems*, Volume 8, Number 2, April 1990, pp. 103–139. *http://www.cs.umass.edu/~moss/papers/tois-1990-mneme.pdf*.

Books

1. J. Eliot B. Moss, *Nested Transactions: An Approach to Reliable Distributed Computing*, MIT Press, 1985, 160 pp.

2. Barbara Liskov, Russell Atkinson, Toby Bloom, Eliot Moss, J. Craig Schaffert, Robert Scheifler, and Alan Snyder, *CLU Reference Manual*, Springer-Verlag, 1981, 190 pp.

Book Chapters

1. J. Eliot B. Moss, “Transaction Management”, in *Encyclopedia of Distributed Computing*, Partha Dasgupta and Jospeh Urban, eds., to appear, Kluwer Academic Publishers.

2. J. Eliot B. Moss, “Nested Transactions: An Introduction,” *Concurrency Control and Reliability in Distributed Systems*, Bharat Bhargava, ed., Van Nostrand Reinhold, 1987, pp. 395–425.

3. J. Eliot B. Moss, “Object Orientation as Catalyst for Language-Database Integration,” *Object-Oriented Concepts, Applications, and Databases*, Won Kim and Fred Lochovsky, eds., Addison-Wesley, 1989, pp. 583–592 (not reviewed).

Conference Papers

1. Phil McGachey, Antony Hosking, and J. Eliot B. Moss, “A unified object model for pervasive virtualized access,” *Eighth International Conference on Generative Programming and Component Engineering (GPCE ’09)*, Denver, CO, ACM, October 2009, pp. 75–84. *http://doi.acm.org/10.1145/1621607.1621620*.

2. Daniel Frampton, Stephen M. Blackburn, Perry Cheng, Robin Garner, David Grove, J. Eliot B. Moss, and Sergey I. Salishev, “Demystifying Magic: High-level Low-level Programming,” *Proceedings of the 5th International Conference on Virtual Execution Environments*, Washington, DC, ACM, March 2009, pp. 81-90. . *http://doi.acm.org/10.1145/1508293.1508305*.

3. Ting Yang, Tongping Liu, Emery D. Berger, Scott F. Kaplan, and J. Eliot B. Moss, “Redline: First Class Support for Interactivity in Commodity Operating Systems,” *Proceedings of the 8th USENIX Conference on Operating Systems Design and Implementation*, San Diego, CA, December 2008, pp. 73–86. *http://www.cs.umass.edu/~moss/papers/osdi-2008-redline.pdf*.

4. Yang Ni, Vijay Menon, Ali-Reza Adl-Tabatabai, Antony L. Hosking, Richard L. Hudson, J. Eliot B. Moss, Bratin Saha, Tatiana Shpeisman, “Open Nesting in Software Transactional Memory,” *ACM SIGPLAN 2007 Symposium on Principles and Practice of Parallel Programming*, San Jose, CA, March 2007, pp. 68–78. *http://doi.acm.org/10.1145/1229428.1229442*.

5. Ting Yang, Emery D. Berger, Scott F. Kaplan, J. Eliot B. Moss, "CRAMM: Virtual Memory Support for Garbage-Collected Applications," *7th USENIX Symposium on Operating Systems Design and Implementation (OSDI '06)*, Seattle, WA, November 2006, pp. 103–116. *http://www.cs.umass.edu/~moss/papers/osdi-2006-heapsizing.pdf*.

6. Stephen M. Blackburn, Robin Garner, Chris Hoffman, Asjad Khan, Kathryn S. McKinley, Rotem Bentzur, Amer Diwan, Daniel Feinberg, Samuel Z. Guyer, Antony Hosking, Maria Jump, J. Eliot B. Moss, Darko Stefanović, Thomas van Drunen, Daniel von Dincklage, Benjamin Wiedermann, "The DaCapo Benchmarks: Java Benchmarking Development and Analysis," *Proceedings of the 2006 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2006)*, Portland, OR, October 2006, pp. 169–190. *http://doi.acm.org/10.1145/1167473.1167488*.

7. John Cavazos, J. Eliot B. Moss, and Michael F. P. O'Boyle, "Hybrid Optimizations: Which Optimization Algorithm to Use?", *Proceedings of the 15th International Conference on Compiler Construction*, Vienna, Austria, March 2006, pp. 124–138. *http://dx.doi.org/10.1007/11688839_12*.

8. Narendran Sachindran, J. Eliot B. Moss, and Emery D. Berger, "MC^2: High-Performance Garbage Collection for Memory-Constrained Environments," *Proceedings of the 2004 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2004)*, Vancouver, BC, October 2004, pp. 81–98. *http://www.cs.umass.edu/~moss/papers/oopsla-2004-mc2.pdf*.

9. Xianglong Huang, Stephen M. Blackburn, Kathryn S. McKinley, J. Eliot B. Moss, Zhenlin Wang, and Perry Cheng, "The Garbage Collection Advantage: Improving Program Locality," *Proceedings of the 2004 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2004)*, Vancouver, BC, October 2004, pp. 69-80. *http://www.cs.umass.edu/~moss/papers/oopsla-2004-gc-advantage.pdf*.

10. Ting Yang, Matthew Hertz, Emery D. Berger, Scott F. Kaplan, and J. Eliot B. Moss, "Automatic Heap Sizing: Taking Real Memory Into Account," *Proceedings of the 2004 International Symposium on Memory Management (ISMM 2004)*, Vancouver, BC, October 2004, pp. 61–72. *http://www.cs.umass.edu/~moss/papers/ismm-2004-auto-heap-size.pdf*.

11. John Cavazos and J. Eliot B. Moss, "Inducing Heuristics To Decide Whether To Schedule," *Proceedings of the 2004 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2004)*, Washington, DC, June 2004, pp. 183–194. *http://www.cs.umass.edu/~moss/papers/pldi-2004-scheduling.pdf*.

12. Narendran Sachindran and J. Eliot B. Moss, "MarkCopy: Fast Copying GC With Less Space Overhead," *Proceedings of the 2003 ACM International Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2003)*, Anaheim, CA, October 2003, pp. 326–343. *http://www.cs.umass.edu/~moss/papers/oopsla-2003-mark-copy.pdf*.

13. Matthew Hertz, Neil Immerman, and J. Eliot B. Moss, "Framework for Analyzing Garbage Collection," *Second IFIP International Conference on Theoretical Computer Science*, Montreal, Canada, Kluwer, August 2002, pp. 230–242.

