

CURRICULUM VITAE
PETER J. KELEHER

DEPARTMENT OF COMPUTER SCIENCE
INSTITUTE FOR ADVANCED COMPUTER STUDIES

THE UNIVERSITY OF MARYLAND

COLLEGE PARK

JANUARY 20, 2003

1 Personal Information

Associate Professor, University of Maryland.

Computer Science Department, and Institute for Advanced Computer Studies.

Appointed December, 1994.

1.1 Education

- Ph.D. in Computer Sciences
Rice University, May 1995
Dissertation title: Lazy Release Consistency for Distributed Shared Memory
Supervisor: Willy Zwaenepoel
- Master of Science in Computer Sciences
Rice University, May 1993
- Bachelor of Science in Electrical Engineering
Rice University, May 1986

1.2 Employment

7/01 to present	Associate Professor University of Maryland, College Park
12/94 to 7/01	Assistant Professor University of Maryland, College Park
1/89 to 12/94	Research Assistant Rice University
8/88 to 5/90	Teaching Assistant Rice University
6/86 to 8/88	Software Engineer General Dynamics
9/87 to 5/88	Programmer/Analyst Rice University

2 Research, Scholarly, and Creative Activities

2.1 Books Edited

1. “The 2nd Annual Workshop on Software Distributed Shared Memory,” *Lecture Notes in Computer Science*, Springer-Verlag, in preparation.

2.2 Chapters in Books

1. “Reducing Synchronization overhead for Compiler-Parallelized Codes on Software DSMs,” Hwansoo Han, Chau-Wen Tseng and Pete Keleher. In *Languages and Compilers for Parallel Computing, Tenth International Workshop*, (Z. Li et al., eds.), *Lecture Notes in Computer Science*, Springer-Verlag, 1997.
2. “Communication-Intensive Parallel Applications and Non-Dedicated Environments,” Kritchalach Thitikamol and Pete Keleher. In *The 3^d Workshop on Runtime Systems for Parallel Programming (RTSPP)*, *Lecture Notes in Computer Science*, Springer-Verlag, 1999.
3. “Resource-Aware Meta-Computing,” Jeffrey K. Hollingsworth, Pete Keleher and Kyung D. Ryu. In *Advances in Computers*, edited by Marvin V Zelkowitz, *Academic Press*, 53:110-171, 2000.
4. “Thread Migration and Load Balancing in Heterogeneous Environments,” Kritchalach Thitikamol and Pete Keleher. In *5th Workshop on Languages, Compilers, and Run-time Systems for Scalable Computers*, (S Dwarkadas, ed.), *Lecture Notes in Computer Science*, Springer-Verlag, 2000.

2.3 Articles in Refereed Journals

1. “Parallelization of General Linkage Analysis Problems,” S. Dwarkadas, A. Schaffer, P. Keleher, R. Cottingham Jr., A. Cox and W. Zwaenepoel. In *Human Heredity*, 115-131, 1994.
2. “An Evaluation of Software-Based Release Consistent Protocols,” Pete Keleher, Alan L. Cox, Sandhya Dwarkadas and Willy Zwaenepoel. In *The Journal of Parallel and Distributed Computing (JPDC)*, 29:1995.
3. “TreadMarks: Shared Memory Computing on Networks of Workstations,” C. Amza, A. Cox, S Dwarkadas, P Keleher, H Lu, R. Rajamony, W. Yu and W. Zwaenepoel. In *IEEE Computer*, 1996.
4. “Per-Node Multi-Threading and Remote Latency,” Kritchalach Thitikamol and Pete Keleher. In *IEEE Transactions on Computers (IEEE-TOCS)*, 47:414-426, 1998.
5. “Eliminating Barrier Synchronization for Compiler-Parallelized Codes on Software DSMs,” Hwansoo Han, Chau-Wen Tseng and Pete Keleher. In *International Journal of Parallel Programming*, 26:591-612, 1998.
6. “Thread Migration and Communication Minimization in DSM Systems,” Kritchalach Thitikamol and Pete Keleher. In *The Proceedings of the IEEE*, 87:487-497, 1999.
7. “Update Protocols and Cluster-based Shared Memory,” Pete Keleher. In *Computer Communications*, 22:1045-1055, 1999.

