# Curriculum Vitae for Dr. Brian N. Bershad

## 8/1/2007

Dr. Brian Bershad is a Professor of Computer Science at the University of Washington. He received his Bachelor's Degree (1986) in Electrical Engineering and Computer Science from the University of California at Berkeley. He received his M.S. (1989) and Ph.D. (1990) degrees in Computer Science from the University of Washington. Prior to his appointment in Seattle, he was on the faculty at Carnegie Mellon University in Pittsburgh, PA. Dr. Bershad received an NSF Presidential Young Investigator award in 1990, an ONR Young Investigator Award in 1994, an NSF Presidential Faculty Fellow Award in 1994, and the ACM/SIGOPS Mark Weiser Award in 2004. He is a member of the IEEE and ACM. In 1997, Dr. Bershad founded Appliant, Inc, and served as CEO from 2000 to 2001. In 2006, he co-founded Illumita Inc, and served as President and CEO through mid 2007.

## Education

- Ph.D. in Computer Science, University of Washington, June 1990. Dissertation Title: *High Performance Cross-Address Space Communication.* Supervised by Prof. H.M. Levy and Prof. E.D. Lazowska.
- M.S. in Computer Science, April 1990, University of Washington.
- B.S. in Electrical Engineering and Computer Science, 1986, University of California at Berkeley.

## Work Experience

- Illumita, Inc. Founder, CEO, President. 2006.
- University of Washington, Department of Computer Science & Engineering. Professor. September 2006-present.
- Appliant, Inc. Founder (1997), and CEO (2000-2001)
- University of Washington, Department of Computer Science & Engineering. Associate Professor. September 1996-2006.

- University of Washington, Department of Computer Science & Engineering. Assistant Professor. September 1993-1996.
- Carnegie Mellon University, School of Computer Science. Assistant Professor. August 1990-August 1993.
- University of Washington, Department of Computer Science & Engineering. Research Assistant. 1986-1990.
- Digital Equipment Corporation Systems Research Center. Research Intern. January 1988 to April 1988; June 1988 to September 1988.
- U.C. Berkeley Department of Electrical Engineering and Computer Science. Assistant Programmer. 1984-1986.
- Brian R. Demsey + Associates. Principal Programmer for actuarial firm/software vendor. 1981-1984.

# Professional Activities

- Member Technical Advisory Board
    - Rendition Networks. 2001-present.
    - Lockdown Networks. 2002-present.
- Member Board of Directors
    - Illumita, Inc. 2006.
    - Appliant, Inc. (Chairman). 1997-2002.
    - RemoteNet, Inc. 1997-2004.
- Program Committees:
    - Architectural Support for Programming Languages and Operating Systems - ASPLOS. 2008.
    - Program Chair: Virtual Execution Environments 2008.
    - Virtual Execution Environments 2007.
    - Program Chair: Symposium on Operating System Design and Implementation (OSDI) – 2006.
    - Mobisys – 2004.

- Symposium on Operating System Principles – SOSP. 1991, 2003, 2005.
- Networked Systems Design and Implementation – NSDI. 2003.
- Sigmetrics Measurement and Modelling – Sigmetrics. 2003.
- Operating Systems Design and Implementation – OSDI. 1994, 2001. *Co-chair for OSDI 2006.*
- Architectural Support for Programming Languages and Operating Systems - ASPLOS. 1998.
- International Symposium on Computer Architecture - ISCA. 1997.
- Workshop on Workstation Operating Systems - WWOS IV (Chair). 1993.
- International Conference on Distributed Computing Systems – ICDCS. 1993.

- Member Advisory Board for National Science Foundation's Office of Polar Programs. 2004-2006.
- Member Advisory Board for National Science Foundation Committee for Cyberinfrastructure. 2006-2008.
- Served on various NSF Peer Review Panels, including the 2005 ITR COV (Committee of Visitors).