14. Matthew Hertz, Stephen M. Blackburn, J. Eliot B. Moss, Kathryn S. McKinley, and Darko Stefanović, “Error-Free Garbage Collection Traces: How to Cheat and Not Get Caught,” *Proceedings of the International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS 2002)*, Marina Del Ray, CA, July 2002, pp. 140–151. *http://www.cs.umass.edu/~moss/papers/sigmetrics-2002-merlin.pdf*.

15. Stephen M. Blackburn, Richard Jones, Kathryn S. McKinley, and J. Eliot B.Moss, “Beltway: Getting Around Garbage Collector Gridlock,” *Proceedings of the ACM SIGPLAN 2002 Conference on Programming Language Design and Implementation (PLDI 2002)*, Berlin, Germany, June 2002, pp. 153–164. *http://www.cs.umass.edu/~moss/papers/pldi-2002-beltway.pdf*.

16. Jeffrey Palm, Han Lee, Amer Diwan, and J. Eliot B. Moss, “When to Use a Compilation Service,” *LCTES ’02 and SCOPES ’02 Joint Conference on Languages, Compilers, and Tools for Embedded Systems and Software and Compilers for Embedded Systems*, Berlin, Germany, June 2002, pp. 194–203. *http://www.cs.umass.edu/~moss/papers/lctes-2002-comp-server.pdf*.

17. Stephen M. Blackburn, Sharad Singhai, Matthew Hertz, Kathryn S. McKinley, and J. Eliot B. Moss, “Pretenuring for Java,” *Proceedings of the 2001 ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 2001)*, Tampa, FL, November 2001, pp. 342–352. *http://www.cs.umass.edu/~moss/papers/oopsla-2001-pretenure.pdf*.

18. Richard L. Hudson and J. Eliot B. Moss, “Sapphire: Copying GC Without Stopping the World,” *Proceedings of ACM 2001 Java Grande Conference*, Palo Alto, CA, June 2001, pp. 48–57. *http://www.cs.umass.edu/~moss/papers/jgrande-2001-sapphire.pdf*.

19. Stephen M. Blackburn, Richard L. Hudson, Ron Morrison, J. Eliot B. Moss, David S. Munro, and John Zigman, “Starting with Termination: A Methodology for Building Distributed Garbage Collection Algorithms,” *Proceedings of the 24th Australasian Computer Science Conference*, Gold Coast, Queensland, Australia, February 2001, pp. 20–28. *http://www.cs.umass.edu/~moss/papers/acsc-2001-termination.pdf*.

20. Darko Stefanović, Kathryn S. McKinley, and J. Eliot B. Moss, “On Models for Object Lifetime Distributions,” *Proceedings of the 2000 International Symposium on Memory Management (ISMM 2000)*, Minneapolis, MN, October 2000, pp. 137-142. *http://www.cs.umass.edu/~moss/papers/ismm-2000-lifetime.pdf*.

21. Richard L. Hudson, J. Eliot B. Moss, Sreenivas Subramoney, and Weldon Washburn, “Cycles to Recycle: Garbage Collection on the IA-64,” *Proceedings of the 2000 International Symposium on Memory Management (ISMM 2000)*, Minneapolis, MN, October 2000, pp. 101-110. *http://www.cs.umass.edu/~moss/papers/ismm-2000-ia64.pdf*.

22. Darko Stefanović, Kathryn S. McKinley, and J. Eliot B. Moss, “Age-Based Garbage Collection,” *Proceedings of the ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA 1999)*, Denver, CO, November 1999, pp. 370-381. *http://www.cs.umass.edu/~moss/papers/oopsla-1999-age-based.pdf*.

23. Amy McGovern and J. Eliot B. Moss, "Scheduling Straight-Line Code Using Reinforcement Learning and Rollouts," *Neural Information Processing Symposium*, (NIPS 1998), Denver, CO, December 1998, 7 pp. *http://books.nips.cc/papers/files/nips11/0903.pdf*.

24. Amer Diwan, Kathryn S. McKinley, and J. Eliot B. Moss, "Type-Based Alias Analysis," *1998 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLSI 1998)*, June 1998, Montreal, Quebec, Canada, pp. 106-117. *http://www.cs.umass.edu/~moss/papers/pldi-1998-tbaa.pdf*.

25. Ole Agesen, David Detlefs, and J. Eliot B. Moss, "Garbage Collection and Local Variable Type-Precision and Liveness in Java Virtual Machines," *1998 ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 1998)*, June 1998, Montreal, Quebec, Canada, pp. 269-279. *http://www.cs.umass.edu/~moss/papers/pldi-1998-liveness.pdf*.

26. Richard L. Hudson, Ron Morrison, J. Eliot B. Moss, and David S. Munro, "Where have all the pointers gone?," *Proceedings of the 21st Australasian Computer Science Conference*, Springer-Verlag, Perth, Western Australia, February 1998, pp. 107-119.

27. J. Eliot B. Moss, Paul E. Utgoff, John Cavazos, Doina Precup, Darko Stefanović, Carla E. Brodley, and David T. Scheeff, "Learning to Schedule Straight-Line Code," *Neural Information Processing Symposium*, (NIPS 1997), Denver, CO, December 1997, pp. 929-935. *http://books.nips.cc/papers/files/nips10/0929.pdf*.

28. Richard L. Hudson, Ron Morrison, J. Eliot B. Moss, and David S. Munro, "Garbage Collecting the World: One Car at a Time," *Proceedings of the ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications*, (OOPSLA 1997), Atlanta, GA, October 1997, pp. 162-175. *http://www.cs.umass.edu/~moss/papers/oopsla-1997-gc-world.pdf*.

29. Amer Diwan, J. Eliot B. Moss, and Kathryn S. McKinley, "Simple and Effective Analysis of Statically-Typed Object-Oriented Programs," *Proceedings of the ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications*, (OOPSLA 1996), San Jose, CA, October 1996, pp. 292-305. *http://www.cs.umass.edu/~moss/papers/oopsla-1996-analysis.pdf*.

30. Gökhan Kutlu, Bruce Draper, J. Eliot B. Moss, and Edward Riseman, "Support Tools for Visual Information Management," *Fifth Symposium on Document Analysis and Information Retrieval (SDAIR 1996)*, Las Vegas, NV, April 1996, pp. 101-112. *http://www.cs.umass.edu/~moss/papers/sdair-1996.pdf*.

31. Darko Stefanović and J. Eliot B. Moss, "Characterisation of Object Behaviour in Standard ML of New Jersey", *ACM SIGPLAN Conference on Lisp and Functional Programming 1994 (LFP 1994)*, Orlando, FL, June 1994, pp. 43-54. *http://www.cs.umass.edu/~moss/papers/lfp-1994-alloc.pdf*.