8. "Prediction and Adaptation in Active Harmony," Jeffrey K. Hollingsworth and Pete Keleher. In *Cluster Computing: The Journal of Networks, Software Tools and Applications*, 1:195-205, 1999.
9. "A Protocol-Centric Approach to On-The-Fly Race Detection," Dejan Perkovic and Pete Keleher. In *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, 11:1058-1072, 2000.
10. "Consistency Management in Deno," Pete Keleher and Ugur Cetintemel. In *The Journal on Special Topics in Mobile Networks and Applications (MONET)*, 5:299-309, 2000.
11. "Attacking the Bottlenecks in Backfilling Schedulers," Pete Keleher, Dmitry Zotkin and Dejan Perkovic. In *Cluster Computing: The Journal of Networks, Software Tools and Applications*, 3:2000.
12. "A High-Level Abstraction of Shared Accesses," Pete Keleher. In *The ACM Transactions on Computer Systems (TOCS)*, 18:1-36, 2000.
13. "The Impact of Symmetry on Software Distributed Shared Memory," Pete Keleher. In *The Journal of Parallel and Distributed Computing (JPDC)*, 60:1388-1419, 2000.
14. "Light-Weight Currency Management Mechanisms in Mobile and Weakly-Connected Environments," Ugur Cetintemel and Pete Keleher. In *The Journal of Distributed and Parallel Databases (JDPD)*, 11:53-71, 2002.
15. "Deno: A Decentralized, Peer-to-Peer Object Replication System for Mobile and Weakly-Connected Environments," U. Cetintemel, P. J. Keleher, B. Bhattacharjee and M. J. Franklin. *To appear in IEEE Transactions on Computer Systems (TOCS)*.

2.4 Articles in Refereed Conferences

1. "Lazy Release Consistency for Software Distributed Shared Memory," Pete Keleher, Alan L. Cox and Willy Zwaenepoel. In *Proceedings of the 19th International Symposium of Computer Architecture (ISCA)*, 13-21, 1992.
2. "Evaluation of Release Consistent Software Distributed Shared Memory on Emerging Network Technology," Sandhya Dwarkadas, Pete Keleher, Alan L. Cox and Willy Zwaenepoel. In *Proceedings of the 20th International Symposium of Computer Architecture (ISCA)*, 244-255, 1993.
3. "Network Multicomputing Using Recoverable Distributed Shared Memory," J. Carter, A. Cox, S. Dwarkadas, D. Johnson, P. Keleher, M. Elnozahy, S. Rodrigues, W. Yu and W. Zwaenepoel. In *Proceedings of the 1993 COMPCON*, 1993.
4. "Software Versus Hardware Shared-Memory: A Case Study," Alan L. Cox, Sandhya Dwarkadas, Pete Keleher, Honghui Lu, Ramakrishnan Rajamony and Willy Zwaenepoel. In *Proceedings of the 21st Annual International Symposium of Computer Architecture (ISCA)*, 106-117, 1994.
5. "TreadMarks: Distributed Shared Memory on Standard Workstations and Operating Systems," Pete Keleher, Alan L. Cox, Sandhya Dwarkadas and Willy Zwaenepoel. In *The 1994 Winter USENIX Conference*, 1994.