# Awards

- 2004. ACM Mark Weiser Award. Received in recognition for twenty years of innovation in operating systems research. Past recipients of the award include Frans Kaashoek (MIT), Mendel Rosenblum (Stanford), and Mike Burrows (Google).
- 2004. Best Paper. Mike Swift, Annamalai Muthu, Brian Bershad, Hank Levy. Recovering Device Drivers. *Proceedings of the 2004 Symposium on Operating Systems Design and Implementation.* December 2004. A version of this paper will appear in an upcoming special issue of ACM *Transactions on Computer Systems*.
- 2003. Best Paper. Mike Swift, Brian Bershad, Henry M. Levy. Improving the Reliability of Commodity Operating Systems. *Proceedings of the 19th Symposium on Operating Systems Principles*. November 2003. A version of this paper will appear in an upcoming special issue of ACM *Transactions on Computer Systems*.
- 2000. Best Paper. Yasushi Saito, Brian Bershad, Hank Levy. Manageability, Availability and Performance in Porcupine: a Highly Scalable, Cluster-Based Mail Service. *17th Symposium on Operating Systems Principles (SOSP)*. Also appeared in *ACM Transactions on Computer Systems*, August 2000.

- 1994 NSF Presidential Faculty Fellowship (PFF).
- 1991. Best Paper. T.E. Anderson, B.N. Bershad, E.D. Lazowska and H.M. Levy. Scheduler Activations: Effective Kernel Support for the User Level Management of Parallelism. *Proceedings of the 13th ACM Symposium on Operating Systems Principles (SOSP)*, pp. 95-109, October 1991. Also appeared in *ACM Transactions on Computer Systems,* 10:1, pp. 53-79, February 1992.
- 1990. Best Paper. B.N. Bershad, T.E. Anderson, E.D. Lazowska and H.M. Levy. Lightweight Remote Procedure Call. . *Proceedings of the 12th ACM Symposium on Operating Systems Principles (SOSP),* pp. 102-113, December 1989. Also appeared in *ACM Transactions on Computer Systems,* 8:1, pp. 37-55, February 1990.
- 1990 NSF Presidential Young Investigator Award (PYI).
- 1988. Best Student Paper. B.N. Bershad and C.B. Pinkerton. Watchdogs - Extending the UNIX File System. *Computing Systems,* 1:2, pp. 169-188, Spring 1988. Also appeared in the *Proceedings of the 1988 Winter Usenix Conference.*

# Patents

- Web browser architecture for virtual machine access. Filed September 2006. *Pending*.
- Predictive tuning of unscheduled streaming digital content. Filed August 2005. *Pending*. http://www.freepatentsonline.com/20060067296.html
- Process for rewriting executable content on a network server or desktop machine in order to enforce site-specific properties. US Patent 6865735.
- Process for transparently enforcing protection domains and access control as well as auditing operations in software components, US Patent 6317868, granted 11/13/2001. (The University of Washington licensed this patent to Microsoft in 2004).
- Method and system for identifying instrumentation targets in computer programs related to logical transactions, US Patent 6327700, granted 12/4/2001.
- Discovering code and data in a binary executable program, US Patent 6014513, granted 1/11/2000.
- Environment manipulation for executing modified executable and dynamically-loaded library files, US Patent 5953534, granted 9/14/1999.
- Method and system for reducing memory access latency by providing fine grain direct access to flash memory concurrent with a block transfer therefrom, US Patent 5802554, granted 9/1/1998.
- Adaptive disk spin-down method for managing the power distributed to a disk drive in a

laptop computer, US Patent 5493670, granted 2/20/1996.

# Grants

- National Science Foundation, Principal Investigator (with CoPI H. Levy), “Reliable Technologies for Operating Systems and Operating System Services”. NSF 0326546. 10/03-10/06, $1,000,000.

- Advanced Research Projects Agency, Principal Investigator (with H. Levy), "Operating System Services for Networked Clusters", 8/97 - 12/99, $1,800,000.

- Advanced Research Projects Agency, Principal Investigator (with H. Levy), "Security Mechanisms for an Extensible Operating System", 8/97 - 12/99, $300,000.

- Advanced Research Projects Agency, Principal Investigator (with S. Eggers and C. Chambers), "Application-Specific Operating Systems for High Performance Computing", 5/94 - 5/97, $3,096,000.