32. Eric Brown, James Callan, Bruce Croft, and J. Eliot B. Moss, "Supporting Full-Text Information Retrieval with a Persistent Object Store," *Fourth International Conference on Extending Database Technology (EDBT 1994)*, Springer-Verlag, Cambridge, UK, March 1994, pp. 365-378. *http://dx.doi.org/10.1007/3-540-57818-8_64*.

33. Amer Diwan, David Tarditi, and J. Eliot B. Moss, "Memory Subsystem Performance of Programs with Intensive Heap Allocation," *Twenty-First Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 1994)*, Portland, OR, January 1994, pp. 1-14. *http://www.cs.umass.edu/~moss/papers/popl-1994-alloc.pdf*.

34. Masanobu Yuhara, Brian N. Bershad, Chris Maeda, and J. Eliot B. Moss, "Efficient Packet Demultiplexing for Multiple Endpoints and Large Messages," *Usenix Winter 1994 Technical Conference*, San Francisco, January 1994, pp. 153-166. Draft version at *http://www.cs.umass.edu/~moss/papers/usenix-1994-draft.pdf*.

35. Antony L. Hosking and J. Eliot B. Moss, "Protection Traps and Alternatives for Memory Management of an Object-Oriented Language," *ACM Symposium on Operating Systems Principles (SOSP 1993)*, Asheville, NC, December 1993, pp. 106-119. *http://www.cs.umass.edu/~moss/papers/sosp-1993-traps.pdf*.

36. Antony L. Hosking and J. Eliot B. Moss, "Object Fault Handling for Persistent Programming Languages," *ACM Conference on Object Oriented Programming Systems, Languages, and Applications* (OOPSLA 1993), Washington, DC, October 1993, pp. 288-303. *http://www.cs.umass.edu/~moss/papers/oopsla-1993-faults.pdf*.

37. Antony L. Hosking, Eric Brown, and J. Eliot B. Moss, "Update Logging for Persistent Programming Languages: A Comparative Performance Evaluation," *Nineteenth International Conference on Very Large Data Bases (VLDB 1993)*, Dublin, Ireland, August 1993, pp. 429-440.

38. Maurice P. Herlihy and J. Eliot B. Moss, "Transactional Memory: Architectural Support for Lock-Free Data Structures," *International Symposium on Computer Architecture (ISCA 1993)*, San Diego, CA, May 1993, pp. 289-300. *http://www.cs.umass.edu/~moss/papers/isca-1993-trans-mem.pdf*.

39. Antony L. Hosking, J. Eliot B. Moss, and Darko Stefanović, "A Comparative Performance Evaluation of Write Barrier Implementations," *ACM Conference on Object Oriented Programming Systems, Languages, and Applications*, (OOPSLA 1992), Vancouver, BC, October 1992, pp. 92-109. *http://www.cs.umass.edu/~moss/papers/oopsla-1992-write-barrier.pdf*.

40. Amer Diwan, J. Eliot B. Moss, and Richard L. Hudson, "Compiler Support for Garbage Collection in a Statically Typed Language," *ACM SIGPLAN '92 Conference on Programming Language Design and Implementation (PLDI 1992)*, San Francisco, CA, June 1992, pp. 273-282. *http://www.cs.umass.edu/~moss/papers/pldi-1992-compiler-gc.pdf*.

41. Maurice P. Herlihy and J. Eliot B. Moss, "Lock-Free Garbage Collection for Multiprocessors" (extended abstract), *Third Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA 1991)*, Hilton Head, July 1991, pp. 229-236. *http://www.cs.umass.edu/~moss/papers/spaa-1991-lock-free.pdf*.

42. J. Eliot B. Moss, "Log-Based Recovery for Nested Transactions," *Thirteenth International Conference on Very Large Data Bases (VLDB 1987)*, Brighton, England, September 1987, pp. 427-432. *http://www.cs.umass.edu/~moss/papers/vldb-1987.pdf*.

43. J. Eliot B. Moss, "Managing Stack Frames in Smalltalk," *SIGPLAN '87 Symposium on Interpreters and Interpretive Techniques*, St. Paul, MN, June 1987, pp. 229-240. *http://www.cs.umass.edu/~moss/papers/sigplan-1987-smalltalk.pdf*.

44. J. Eliot B. Moss and Walter H. Kohler, "Concurrency Features for the Trellis/Owl Language," *Proceedings of the European Conference on Object-Oriented Programming (ECOOP 1987)*, Paris, June 1987, pp. 171-180. *http://www.ifs.uni-linz.ac.at/~ecoop/cd/papers/0276/02760171.pdf*.

45. J. Eliot B. Moss, Bruce Leban, and Panos K. Chrysanthis, "Finer Grained Concurrency Control for the Database Cache," *Third International Conference on Data Engineering (ICDE 1987)*, Los Angeles, CA, February 1987, pp. 96-103.

46. J. Eliot B. Moss, Nancy D. Griffeth, and Marc H. Graham, "Abstraction in Recovery Management," *ACM Conference on Management of Data (SIGMOD 1986)*, Washington, DC, May 1986, pp. 72-83. *http://www.cs.umass.edu/~moss/papers/sigmod-1986.pdf*.

47. J. Eliot B. Moss, "Checkpoint and Restart in Distributed Transaction Systems," *Third Symposium on Reliability in Distributed Software and Database Systems (SRDSDS 1983)*, Clearwater Beach, FL, October 1983, pp. 85-89.

48. J. Eliot B. Moss, "Nested Transactions and Reliable Distributed Computing," *Second Symposium on Reliability in Distributed Software and Database Systems (SRDSDS 1982)*, Pittsburgh, PA, August 1982, pp. 33-39.

Workshop Papers

1. Phil McGachey, Antony L. Hosking, and J. Eliot B. Moss, "Pervasive Load-Time Transformation for Transparently Distributed Java," *4th International Workshop on Bytecode Semantics, Verification, Analysis and Transformation*, York, UK, ETAPS, March 2009, pp. 3–17.

2. J. Eliot B. Moss, "Open Nested Transactions: Semantics and Support," poster presented at *Workshop on Memory Performance Issues (WMPI 2006)*, Austin, TX, February 2006. *http://www.cs.umass.edu/~moss/papers/wmpi-2006.pdf*.

3. J. Eliot B. Moss and Antony L. Hosking, "Nested Transactional Memory: Model and Preliminary Architecture Sketches," *OOPSLA 2005 Workshop on Synchronization and Concurrency in Object-Oriented Languages (SCOOL 2005)*, San Diego, CA, October 2005, no proceedings. *http://www.cs.umass.edu/~moss/papers/scool-2005.pdf*.