6. "Enhancing Software DSM for Compiler-Parallelized Applications," Pete Keleher and Chau-Wen Tseng. In *The 11th International Parallel Processing Symposium (IPPS)*, 1996.
7. "The Relative Importance of Concurrent Writers and Weak Consistency Models," Pete Keleher. In *The 16th International Conference on Distributed Computing Systems (ICDCS)*, 1996.
8. "Online Data-Race Detection via Coherency Guarantees," Dejan Perkovic and Pete Keleher. In *The Second Symposium on Operating Systems Design and Implementation (OSDI)*, 1996.
9. "Multi-Threading and Remote Latency in Software DSMs (Award Paper)," Kritchalach Thitikamol and Pete Keleher. In *The 17th International Conference on Distributed Computing Systems (ICDCS)*, 1997.
10. "Update Protocols and Iterative Scientific Applications," Pete Keleher. In *The 12th International Parallel Processing Symposium (IPPS)*, 1998.
11. "Locality and Performance of Page- and Object-Based DSMs," Bryan Buck and Pete Keleher. In *The 12th International Parallel Processing Symposium (IPPS)*, 1998.
12. "Prediction and Adaptation in Active Harmony," Jeffrey K. Hollingsworth and Pete Keleher. In *The 7th International Symposium on High Performance Distributed Computing (HPDC)*, 1998.
13. "General Data Streaming," Frank W. Miller, Pete Keleher and Satish K. Tripathi. In *The 19th IEEE Real-Time Systems Symposium (RTSS)*, 1998.
14. "Tapeworm: High-Level Abstractions of Shared Accesses," Pete Keleher. In *The 3rd Symposium on Operating Systems Design and Implementation (OSDI)*, 1999.
15. "Decentralized Replicated-Object Protocols," Pete Keleher. In *The 18th Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC)*, 1999.
16. "Responsiveness without Interrupts," Dejan Perkovic and Pete Keleher. In *The 13th International Conference on Supercomputing (ICS)*, 1999.
17. "Active Correlation Tracking," Kritchal Thitikamol and Pete Keleher. In *The 19th International Conference on Distributed Computing Systems (ICDCS)*, 1999.
18. "Exploiting Application Alternatives," Pete Keleher, Jeffrey K. Hollingsworth and Dejan Perkovic. In *The 19th International Conference on Distributed Computing Systems (ICDCS)*, 1999.
19. "Symmetry and Performance in Consistency Protocols," Pete Keleher. In *The 13th International Conference on Supercomputing (ICS)*, 1999.
20. "Mechanisms and Policies for Supporting Fine-Grained Cycle Stealing," Kyung Dong Ryu, Jeffrey K. Hollingsworth and Pete Keleher. In *The 13th International Conference on Supercomputing (ICS)*, 1999.
21. "Job-Length Estimation and Performance in Backfilling Schedulers," Dmitry Zotkin and Pete Keleher. In *The 8th High Performance Distributed Computing Conference (HPDC)*, 1999.

22. "Thread Migration, Load Balancing, and Heterogeneity in Non-Dedicated Environments," Kritchal Thitikamol and Pete Keleher. In *The 2000 International Parallel and Distributed Processing Symposium (IPDPS)*, 2000.
23. "A Decision-Process Analysis of Implicit Coscheduling," R. Poovendran, P. Keleher and J. S. Baras. In *The 2000 International Parallel and Distributed Processing Symposium (IPDPS)*, 2000.
24. "Randomization, Speculation, and Adaptation in Batch Schedulers," Dejan Perkovic and Pete Keleher. In *Supercomputing (SC2000)*, 2000.
25. "Performance of Mobile, Single-Object, Replication Protocols," Ugur Cetintemel and Pete Keleher. In *The 19th Symposium on Reliable Distributed Systems (SRDS)*, 2000.
26. "Efficient Network and I/O Throttling for Fine-Grain Cycle Stealing," Kyung Dong Ryu, Jeffrey K. Hollingsworth and Pete Keleher. In *The 2001 Supercomputing Conference (SC2001)*, 2001.
27. "Object Distribution With Local Information," Bujor D. Silaghi and Pete Keleher. In *The 22nd International Conference on Distributed Computing Systems (ICDCS)*, 2001.
28. "Support for Speculative Update Propagation and Mobility in Deno," Ugur Cetintemel, Pete Keleher and Michael Franklin. In *The 22nd International Conference on Distributed Computing Systems (ICDCS)*, 2001.
29. "Exploiting Precision vs. Efficiency Tradeoffs in Symmetric Replication Environments," Ugur Cetintemel and Pete Keleher. In *The 21st Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC)*, 2002.
30. "Query Routing in the TerraDir Distributed Directory," Bujor Silaghi, Bobby Bhattacharjee and Pete Keleher. In *SPIE ITCOM'02*, 2002.
31. "Exploiting Precision vs. Efficiency Tradeoffs in Symmetric Replication Environments," Ugur Cetintemel and Pete Keleher. In *The 20th Symposium on Reliable Distributed Systems (SRDS)*, 2002.
32. "Thread Scheduling and Grain Emulation in Software-DSM Systems," Kritchal Thitikamol and Pete Keleher. In *The International Conference on Parallel and Distributed Computing and Systems (PDCS)*, 2002.