- Advanced Research Projects Agency, Principal Investigator, "Scalable I/O Initiative", 3/95 - 3/98, $450,000.

- National Science Foundation - Presidential Faculty Fellowship, Principal Investigator, "Extensible Operating Systems", 12/94 - 12/96, $200,000.

- Office of Naval Research, Principal Investigator, "Microkernel Support for High-Performance Operating Systems and Processor Architectures", 4/94 - 4/97, $225,000.

- Carnegie Mellon University (subcontract), Principal Investigator, "Kernel and Networking Support for High Performance Multicomputing", 1/94 - 1/95, $423,966.

- National Science Foundation, Principal Investigator, "Presidential Young Investigator Award", 9/92 - 9/94, $125,000.

# Industrial Gifts

- Intel Research Grant.  Distributed Systems and Related Hardware Devices. 2004-2005. $28,000
- Apple. 2003. $80,000.
- Toshiba, Faculty Development Gift, 1997, $90,000.
- Intel, University-Wide Intel Grant, 1997, $6,000,000.
- Intel, Operating System Services for Networked Clusters, 1997, $500,000.

- Intel, Enhancing the EE Curriculum on the PC Platform, Phase 2, 1997-98, $1,500,000 in equipment.
- Intel, Enhancing the EE Curriculum on the PC Platform, Phase 1, 1996-97, $925,000 in equipment.
- Intel, Memory Management for Advanced Processors, 1995-96, $50,000 (includes equipment).
- DEC, PYI Matching, 1993-94, $27,500.
- Xerox, PYI Matching, 1993-94, $10,000.

# Academic Papers

## Publications

- Eytan Adar, Dan Weld, Brian Bershad and Steve Gribble. Why We Search: Visualizing and Predicting User Behavior. Sixteenth International World Wide Web Conference (WWW07). May 2007.
- Mike Swift, Annamalai Muthu, Brian Bershad, Hank Levy. Recovering Device Drivers. *ACM Transactions on Computer Systems (ACM TOCS)*. February 2005.
- Mike Swift, Annamalai Muthu, Brian Bershad, Hank Levy. Recovering Device Drivers. *Proceedings of the 2004 Symposium on Operating Systems Design and Implementation.* December 2004. Received **best paper** award.
- Robert Grimm, David Wetherall, Janet Davis, Eric Lemar, Adam Macbeth, Steven Swanson, Thomas Anderson, Brian Bershad, Gaetano Borrriello, Steven Gribble. System Support for Pervasive Applications. ACM Transactions on Computer Systems. Volume 22, Issue 4. November 2004.
- Paul Gauthier, Brian Bershad, Steven D. Gribble. Dealing with Cheaters in Anonymous Peer-to-Peer Networks. *University of Washington Technical Report 04-01-03*. January 2004.
- Mike Swift, Brian Bershad, Henry M. Levy. Improving the Reliability of Commodity Operating Systems. *Proceedings of the 19th Symposium on Operating Systems Principles*. November 2003. Received **best paper** award. A version of this paper will appear in an upcoming special issue of ACM's *Transactions on Computer Systems*.
- Joshua Redstone, Michael M. Swift, Brian N. Bershad. Using Computers to Diagnose Computer Problems. *Proceedings of the 9th Workshop on Hot Topics in Operating Systems*, May 2003.
- Robert Grimm and Brian N. Bershad. Future Directions: System support for pervasive

applications. *Proceedings of the International Workshop on Future Directions in Distributed Computing*, pages 56–59, Bertinoro, Italy, June 2002. Also appeared in *Future Directions in Distributed Computing* , pages 212–217, volume 2584 of Lecture Notes in Computer Science, Springer-Verlag, Heidelberg, April 2003.

- Robert Grimm, Janet Davis, Eric Lemar, Adam MacBeth, Steven Swanson, Steven Gribble, Tom Anderson, Brian Bershad, Gaetano Borriello, David Wetherall. System-Level Programming Abstractions for Ubiquitous Computing. *UbiTools '01 Workshop on Application Models and Programming Tools for Ubiquitous Computing*, September 2001.