4. J. Eliot B. Moss, Trek Palmer, Timothy Richards, Edward K. Walters II, and Charles C. Weems, "CMDL: A Class-based Machine Description Language for Co-generation of Compilers and Simulators," *Proceedings of the 2004 International Parallel and Distributed Processing Symposium Workshop on Next Generation Software*, Santa Fe, NM, April 2004, 8 pp. *http://www.cs.umass.edu/~moss/papers/ipdps-2004-cmdl.pdf*.

5. J. Eliot B. Moss, Charles C. Weems, and Timothy Richards, "The CoGenT Project: Co-Generating Compilers and Simulators for Dynamically Compiled Languages," *Proceedings of the 2003 International Parallel and Distributed Processing Symposium Workshop on Next Generation Software*, Nice, France, April 2003, 8 pp. *http://www.cs.umass.edu/~moss/papers/ipdps-2003-cogent.pdf*.

6. Darko Stefanović, Matthew Hertz, Stephen M. Blackburn, Kathryn S. McKinley, and J. Eliot B. Moss, "Older-First Garbage Collection in Practice: Evaluation in a Java Virtual Machine," *Proceedings of ACM SIGPLAN Workshop on Memory System Performance (MSP 2002)*, Berlin, Germany, June 2002, 12 pp.
http://www.cs.umass.edu/~moss/papers/msp-2002-OF-in-practice.pdf.

7. John Zigman, Stephen Blackburn, and J. Eliot B. Moss, "TMOS: A Transactional Garbage Collector," *Ninth International Workshop on Persistent Object Systems (POS 9)*, Lillehammer, Norway, September 2000, about 10 pp.

8. Amy McGovern, J. Eliot B. Moss, and Andrew G. Barto, "Building a Basic Block Instruction Scheduler with Reinforcement Learning and Rollouts," Summaries of the IJCAI '99 Workshop on Statistical Machine Learning for Large-Scale Optimization, 10 pp.
http://www.cs.umass.edu/~moss/papers/ijcai-1999.pdf.

9. Gökhan Kutlu and J. Eliot B. Moss, "Exploiting Reflection to Add Persistence and Query Optimization to a Staticially Typed Object-Oriented Language," *Eighth International Workshop on Persistent Object Systems (POS 8)*, Tiburon, CA, August 1998, 13 pp.
http://www.cs.umass.edu/~moss/papers/pos-1998.pdf.

10. David S. Munro, Alfred L. Brown, Richard L. Hudson, Ron Morrison, and J. Eliot B. Moss. "Incremental Garbage Collection of a Persistent Object Store using PMOS," *Eighth International Workshop on Persistent Object Systems (POS 8)*, Tiburon, CA, August 1998.

11. J. Eliot B. Moss and Antony L. Hosking, "Approaches to Adding Persistence to Java," *First International Workshop on Persistence and Java (PJ 1)*, September 1996, Drymen, Scotland.

12. J. Eliot B. Moss, David S. Munro, and Richard L. Hudson, "PMOS: A Complete and Coarse-Grained Incremental Garbage Collector for Persistent Object Stores," *Seventh International Workshop on Persistent Object Systems (POS 7)*, Cape May, NJ, May 1996. Published as *Persistent Object Systems: Principles and Practice, The Seventh International Workshop on Persistent Object Systems*, Richard Connor and Scott Nettles, eds., Morgan Kaufmann, 1997, pp. 140-150.

13. Gökhan Kutlu, Bruce Draper, J. Eliot B. Moss, Edward Riseman, and Allen Hanson, "Persistent Data Management for Visual Applications," *ARPA Image Understanding Workshop (IUW 1996)*, Palm Springs, CA, February 1996, Volume II, pp. 1519-1523.

14. David S. Munro, Richard C. H. Connor, Ron Morrison, J. Eliot B. Moss, and Stephan J. G. Scheuerl, "Validating the MaStA I/O Cost Model for Database Crash Recovery Mechanisms," *OOPSLA '95 Workshop on Database Performance*, October 1995 (preprints only).

15. Stephan Scheuerl, Richard Connor, Ron Morrison, Eliot Moss, and David Munro, "Validation Experiments for the MaStA I/O Cost Model," *Second International Workshop on Advances in Databases and Information Systems (ADBIS 1995)*, Moscow, Russia, June 1995, pp. 305-328.

16. J. Eliot B. Moss and Antony L. Hosking, "Expressing Object Residency Optimizations Using Pointer Type Annotations." *Proceedings of the Sixth International Workshop on Persistent Object Systems (POS 6)*, Tarascon, France, September 1994, published in series *Workshops in Computing*, Springer-Verlag, pp. 3-15.

17. Richard L. Hudson and J. Eliot B. Moss, "Incremental Collection of Mature Objects," *International Workshop on Memory Management (IWMM 1992)*, St. Malo, France, September 1992, published as *Lecture Notes in Computer Science*, Number 637, Springer-Verlag, pp. 388-403.

18. J. Eliot B. Moss, "Simple and Flexible Consistency Management in Distributed Persistent Object Systems," *OOPSLA '91 Workshop on Objects in Large Distributed Applications*, Phoenix, AZ, October 1991, 4 pp.

19. J. Eliot B. Moss, "The UMass Language Independent Garbage Collector Toolkit," *OOPSLA '91 Workshop on Garbage Collection*, Phoenix, AZ, October 1991, 5 pp.

20. J. Eliot B. Moss, "Some Issues in Programming Language Interface and Integration for OODBs," *Second DARPA/Texas Instruments Workshop on Open Object-Oriented Databases*, Dallas, TX, September 1991, 7 pp.

21. Antony L. Hosking and J. Eliot B. Moss, "Towards Compile-Time Optimisations for Persistence," *Fourth International Workshop on Persistent Object Systems (POS 4)*, Martha's Vineyard, September 1990, Morgan Kaufmann, pp. 17-27.

22. J. Eliot B. Moss, "Addressing Large Distributed Collections of Persistent Objects: The Mneme Project's Approach," *Second International Workshop on Database Programming Languages (DBPL 2)*, Gleneden Beach, OR, June 1989, Hull, Morrison, and Stemple, eds., Morgan Kaufmann, 1990, pp. 358-374.

23. J. Eliot B. Moss, "Using Object-Oriented Subtyping in Query Optimization and Processing," *Workshop on Database Query Optimization*, Goetz Graefe, ed., Portland, OR, May 1989, pp. 109-114.

24. J. Eliot B. Moss and Steven Sinofsky, "Managing Persistent Data with Mneme: Designing a Reliable, Shared Object Interface," *Second International Workshop on Object-Oriented Database Systems*, Ebernberg, Germany, September 1988, published as *Lecture Notes in Computer Science*, Volume 334, Springer-Verlag, pp. 298-316.