2.5 Articles in Refereed Workshops

1. "Distributed Shared Memory: Experience with Munin," John Bennett, John Carter, Alan Cox, David Johnson, Pete Keleher, Mootaz Elnozahy and Willy Zwaenepoel. In *Proceedings of the 5th ACM SIGOPS Workshop on Models and Paradigms for Distributed Systems Structuring*, 1992.
2. "Compile Time Support for Distributed Shared Memory," Sandhya Dwarkadas, Pete Keleher, Alan Cox and Willy Zwaenepoel. In *Proceedings of the Third Workshop on Scalable Shared Memory Multiprocessors*, 1993.
3. "Improving the Compiler/Software DSM Interface: Preliminary Experiences," Chau-Wen Tseng and Pete Keleher. In *Proceedings of the First SUIF Compiler Workshop*, 1996.

4. "Sparks: Coherence as an Abstract Type," Pete Keleher. In *The Fifth IEEE International Workshop on Object-Orientation in Operating Systems (IWOOS 96)*, 1996.
5. "Reducing Synchronization Overhead for Compiler-Parallelized Codes on Software DSMs," H. Han, Chau-Wen Tseng and Pete Keleher. In *The Workshop on Languages and Compilers for Parallel Computing (LCPC'97)*, 1997.
6. "Parallel Jobs, Sequential Jobs, and Non-Dedicated Clusters of Workstations," K. Thitikamol and P. Keleher. In *The 3rd Workshop on Runtime Systems for Parallel Programming (RT-SPP)*, 1999.
7. "Light-Weight Currency Management Mechanisms in Deno," Ugur Cetintemel and Pete Keleher. In *The 10th IEEE Workshop on Research Issues in Data Engineering (RIDE2000)*, 2000.
8. "Thread Migration and Load-Balancing in Heterogenous Environments," Kritchal Thitikamol and Pete Keleher. In *The 5th ACM Workshop on Languages, Compilers, and Run-time Systems for Scalable Computers (LCR)*, 2000.
9. "Are Virtualized Overlay Networks Too Much of a Good Thing?" Pete Keleher, Samrat Bhattacharjee and Bujor Silaghi. In *The 1st International Workshop on Peer-to-Peer Systems (IPTPS'02)*, 2002.
10. "Efficient Peer-To-Peer Searches Using Result-Caching," Bobby Bhattacharjee, Sudarshan Chawathe, Vijay Gopalakrishnan, Pete Keleher and Bujor Silaghi. In *The 2nd International Workshop on Peer-to-Peer Systems (IPTPS'03)*, 2003.

2.6 Talks, Abstracts, and Other Professional Papers Presented

- "Wide-Area Heterogeneity," University of Virginia, Feb. 1998.
- "Decentralized Network Objects," IBM, Jan. 2000.