- Robert Grimm, Janet Davis, Eric Lemar, Adam MacBeth, Steven Swanson, Steven Gribble, Tom Anderson, Brian Bershad, Gaetano Borriello, David Wetherall. Programming for Pervasive Computing Environments. *Technical Report UW-CSE-01-06-01, June 2001.*

- Robert Grimm, Janet Davis, Ben Hendrickson, Eric Lemar, Adam MacBeth, Steven Swanson, Tom Anderson, Brian Bershad, Gaetano Borriello, Steven Gribble, David Wetherall. Systems Directions for Pervasive Computing. *8th IEEE Workshop on Hot Topics in Operating Systems (HotOS-VIII)*, pp. 147-151, May 2001.

- Robert Grimm and Brian Bershad. Separating Access Control Policy, Enforcement and Functionality in Extensible Systems. *ACM Transactions on Computer Systems*, pp. 36-70, February 2001.

- Robert Grimm, Tom Anderson, Brian Bershad, David Wetherall. A System Architecture for Pervasive Computing. *Proceedings of the 9th ACM SIGOPS European Workshop*, pp. 177-182, September 2000.

- Yasushi Saito, Brian Bershad, Hank Levy. Manageability, Availability and Performance in Porcupine: a Highly Scalable, Cluster-Based Mail Service. *17th Symposium on Operating Systems Principles (SOSP)*, December; also received **best paper** award. Also appeared in *ACM Transactions on Computer Systems*, August 2000.

- Patrick Crowley, Marc Fiuczynski, Jean-Loup Baer, and Brian Bershad. Characterizing Processor Architectures for Programmable Network Interfaces. *Proceedings of the 2000 International Conference on Supercomputing*, May 2000. Postscript version.

- Patrick Crowley, Marc E. Fiuczynski, Jean-Loup Baer, Brian Bershad. Workloads for Programmable Network Interfaces. *IEEE 2nd Annual Workshop on Workload Characterization*, October 1999. Also appears as Chapter 7 in Workload Characterization for Computer System Design, Kluwer Academic Publishers, 2000. Postscript version.

- Emin Gun Sirer, Robert Grimm, Arthur J. Gregory, Brian Bershad. Design and Implementation of a Distributed Virtual Machine for Networked Computers. *Proceedings of the Seventeenth Symposium on Operating Systems Principles*, pp. 202-

216, December 1999. Postscript version.

- Emin Gun Sirer and Brian Bershad. Using Production Grammars in Software Testing. *Proceedings of the Second Conference on Domain-Specific Language*s, pp. 1-13, October 1999. Postscript version.

- Robert Grimm and Brian N. Bershad. Providing Policy-Neutral and Transparent Access Control in Extensible Systems. In J. Vitek and C. Jensen, editors, Secure Internet Programming: Security Issues for Distributed and Mobile Objects, Springer-Verlag, June 1999. Postscript version.

- Emin Gun Sirer, Arthur J. Gregory, Brian N. Bershad. A Practical Approach for Improving Startup Latency in Java Applications. *Proceedings of the Workshop on Compiler Support for Systems Software*, May 1999. Postscript version.

- Tian Lim, Przemyslaw Pardyak, Brian Bershad. A Memory Efficient Real-Time Non Copying Garbage Collector. *Proceedings of the International Symposium on Memory Management (ISMM 98),* Vancouver, British Columbia. October 1998.

- Emin Gun Sirer, Robert Grimm, Brian Bershad, Arthur Gregory, Sean McDirmid. Distributed Virtual Machines: A System Architecture for Network Computing. *Eighth ACM SIGOPS European Workshop,* September 1998. Postscript version. Also published as a technical report, UW-CSE-98-09-01, September 1998. Postscript version.

- Yasushi Saito, Eric Hoffman, Brian Bershad, Henry Levy, and Bertil Foilot. The Porcupine Mail Server. *Eighth ACM SIGOPS European Workshop,* September 1998.

- Marc Fiuczynski and Brian Bershad. SPINE - A Safe Programmable and Integrated Network Environment. *Eighth ACM SIGOPS European Workshop,* September 1998.