25. J. Eliot B. Moss, "Semantics for Transactions in Shared Object Worlds," *Proceedings of the Workshop on Database Programming Languages (DBPL 1)*, Roscoff, Brittany, France, September 1987, pp. 248-252; also available in *Advances in Database Programming Languages*, Bancilhon and Buneman, eds., ACM Press, New York, 1990, pp. 289-293.

26. J. Eliot B. Moss, "Implementing Persistence for an Object Oriented Language," *Proceedings of the (Second) Workshop on Persistent Object Systems (POS 2)*, Port Appin, Scotland, August 1987, 7 pp.

27. J. Eliot B. Moss, "Transaction Management for Distributed Object-Oriented Computing," *Workshop on Design Principles for Experimental Distributed Systems*, Purdue University, West Lafayette, IN, October 1986, 2 pp.

28. J. Eliot B. Moss, "Transaction Management for Object-Oriented Systems," *International Workshop on Object-Oriented Database Systems*, Pacific Grove, CA, September 1986, p. 229.

Other Publications

1. J. Eliot B. Moss, “Issues in Storage Techniques for Object Oriented Data Bases and Persistent Programming Languages,” notes for Tutorial on Object-Oriented Databases, OOPSLA ’88, San Diego, CA, September 1988, 35 pp.

2. J. Eliot B. Moss, “Getting the Operating System Out of the Way,” *Database Engineering*, Volume 9, Number 3, September 1986, pp. 35-42, invited.

Technical Reports (not otherwise published)

1. Kathryn S. McKinley, J. Eliot B. Moss, Sharad K. Singhai, Glen E. Weaver, and Charles C. Weems, “Compiling for Heterogeneous Systems: A Survey and an Approach,” University of Massachusetts, Department of Computer Science, Report CMP SCI 95-82, October 1995, Amherst, MA (also submitted for publication).

2. Stephan J. G. Scheuerl, Richard C. H. Connor, Ron Morrison, J. Eliot B. Moss, and David S. Munro, “The MaStA I/O Trace Format,” School of Mathematical and Computational Sciences, University of St. Andrews, Report CS/95/4, October 1995, 11 pp.

3. Stephan J. G. Scheuerl, Richard C. H. Connor, Ron Morrison, J. Eliot B. Moss, and David S. Munro, “MaStA—An I/O Cost Model for Database Crash Recovery Mechanisms,” School of Mathematical and Computational Sciences, University of St. Andrews, Report CS/95/1, January 1995, 21 pp..

4. Richard L. Hudson, J. Eliot B. Moss, Amer Diwan, Christopher F. Weight, “A Language Independent Garbage Collector Toolkit,” COINS TR 91-47, August 1991, 23 pp.

5. Antony L. Hosking and J. Eliot B. Moss, “Compiler Support for Persistent Programming,” COINS TR 91-25, March 1991, 17 pp.

6. Antony L. Hosking, J. Eliot B. Moss, and Cynthia Bliss, “Design of an Object Faulting Persistent Smalltalk,” COINS TR 90-45, May 1990, 15 pp.

7. J. Eliot B. Moss and Alexander L. Wolf, “Toward Principles of Inheritance and Subtyping in Programming Languages,” COINS TR 88-95, October 1988, 57 pp.

8. Vassiliki Christou and J. Eliot B. Moss, “Persistent Owl: Heap Management and Integration with Mneme,” COINS TR 88-78, August 1988, 17 pp.

9. J. Eliot B. Moss, “Implementing Persistence for an Object Oriented Language,” COINS TR 87-69, September 1987, 7 pp.

10. J. Eliot B. Moss, Nancy D. Griffeth, and Marc H. Graham, “Abstraction in Concurrency Control and Recovery,” COINS TR 86-20, May 1986, 29 pp.

11. J. Eliot B. Moss, “A Specific Distributed Object Retention Scheme,” DEC Eastern Research Laboratory, Design Note ASR062, February 1985, 7 pp.

12. J. Eliot B. Moss, “Issues of Object Reference and Reclamation in Distributed Owl,” DEC Eastern Research Laboratory, Design Note ASR061, February 1985, 7 pp.

13. Walter H. Kohler, Toby Bloom, and J. Eliot B. Moss, “Concurrency Control Options for Owl,” DEC Eastern Research Laboratory, Design Note ASR059, January 1985, 18 pp.

14. Toby Bloom., Walter H. Kohler, J. Eliot B. Moss, and William E. Weihl, “Multiple Activities and Concurrency Control in Owl,” DEC Eastern Research Laboratory, Design Note ASR058, April 1985, 21 pp.

15. J. Eliot B. Moss, “Abstract Data Types in Stack Based Languages,” MIT Laboratory for Computer Science TR 190, May 1978, 154 pp., MS and EE thesis.

Other Significant Research Products

Special Presentations

1. J. Eliot B. Moss, "Nesting Transactions: Why and What Do We Need?", invited opening talk, *First ACM SIGPLAN Workshop on Languages, Compilers, and Hardware Support for Transactional Computing (TRANSACT)*, Ottawa, Canada, June 2006.

2. J. Eliot B. Moss, "Compiling Object-Oriented Languages: Achievements and Promise," invited talk, *ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications, (OOPSLA '97)*, Atlanta, GA, October 1997.

Artifacts and Systems

1. The DaCapo Benchmark Suite. This collects together Java programs with interesting memory allocation and garbage collection behavior, and is suited to evaluating the performance memory managers and garbage collectors. It is intended to advance methodological standards in this area of research and we offer it to the research community with that hope.

2. Quick Compiler for the Jikes RVM. The Jikes RVM comes with a fast non-optimizing compiler and a slow optimizing compiler. Our quick compiler is modeled on the fast non-optimizing compiler, but adds simple register allocation and other optimizations that are cheap to perform, to provide better code without the overhead of the optimizing compiler.

3. PowerPC 64 port of the Jikes RVM. This is the first port of the Jikes RVM, a complete "industrial strength" Java virtual machine developed by IBM Research and now available as open source software, to a 64-bit platform. It will be offered back to the research community. It enables interesting research in the use of 64-bit address spaces with Java.

4. JMTk, a Java Memory-management Toolkit for the Jikes RVM. This is a rework of GCTk (see below) in cooperation with researchers at IBM. It is now the standard memory manager for this platform.

5. Dynamic SimpleScalar. This program extends SimpleScalar, a functional, cache, and timing simulator for an out-of-order superscalar implementation of the PowerPC. It adds support for dynamic code generation, memory mapping and memory traps, software traps, and user-mode signal handlers, as well as supporting more operating system calls, more hosts, and more target operating systems. It is important in that it can simulate the Jikes RVM.