2.7 Contracts and Grants

1. "Fast, Flexible, and Secure Wide-Area File Systems," National Science Foundation, PI, September 2002 - September 2004, \$420,001.
2. "TerraDir: Scalable, Configurable Distributed Directories for the Internet," National Science Foundation, co-PI, September 2001 - September 2004, \$709,973.
3. "Shared-memory Metacomputing," National Science Foundation, PI, September 2000 - September 2002, \$111,987.
4. "High Performance Systems for Shape and Action Modeling," National Science Foundation, co-PI (with PI Davis, co-PIs Aloimonos, Sussman, Hollingsworth) September 15, 1999 - August 30, 2002, NSF, \$1,096,011.
5. "Decentralized Consistency Protocols," Microsoft, PI, August 1999, \$34,588.
6. "Dynamic Resource Management," NSA, co-PI (PI Jeff Hollingsworth), 1997-2000, \$200,000.
7. "Active Harmony: Dynamic Resource Management in the Large," National Science Foundation, co-PI (PI Hollingsworth), Aug. 1997 - Aug. 2001, \$200,000.

8. “Sparks: Coherence as an Abstract Type”, National Science Foundation, PI, March 1996 - March 2000, \$200,000.
9. “Per-Node Multi-Threading and Remote Latency in Software DSMs,” PI, NSA, 1997, \$50,000.

2.8 Fellowships, Prizes and Awards

1. NSF Faculty Early Career Development Award, 1996-2000.
2. ORAU Junior Faculty Enhancement Award, Honorable Mention, 1996.
3. Department of Computer Science Teaching Excellence Award, 1996.
4. NASA Graduate Fellowship, 1990-1993.
5. Outstanding Achievement Award, General Dynamics, 1988.
6. Brown Engineering Scholarship, 1983.
7. National Merit Scholar.

2.9 Editorial Boards and Reviewing Activities for Learned Publications

1. Reviews for virtually every journal and conference in the field.

2.10 Research Software

1. CVM: A high-performance distributed shared memory implementation that facilitates protocol experimentation. Unique features include multiple protocols and multi-threading support. Released on the Internet and used by many projects worldwide. Over 500 copies downloaded to date.
2. TreadMarks: The first publicly released distributed shared memory system. Commercialized by Parallel Tools, L.L.C. (1996).
3. Alpha: Macintosh programmers text editor used by tens of thousands of users world-wide.

3 Teaching and Advising

3.1 Course and Curriculum Development

1. CMSC 414 - Computer and Network Security (2000) Created a new computer and network security course from scratch. The course includes a series of programming projects that stress all aspects of building secure systems, from private-key encryption algorithms through message privacy and integrity, to authentication. The course includes an entirely new series of programming projects, not based on similar courses elsewhere. This course was previewed as CMSC 498k in Spring, 2000, and will be taught as 414 in the Fall.

3.2 Teaching Awards and Other Special Recognition

1. Teaching Excellence Award for Faculty - Department of Computer Science, May 1996.

3.3 Advising: Research Advisor

3.3.1 Undergraduate

- Eric Lemar, 1997-1998.

3.3.2 Masters

- Suman Banerjee, 1997-1998.

3.3.3 Doctoral (completed)

- Kritchalach Thitikamol, graduated May 2000.
- Ugur Cetintemel, graduated December 2001.

3.3.4 Doctoral (current)

- Bujor Salehi, 1999 to present. Expected Graduation: May 2004.
- Ruggero Morselli, 2002 to present. Expected Graduation: May 2006.
- Vasile Gaburici, 2002 to present. Expected Graduation: May 2006.

3.4 Advising: Ph.D. Committees

1. George Apostolopoulos, PhD 1999.
2. Krishnan K Kailas, PhD 1999.
3. Ravindra Kuramkot (University of Utah), PhD 2002.
4. John Chu (State University of New York at Buffalo), PhD 1999.
5. Frank Miller, PhD 1998.
6. Donald Welch, PhD 1998.
7. Bjorn Jonsson, PhD 1998.
8. K. Subramani, PhD 2000.
9. Hwansoon Kim, PhD 2001.
10. Kyung Dong Ryu, PhD 2001.
11. S Banerjee, current.
12. M.Ranganathan, current.
13. Bryan Buck, current.
14. Jeremy Manson, current.