- Wilson C. Hsieh, Przyemyslaw Pardyak, Marc E. Fiuczynski, Brian N. Bershad, Charles Garrett. The Interaction of Access Control and Object-Orientation in Extensible Systems. *Proceedings of the 26th International Conference on Technology of Object-Oriented Languages and Systems (TOOLS)*, August 1998.

- Marc E. Fiuczynski, Richard P. Martin, Brian N. Bershad, David E. Culler. SPINE: An Operating System for Intelligent Network Adapters. Technical Report UW-CSE-98-08-01, August 1998.

- Marc Fiuczynski, Rich Martin, Tsutomu Owa and Brian Bershad. On Using Intelligent Network Interface Cards to Support Multimedia Applications. *Proceedings of the Seventh Workshop on Network and Operating System Support for Digital Audio Video,* July 1998.

- Yasushi Saito and Brian N. Bershad. Transaction Support in an Extensible Operating System. *Usenix Annual Technical Conference,* June 1998.

- Marc E. Fiuczynski, Vincent K. Lam, Brian N. Bershad. The Design and Implementation

of an IPv6/IPv4 Network Address and Protocol Translator. *Usenix Annual Technical Conference,* June 1998.

- Dennis Lee, Patrick Crowley, Jean Loup Baer, Tom Anderson, Brian Bershad. Execution Characteristics of Desktop Applications on Windows NT. *25th Annual International Symposium on Computer Architecture (ISCA),* June 1998.
- Robert Grimm and Brian N. Bershad. Providing Policy-Neutral and Transparent Access Control in Extensible Systems. *University of Washington Technical Report* UW-CSE-98-02-02, February 1998. Postscript version.
- Robert Grimm and Brian N. Bershad. Access Control in Extensible Systems. *University of Washington Technical Report* UW-CSE-97-11-01, November 1997. Postscript version.
- Emin Gun Sirer, Przemyslaw Pardyak, Brian N. Bershad. Strands: An Efficient and Extensible Thread Management Architecture. Technical Report UW-CSE-97-09-01, September 1997. Postscript version.
- Marc Fiuczynski, Wilson Hsieh, Emin Gun Sirer, Przemyslaw Pardyak, Brian N. Bershad. Low-Level Systems Programming with Modula-3. *Threads, Modula-3 Systems Journal*, Fall 1997.
- Ted Romer, Geoff Voelker, Dennis Lee, Alec Wolman, Wayne Wong, Hank Levy, and Brian Bershad. Instrumentation and Optimization of Win32/Intel Executables Using Etch. *Usenix NT Workshop,* August 1997. Postscript version.
- Robert Grimm and Brian N. Bershad. Security for Extensible Systems. *Sixth Workshop on Hot Topics in Operating Systems (HotOS)*, pp. 62-66, May 1997. Postscript version.
- Tracy Kimbrel, Andrew Tomkins, R. Hugo Patterson, Brian Bershad, Pei Cao, Edward W. Felten, Garth A. Gibson, Anna R. Karlin, and Kai Li. A Trace-driven Comparison of Algorithms for Parallel Prefetching and Caching. *ACM SIGOPS/Usenix Association Symposium on Operating System Design and Implemenation (OSDI),* October 1996.
- Przemyslaw Pardyak and Brian N. Bershad. Dynamic Binding for Extensible Systems. *ACM SIGOPS/USENIX Association Symposium on Operating System Design and Implemenation (OSDI),* October 1996.
- Theodore H. Romer, Dennis Lee, Geoffrey M. Voelker, Alec Wolman, Wayne A. Wong, Jean-Loup Baer, Brian N. Bershad and Henry M. Levy. The Structure and Performance of Interpreters. *Proceedings of the Seventh Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS),* October 1996. Postscript version.
- J. Auslander, M. Philipose, C. Chambers, S.J. Eggers and B.N. Bershad. Fast, Effective Dynamic Compilation. *Conference on Programming Language Design and*

*Implementation (PLDI),* May 1996.

- Emin Gun Sirer, Stefan Savage, Przemyslaw Pardyak, Greg DeFouw, Mary Ann Alapat, and Brian Bershad. Writing an Operating System Using Modula-3. *Workshop on Compiler Support for System Software,* February 1996.