6. GCTk, a Garbage Collector Toolkit for the Jikes RVM. WHile this is specialized to Java, and somewhat to the Jikes RVM, it is a more modern descendant of the UMass Language Independent Toolkit, and was written from scratch. It has enabled much work in garbage collection because it allows us to develop and debug new collectors much more quickly than before.

7. Merlin Object Trace Generator. This tool generates, very efficiently, traces that are very precise in their determination of when objects become unreachable. Previously it was not practical to generate such traces, and the technique led to two publications just about how it is done and why it is important. Working code is now being offered back to the community.

8. UMass Object Trace Analyzer. This tool processes traces of object allocation, update, and death (garbage collection) and can simulate a wide range of garbage collection algorithms. It has been instrumental in producing preliminary results leading to the ITR award (NSF, 2000).

9. Bayesian Inference Engine. A joint project with Martin Weinberg and others in Astronomy and Allen Hanson in Computer Science, this tool can load, transform, and most importantly compute likelihood distributions of physical models from observed data. Among other things, we have used it to study the shape of the Milky Way galaxy. My contributions have been in its software engineering design and in persistence of computation history and results.

10. UMass Java Virtual Machine. This Java byte-code interpreter provided a number of preliminary results important to obtaining the large ITR award (NSF, 2000). Because of its high maintenance costs, we have now abandoned it in favor of IBM's Jalapeño system, which supports compiling and optimization.

11. Mneme Persistent Object Store. This enabled a number of studies of performance of mechanisms supporting persistence for programming languages, and was crucial to Hosking's PhD work.

12. GNU Modula-3 Compiler. While never completed, this led to important work on interaction between garbage collection and optimizing compilers, and was instrumental in Diwan's work leading to his use of Modula-3 for his PhD.

13. UMass Language Independent Garbage Collector Toolkit. Used to explore garbage collector performance issues, resulting in a number of papers and important to Hosking's and Stefanović's PhD work. The toolkit still enjoys significant use by other researchers, including Craig Chambers' group at Washington, and enabling Chilimbi's (Wisconsin) impressive PhD results.

14. UMass Smalltalk Virtual Machine. Used in explorations of object-oriented language implementation techniques and to drive other system, notably garbage collection and persistence. Important to Hosking's PhD work.

Research Funding

Active Federal Grants and Contracts

Period **Granting agency, title, amount, etc.**

2008-09 National Science Foundation, "CPA SGER: The Chaotic Behavior of Automatic Memory Management", $68,137 (Small Grant for Exploratory Research)

2007-08 National Science Foundation, "Encore/J: Transparently Recoverable Java for Resilient Distributed Computing", $30,000 (UMass portion), co-PI with Tony Hosking of Purdue

2006-09 National Science Foundation, "High-Performance Bayesian Inference for Astronomy", $771,905 over three years, co-PI with Martin D. Weinberg, Neal Katz, and Houjun Mo of Astronomy

2006-09 National Science Foundation, "CSR-SMA: CoGenT: CoGenerating Tools for Modeling Next Generation Systems", $299,999 over three years, co-PI with Charles Weems; REU supplement in 2007, 2008

2006-09 National Science Foundation, "CPA Collaborative: Delivering on Atomic Actions: Unlocking Concurrency for Ordinary Programmers", $354,998 over three years, co-PI with Tony Hosking of Purdue; REU supplement in 2006, 2007, 2008.

2006-09 NASA Applied Information Systems Research, "Enabling Bayesian inference for the astronomy masses", $714,101 over three years, co-I with Martin Weinberg, Neal Katz, and Houjun Mo of Astronomy

Pending Grant Proposals

2009-14 National Science Foundation, "Paradymes—Bridging the Performance Divide: From Many Cores to Smart Systems", $10,000,000 over five years (UMass portion $4,611,273), lead PI with Amer Diwan (Colorado), Antony Hosking (Purdue), Kathryn McKinley (Texas), and Guy Steele (Sun); with 12 senior researchers, *preliminary proposal*.

2008-10 National Science Foundation, "CSR SGER: Describing the Operating System for Accurate User-mode Simulation", $186,770 over two years, co-PI with Charles Weems

Previous Federal Grants and Contracts

2005-06 National Science Foundation, "CSR-AES Collaborative: *RuggedJ:* Resilient Distributed Java Over Heterogeneous Platforms", $70,000 over 1 year, co-PI with Antony Hosking of Purdue University.

2003-06 National Science Foundation, "Bridging the Compiler-Simulator Gap: Co-Optimizing Hardware and Software for Dynamically Compiled Languages", $300,000 over three years, lead PI, Charles Weems co-PI; REU supplements in 2005 and 2006.

Previous Federal Grants and Contracts (continued)

2002-05 National Science Foundation, "Supporting Compiler/Simulator CoEvolution for Architectural Exploration and Evaluation", $49,990 for one year, co-PI with Charles Weems

2000-05 National Science Foundation, "Dynamic Cooperative Performance Optimization", $3,165,000 over 5 years, lead PI, 2 co-PIs, 3 subcontractors; REU supplements in 2003, 2004, and 2005.

1999-01 National Science Foundation, "Multiprocessor Garbage Collection: A Post-Doctoral Associateship in Computer-Communication Research", $66,000 over 2 years

1999-02 University of Utah (DARPA sub-contract), "Compiling for an Impulse Memory Controller," $1,091,435 over 2 1/2 years, co-I with 2 others

1998-01 NASA, "Parallel Statistical Inference and Model Comparison Using Large Databases," $852,432 over 3 years, 2 co-PIs

1998-01 National Science Foundation, "Automatic Interpretation of High-Altitude Image Data for Eco-System Modeling," $1,800,000 over 3 years, 5 co-I with 4 others

1996-99 National Science Foundation, "Object Store Garbage Collection," $198,320 over 3 years

1996-99 National Science Foundation, "Storage Management for Persistent Programming Languages (Collaborative Project)," $18,000 (travel only, over 3 years)

1995-00 National Science Foundation, "Infrastructure to Support Research on Networked Multimedia Information Systems," $1,350,000 (eqmt. only, over 5 years, co-I with 6 others)

1992-95 National Science Foundation, "Storage Management for Persistent Programming Languages," $171,093 over 3 years

1992 National Science Foundation, "Enhancing and Distributing a Garbage Collector Toolkit," $35,856 supplement to above award

1987-92 National Science Foundation Presidential Young Investigator Award, $62,500/year ($25,000, plus $37,500 matching funds), for 5 years; industrial matching from Eastman Kodak ($40,000), GTE Laboratories ($25,000), General Electric Foundation Young Faculty Award ($20,000), Apple Computer graduate fellowships ($48,500), plus portion of Digital Equipment Corporation equipment allowances listed below