4 Service

4.1 Professional

4.1.1 Unpaid reviewing activities for agencies

Proposal reviewer, NSF 1995-2002.

4.1.2 Other non-University Panels and Positions

- Program Committee, *International Conference on Parallel Processing*, October 2003.
- Program Committee, *The 6th International Conference on Open Architectures and Network Programming (OPENARCH)*, April 2003.
- Program Committee, *International Conference on Parallel Processing*, August 2003.
- Program Co-Chair, *6th Workshop on Languages, Compilers, and Run-time Systems for Scalable Computers, (LCR2002)*, March 2002.
- Program Committee, *International Conference on Distributed Computing Systems*, 2002.
- Program Committee, *International Conference on Parallel Processing*, August 2002.
- Proceedings Chair, *Fourteenth International Parallel Processing Symposium and Tenth Symposium on Parallel and Distributed Processing*, 2001.
- Program Committee, *2nd International Conference on Mobile Data Management*, January 2001.
- Program Committee, *International Conference on Distributed Computing Systems*, 2001.
- Program Committee, *IEEE International Conference on Cluster Computing and the Grid*, 2001.
- Program Committee, *Fourth International Workshop on High-Level Parallel Programming Models and Supportive Environments Workshop*, 2001.
- Program Co-Chair, *2nd Annual Workshop on Software Distributed Shared Memory*, June 2000.
- Proceedings Chair, *Thirteenth International Parallel Processing Symposium and Tenth Symposium on Parallel and Distributed Processing*, 2000.
- Panel Member, “Mobile Infrastructure: Myth or Reality?” at *The 10th IEEE Workshop on Research Issues in Data Engineering (RIDE2000)*, May 2000.
- Panel Member, “Pervasive Computing”, at *The 2000 International Conference on Parallel Processing*, August 2000.
- Program Committee, *14th International Conference on Supercomputing*, June 2000.
- Program Committee, *International Conference on Distributed Computing Systems*, 2000.
- Program Committee, *Fourth International Workshop on High-Level Parallel Programming Models and Supportive Environments Workshop*, 2000.

- Session Chair, *14th International Parallel Processing Symposium and Tenth Symposium on Parallel and Distributed Processing*, 2000.
- Session Chair, *5th Workshop on Languages, Compilers, and Run-time Systems for Scalable Computers*, May 2000.
- Program Co-Chair, *1st Annual Workshop on Software Distributed Shared Memory*, June 1999.
- Program Committee, *International Conference on Parallel and Distributed Processing Techniques and Applications*, 1999.
- Program Committee, *Fourth International Workshop on High-Level Parallel Programming Models and Supportive Environments Workshop*, 1999.
- Program Committee, *International Conference on Distributed Computing Systems*, 1998.
- Program Committee, *Third International Workshop on High-Level Parallel Programming Models and Supportive Environments Workshop*, 1998.
- Program Committee, *International Conference on Distributed Computing Systems*, 1997.
- Program Committee, *Second International Workshop on High-Level Parallel Programming Models and Supportive Environments Workshop*, 1997.

4.1.3 Departmental Service

- Chair, Lab Committee, 1999-2001, 2002-2003.
- Lab Committee, 1996-1997.
- Department Council, 2002-2003.
- Grad Student Applications 1999, 2000.
- UMIACS APT Committee, 1997-1998, 1999-2000.
- Departmental Hiring committee, 1999-2001.
- Honors Program Chair, 1998-2000.
- Webmaster, 1999-2000.
- Teaching Committee, 1996-1999.
- Search Committee for Systems Support Staff, 1995-1997.
- Judge, High School Programming Contest, 1995-1998.
- Coordinated Graduate Orientation, 1996.

4.1.4 University

- Computer Engineering ABET Committee 1999-2000
- Search Committee for Director of Network Operations, 1997.
- Senior Summer Scholars Committee, 1999-2000.