- Wilson Hsieh, Marc Fiuczynski, Charles Garrett, Stefan Savage, David Becker, and Brian Bershad. Language Support for Extensible Operating Systems. *Workshop on Compiler Support for System Software,* February 1996.

- Emin Gun Sirer, Marc Fiuczynski, Przemyslaw Pardyak, Brian Bershad. Safe Dynamic Linking in an Extensible Operating System. *Workshop on Compiler Support for System Software,* February 1996.

- B.N. Bershad, S. Savage, P. Pardyak, E.G. Sirer, M.E. Fiuczynski, D. Becker, S.J. Eggers, C. Chambers. Extensibility, Safety and Performance in the SPIN Operating System. *Proceedings of the Symposium on Operating Systems Principles (SOSP),* December 1995.

- Marc E. Fiuczynski and Brian N. Bershad. An Extensible Protocol Architecture for Application-Specific Networking. *Proceedings of the Winter Usenix Conference,* 10pp., December 1995.

- T. Romer, W. Ohlrich, A. Karlin and B.N. Bershad. Reducing TLB and Memory Overhead Using Online Superpage Promotion. *Proceedings from the International Symposium on Computer Architecture (ISCA),* pp. 176-187, June 1995.

- B. N. Bershad, S. Savage, P. Pardyak, D. Becker, M. Fiuczynski and E.G. Sirer. Protection is a Software Issue. *Proceedings of the Fifth Workshop on Hot Topics in Operating Systems (HotOS),* pp. 62-65, May 1995.

- F. Douglis, P. Krishnan and B.N. Bershad. Adaptive Disk Spin-Down Policies for Mobile Computers. *Proceedings of the Second Usenix Symposium on Mobile and Location-Independent Computing (MOBLIC),* pp. 121-137, April 1995.

- G. Voelker and B.N. Bershad. Mobisaic: An Information System for a Mobile and Wireless Computing Environment. *Workshop on Mobile Computing Systems and Applications,* pp. 185-190, December 1994. Also appeared as a book chapter in *Mobile Computing,* published by Kluwer Academic Publishers, 1996.

- M. Zekauskas, W. Sawdon and B.N. Bershad. Software Write Detection for a Distributed Shared Memory. *Proceedings from the Conference on Operating Systems Design and Implementation (OSDI),* pp. 87-100, November 1994.

- T. Romer, D. Lee, B.N. Bershad and B. Chen. Dynamic Page Mapping Policies for Cache Conflict Resolution on Standard Hardware. *Proceedings from the Conference on Operating Systems Design and Implementation ( OSDI),*pp. 255-266, November 1994.

- S. Savage and B.N. Bershad. Some Issues in the Design of an Extensible Operating System. *Proceedings of the First Conference on Operating Systems Design and Implementation (OSDI)*, short paper, p. 196, November 1994. Postscript version.

- B.N. Bershad, B. Chen, D. Lee and T. Romer. Avoiding Conflict Misses Dynamically in Large Direct-Mapped Caches. *Proceedings of the Sixth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS),* pp. 158-170, October 1994.

- P. Pardyak and B.N. Bershad. A Group Structuring Mechanism for a Distributed Object-Oriented Language. *Proceedings of the 14th International Conference on Distributed Computing Systems (DCS),* pp. 312-319, June 1994.

- B.N. Bershad, C. Chambers, S. Eggers, C. Maeda, D. McNamee, P. Pardyak, S. Savage, and E. G. Sirer. SPIN--An Extensible Microkernel for Application-Specific Operating System Services. *ACM SIGOPS European Workshop*, pp. 74-77, September 1994. Also a *University of Washington Technical Report*, UW-CSE-94-03-03, March 1994.

- M. Yuhara, B.N. Bershad, C. Maeda and J.E. Moss. Efficient Packet Demultiplexing for Multiple Endpoints and Large Messages. *Proceedings of the Winter Usenix Conference,* pp. 153-165, January 1994.

- B. Chen and B.N. Bershad. The Impact of Operating System Structure on Memory System Performance. *Proceedings of the 14th Symposium on Operating Systems Principles (SOSP)*, pp. 120-133, December 1993.