Active and Previous Industrial and Internal Funding

Year Company

2006 Intel Corporation, gift, $50,000

2005 Intel Corporation, gift, $50,000

1998 IBM Corporation, University Partnership Program gift, $40,000

1998 Amerinex AI, contract, "Commericalization of DoD IUA Vision Computer," $180,000, 4 co-PIs

1997 Hewlett-Packard Laboratories, gift, $30,000

1997 Sun Microsystems Laboratories, $36,000 plus eqmt. valued at $30,000.

1996 Hewlett-Packard Laboratories, gift, $26,000 plus eqmt. valued at ˜$35,000

1995 Hewlett-Packard Laboratories, gift, $26,000 plus eqmt. valued at ˜$100,000

Active and Previous Industrial and Internal Funding (continued)

1995 Sun Microsystems Laboratories, gift, $50,000 (FY96)
1994 Sun Microsystems Laboratories, gift, $12,758
1994 Sun Microsystems Laboratories, gift, $50,000 (FY95)
1992 Sun Microsystems, equip. donation, $35,090
1991 Digital Equipment Corporation, equipment allowance, "Modula-3: Implementation, Optimization, Garbage Collection, and Persistence," $111,000[1]
1990 Digital Equipment Corporation, equipment allowance, "Performance of Persistence Mechanisms," $87,500
1989 Digital Equipment Corporation, equipment allowance, "Performance of Persistence Mechanisms," $75,000
1988 Apple Computer, equipment and software, $8,778
1988 Digital Equipment Corporation, equipment allowance, "A Distributed Persistent Object Virtual Machine," $50,000
1988 Digital Equipment Corporation, equipment allowance, $41,000
1987 Digital Equipment Corporation, equipment allowance, $32,555
1987 Digital Equipment Corporation, equipment allowance, $19,400
1987 PARC Place Systems, gift, $11,000
1986 Digital Equipment Corporation, graduate fellowship, $5,000
1986 Xerox Corporation, gift, $3,000
1986 Xerox Corporation, gift, $10,000
1986 Healey Endowment Grant, $5,000
1986 Tektronix, contribution for equipment, $11,950

[1] Allowances are stated in terms of net value over ordinarily available discounts.

Educational Activities and Teaching

Special Activities

2005 University of Massachusetts Interdisciplinary Seminar on Humanities and the Arts, "Marriage and its Alternatives," invited based on proposal

PhD Committees Chaired

Naren Sachindran	chair, completed 2005, now research staff, IBM Research, India
John Cavazos	chair, completed 2004, now Asst. Prof., Univ. of Delaware
Darko Stefanović	chair, completed 1998, now tenured, Univ. of New Mexico
Amer Diwan	chair, completed 1996, now tenured, Univ. of Colorado, Boulder
Antony Hosking	chair, completed 1994, now tenured, Purdue Univ.
Tim Richards	chair, in progress
Trek Palmer	chair, in progress
Ed Walters	chair, in progress

Other PhD Committees

Ting Yang	member, in progress
Matthew Hertz	member, completed 2006
John Ridgway	member, completed 2004
Zhenlin Wang	member, completed 2003
Amy McGovern	member, completed 2002
Brendon Cahoon	member, completed 2002
Cristobal Pedregal-Martin	member, completed 2002
Sharad Singhai	member, completed 2001
Dan Barrett	member, completed 1997
Jose Medina-Peralta	member, completed 1996
Erich Nahum	member, completed 1996
Peri Tarr	member, completed 1996
Alan Kaplan	member, completed 1996
Eric Brown	member, completed 1995
Douglas Niehaus	member, completed 1994
Leo Fegaras	member, completed 1992
Ed Epp	member, completed 1992
Anne Goodman	member, completed 1990
Han Lee	outside member (Colorado, Boulder), completed 2004
Lars Hansen	outside member (Northeastern), completed 2001
Qi Lu	outside member (Carnegie Mellon), completed 1996
Scott Nettles	outside member (Carnegie Mellon), completed 1995
David Yates	member, defended 1997; redefended 2005

Subjects Taught

F 2008 CMP SCI 220(291A): Programming Methodology (with Wileden)

F 2008 CMP SCI 410/610: Compiler Techniques

S 2008 CMP SCI 691SS: Seminar: SAT Solvers and Their Applications

S 2008 CMP SCI 591FF: Seminar: Designing an Exciting Course Project

F 2007 CMP SCI 410/610: Compiler Techniques

F 2006 CMP SCI 410/610: Compiler Techniques

S 2006 CMP SCI 187: Data Structures

F 2005 CMP SCI 410/610: Compiler Techniques

S 2005 CMP SCI 187: Data Structures

F 2004 CMP SCI 491A(410)/610: Compiler Techniques

F 2003 CMP SCI 491A(410)/610: Compiler Techniques

F 2002 CMP SCI 491A(410)/610: Compiler Techniques

F 2001 CMP SCI 491A(410)/610: Compiler Techniques

F 2000 CMP SCI 491A(410)/610: Compiler Techniques

S 2000 CMP SCI 491A(410)/610: Compiler Techniques

S 1999 CMP SCI 791S: Seminar: Optimizing Java (with McKinley)

F 1998 CMP SCI 491A(410)/610: Compiler Techniques

F 1998 CMP SCI 791N: Seminar: Instruction Scheduling for Modern Processors (with McKinley)

Subjects Taught (continued)

S 1998 CMP SCI 791S: Seminar: Out-of-Core Algorithms (with McKinley)

S 1998 CMP SCI 791G: Seminar: Applications of Machine Learning to Systems Problems (with Barto)

F 1997 CMP SCI 491A(410)/610: Compiler Techniques

F 1997 CMP SCI 791M: Garbage Collection (with McKinley)

S 1997 CMP SCI 645: Object Oriented Database Management

F 1996 CMP SCI 491A(410)/610: Translator Design

S 1996 CMP SCI 645: Object Oriented Database Management

S 1996 CMP SCI 791G: Seminar: Applications of Machine Learning to Systems Problems (with Barto, Utgoff)

F 1995 CMP SCI 491A(410)/610: Translator Design (McKinley assisting)

S 1995 CMP SCI 645: Object Oriented Database Management

F 1994 CMP SCI 491A(410)/610: Translator Design (McKinley assisting)

F 1994 CMP SCI 791M: Seminar: Compiler Architecture (with 2 others)

S 1994 CMP SCI 710: Advanced Translator Design (assist McKinley)

F 1993 CMP SCI 610: Translator Design

F 1993 CMP SCI 791N: Seminar: Megaprogramming (assist Wileden)

F 1993 CMP SCI 791R: Seminar: Heterogenous Programming Languages (assist Weems)

S 1993 15-860(A) (at Carnegie Mellon): Modern Language Implementation (with Peter Lee and one other)

S 1992 COINS 791V: Seminar: Compiling for Modern Architectures

F 1991 COINS 610: Translator Design

Subjects Taught (continued)

F 1990 COINS 610: Translator Design

F 1989 COINS 610: Translator Design

S 1989 COINS 791I: Seminar: Designing a Distributed Virtual Machine

F 1988 COINS 610: Translator Design

S 1988 COINS 320: Programming Methodology (with Jack Wileden)

F 1987 COINS 791D: Seminar: Database Support for Software Engineering

S 1987 COINS 250: Introduction to Computation (Discrete Mathematics)

F 1986 COINS 250: Introduction to Computation (Discrete Mathematics)

F 1986 COINS 791F: Seminar: Survey of Recent Programming Languages

S 1986 COINS 791V: Seminar: Failure Recovery in Software Systems

F 1985 COINS 591G/ECE 544: Programming Languages

Professional Service

Program Committees Chaired

2006	2006 International Symposium on Memory Management
1994	OOPSLA ’94

Program Committees

2007	1st Workshop on Stat. and Machine learning approaches applied to ARchitecture and compilaTion (SMART ’07)
	34th Symp. on Principles of Programming Languages (POPL ’07)
2006	SIGPLAN 2006 Conference on Prog. Lang. Design and Impl. (PLDI 2006)
2003	International Symposium on Code Generation and Optimization (CGO 2003)
2002	ACM Java Grande/ISCOPE 2002
	Java Virtual Machine Research and Technology Symposium (JVM ’02)
2000	9th International Workshop on Persistent Object Systems
1999	OOPSLA ’99
1998	3rd International Workshop on Persistence and Java (PJ3)
	8th International Workshop on Persistent Object Systems
1997	2nd International Workshop on Persistence and Java (PJ2)
1996	4th International Conference on Parallel and Distributed Information Systems
	7th International Workshop on Persistent Object Systems
	International Symposium on Object Technology for Advanced Software ’96
1995	OOPSLA ’95
	Research Issues in Data Engineering-Distributed Object Mgmt.
1994	ECOOP ’94
1993	19th International Conference on Very Large Data Bases
	9th International Conference on Data Engineering
	4th International Conference on Foundations of Data Organization and Algorithms
1992	OOPSLA ’92
1991	OOPSLA ’91
	17th International Conference on Very Large Data Bases
	3rd International Workshop on Database Programming Languages
1990	10th International Conference on Distributed Computing Systems (Vice-Chair)
	6th International Conference on Data Engineering
1989	15th International Conference on Very Large Data Bases
	SIGMOD-89
	5th International Conference on Data Engineering
1988	International Symposium on Databases in Parallel and Distributed Systems
	14th International Conference on Very Large Data Bases
	SIGMOD-88
1987	SIGMOD-87

Elected Positions

2005 ACM SIGPLAN Executive Committee, Secretary

Program Reviews, Study Groups, Site Visits

1998 National Science Foundation, grant proposal review panel member
1996 member, National Research Council study group on "The Past and Present Contexts of the Use of the Ada Programming Language by the US DoD"
1996 National Science Foundation Research Infrastructure Program, site visitor
1994 member, DoD study on "out-sourcing" and DoD laboratories
1988 National Science Foundation PYI Program Review

Meetings Chaired

1993 OOPSLA '93 Workshop on Memory Management and Garbage Collection, co-chair
1986 Smalltalk implementors meeting

Panels Chaired

1989 OOSPLA '89: Inheritance: Can we have our cake and eat it, too?
1989 National Science Foundation PYI Meeting

Organizing and Steering Committees

2006 ACM SIGPLAN Workshop on Languages, Compilers, and Hardware Support for Transactional Computing (TRANSACT), Steering Committee
2000 International Symposium on Memory Management (Treasurer, Steering Committee)
1998 International Symposium on Memory Management (Treasurer)
1996 OOPSLA '96 Electronic Proceedings Editor (CD-ROM)
1996 Treasurer, Workshop on Compiler Support for Systems Software
1995 OOPSLA '95 Electronic Proceedings Editor (CD-ROM)
1987 OOPSLA '87 Birds of a Feather sessions

Member: ACM, IEEE, Sigma Xi, Tau Beta Pi, Eta Kappa Nu

Certifications: CCP (computer programming), CDP (data processing)

Departmental and University Service

Departmental Committees

Comprehensive Examination (Systems)[1]	AY 1986–1993
Computing[2]	AY 1991–1992, 1994 (chair), 2005
Educational Computing[2]	AY 1986 (member), 1987–1990 (chair)
Space	AY 1995–1996, 2002
Graduate Admissions	AY 1986–1987, 1997, 2002–2004, 2006, Chair 2007–2008
Graduate Curriculum	AY 1994–1997
Graduate Program	AY 1994, 2000, 2004, 2006
Oral Examination (Systems)[3]	AY 1985, Fall 1986

Departmental Committees (continued)

Personnel	AY 1988, 1992
Recruiting	AY 1998–2000, 2003–2006
Research Computer Facility[2]	AY 1986

[1]Written comprehensive examinations were instituted in AY 1986 and discontinued as of AY 1994.

[2]The Computing Committee was instituted in AY 1991 and subsumed the Educational Computing Committee and the Research Computing Facility Committee.

[3]Oral examinations were discontinued as of Spring 1987.

Other Departmental Service

COMEC Representative	AY 1995, 1996
CNSM Computing Committee	AY 1995
ACSIOM Board member	AY 1990–2000
Establishing ARPANet Service	AY 1986–1988
NSF proposal for educational equipment	1987

University Service

Academic Priorities Council	AY 2007–
Research Council	AY 1995–1998
Chair, RTF Committee of Research Council	AY 1996–1998
Faculty Senate	AY 1992, 1994–1996, 2003–
Committee on Committees (Faculty Senate)	AY 1999–
Campus Task Force on International Graduate Student Needs and Concerns	CY 1995
Campus Task Force on Research and Graduate Education	CY 1994
Search Committee for position in CVIP	Fall 2000
Search Committee for position in Center for Teaching	Spring 1994
Lilly Fellows selection committee	AY 1997, 1998
MSP contract bargaining team	AY 2001
MSP (union) negotiation team, intellectual property policies	AY 1997
MSP (union) Executive Board, Vice President	CY 1998–2001
Information Technology Council, Policy Subcommittee	AY 1999–2001