- C. Maeda and B.N. Bershad. Protocol Service Decomposition for High Performance Networking. *Proceedings of the 14th Symposium on Operating Systems Principles (SOSP),* pp. 244-255, December 1993.

- C. Maeda and B.N. Bershad. Service without Servers. *Proceedings of the Fourth Workshop on Workstation Operating Systems (WWOS),* pp. 170-176, October 1993.

- D. Stodolsky, B.N. Bershad, and B. Chen. Fast Interrupt Priority Management in Operating System Kernels. *Usenix Workshop on Microkernels,* pp. 105-110, September 1993.

- T. Watson and B.N. Bershad. Local Area Mobile Computing on Stock Hardware and Mostly Stock Software. *Usenix Mobile Computing (MOBLIC),* pp. 109-115, August 1993.

- B.N. Bershad. Practical Considerations for Non-Blocking Concurrent Objects. *Proceedings of the 13th International Conference on Distributed Computing Systems (DCS),* pp. 264-273, May 1993. Also published as a *Carnegie-Mellon University Technical Report* CMU-CS-91-183, October 1991.

- M. Ginsburg, R. Baron, and B.N. Bershad. Using the Mach Communication Primitives in X11. *Third Usenix Mach Workshop (MACHNIX),* pp. 103-110, March 1993.

- B.N. Bershad, M.J. Zekauskas, and W.A. Sawdon. The Midway Distributed Shared Memory System. *IEEE Computer Conference (Compcon),* pp. 528-537, February 1993.
- B. Wheeler and B.N. Bershad. Consistency Management for Virtually Indexed Caches. *Proceedings of the Fifth Architectural Support for Programming Languages and Operating Systems (ASPLOS),* pp. 124-136, October 1992.
- B.N. Bershad, D. Redell, and J. Ellis. Fast Mutual Exclusion for Uniprocessors. *Proceedings of the Fifth Architectural Support for Programming Languages and Operating Systems (ASPLOS),* pp. 223-233, October 1992.
- P. Stout and B.N. Bershad. Diffusive Parallelism: A Parallel Programming Model for Large-Scale Distributed Computation Systems. *Proceedings of the 5th ACM SIGOPS European Workshop,* 5 pp., September 1992.
- R.P. Draves, B.N. Bershad, and A.F. Forin. Using Microbenchmarks to Evaluate System Performance. *Proceedings of the Third Workshop on Workstation Operating Systems (WWOS),* pp. 148-153, April 1992.
- C. Maeda and B.N. Bershad. Networking Performance for Microkernels. *Proceedings of the Third Workshop on Workstation Operating Systems ( WWOS),* pp. 154-159, April 1992.
- B.N. Bershad. The Increasing Irrelevance of IPC Performance for Microkernel-Based Operating Systems. *Usenix Microkernels Workshop,* pp. 205-211, April 1992.
- A.F. Forin, D.B. Golub, and B.N. Bershad. An I/O System for Mach. *Proceedings of the Usenix Mach Symposium (MACHNIX),* pp. 163-176, November 1991.
- R.P. Draves, B.N. Bershad, R.F. Rashid, and R.W. Dean. Using Continuations to Implement Thread Management and Communication in Operating Systems. *Proceedings of the 13th Symposium on Operating Systems Principles (SOSP),* October 1991.
- T.E. Anderson, B.N. Bershad, E.D. Lazowska and H.M. Levy. Scheduler Activations: Effective Kernel Support for the User Level Management of Parallelism. *ACM Transactions on Computer Systems,* 10:1, pp. 53-79, February 1992. Also appeared in *Proceedings of the 13th ACM Symposium on Operating Systems Principles (SOSP)*, pp. 95-109, October 1991.
- B.N. Bershad and M.J. Zekauskas. Midway: Shared Memory Parallel Programming with Entry Consistency for Distributed Memory Environments. *Carnegie Mellon University Technical Report* CMU-CS-91-170, September 1991.
- B.N. Bershad, T.E. Anderson, E.D. Lazowska and H.M. Levy. User-Level Interprocess Communication for Shared Memory Multiprocessors. *ACM Transactions on Computer Systems,* 9:2, pp. 175-198, May 1991.
- T.E. Anderson, H.M. Levy, B.N. Bershad and E.D. Lazowska. The Interaction of

Architecture and Operating System Design. *Proceedings of the 4th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS),* pp. 108-120, April 1991.

- M.J. Feeley, B.N. Bershad, J.S. Chase and H.M. Levy. Dynamic Node Reconfiguration in a Parallel-Distributed Environment. *Proceedings of the 3rd ACM Symposium on Principles and Practice of Parallel Programming.* pp. 114-120, April 1991.

- B.N. Bershad. "Mutual Exclusion for Uniprocessors." *Carnegie Mellon University Technical Report* CMU-CS-91-116, April 1991.

- B.N. Bershad. "High Performance Cross Address Space Communication." *PhD Thesis*, June 1990. Also available as UW Technical Report *UW-CSE-90-06-02* (revision of author's PhD dissertation).

- B.N. Bershad, T.E. Anderson, E.D. Lazowska and H.M. Levy. Lightweight Remote Procedure Call. *ACM Transactions on Computer Systems,* 8:1, pp. 37-55, February 1990. Also appeared in *Proceedings of the 12th ACM Symposium on Operating Systems Principles (SOSP),* pp. 102-113, December 1989.

- B.N. Bershad, T.E. Anderson, E.D. Lazowska and H.M. Levy. "Thread Management for Shared Memory Multiprocessors." *University of Washington Technical Report* UW-CSE-89-10-02, October 1989.

- D.B. Wagner, E.D. Lazowska and B.N. Bershad. Techniques for Efficient Shared Memory Parallel Simulation. *Distributed Simulation 1989*. Society for Computer Simulation International, March 1989.

- B.N. Bershad, E.D. Lazowska and H.M. Levy. PRESTO: A System For Object-Oriented Parallel Programming. *Software: Practice and Experience,* 18:8, pp. 713-732, August 1988.

- B.N. Bershad, E.D. Lazowska, H.M. Levy and D.B. Wagner. An Open Environment for Building Parallel Programming Systems. *Proceedings of the ACM SIGPLAN Conference on Parallel Programming: Experience with Applications, Languages, and Systems,* pp. 1-9, July 1988.

- B.N. Bershad and H.M. Levy. A Remote Computation Facility for a Heterogeneous Environment. *IEEE Computer,* 21:5, pp. 50-60, May 1988.

- B.N. Bershad and C.B. Pinkerton. Watchdogs - Extending the UNIX File System. *Computing Systems,* 1:2, pp. 169-188, Spring 1988. Also appeared in the *Proceedings of the 1988 Winter Usenix Conference.*

- B.N. Bershad. The PRESTO User's Manual. *University of Washington Technical Report* UW-CSE-88-01-04, January 1988.

- B.N. Bershad, D.T. Ching, E.D. Lazowska, J. Sanislo and M. Schwartz. A Remote Procedure Call Facility for Interconnecting Heterogeneous Computer Systems. *IEEE Transactions On Software Engineering,* 13:8, pp. 880-894, August 1987.
- B.N. Bershad. Load Balancing With Maitre d'. U.C. Berkeley. *Computer Science Division Technical Report* UCB/CSD 86/276, December 1985.

### Unpublished Reports

- Paul Gauthier, Brian Bershad, Steven D. Gribble, John Zahorjan. Caching Large Objects at the Ends of the Network. May 2004.
- Damien Martin-Guilerrez, Michael M. Swift, Brian N. Bershad and Henry M. Levy. Removing Forced Reboots. October 2004.
- Micah Brodsky, Eric Kochar, Michael M. Swift, Henry M. Levy and Brian N. Bershad. Recovering Device Drivers Without Isolation. March 2005.
- Gaurav Bhaya and Brian Bershad and Tracy Kimbrell. Data Turbine. March 2005.

## Student Advising

### Doctoral Students

1. Paul Gauthier. *Topic TBD.* Expected Completion: 2007.
2. Gaurav Bharaya. *Topic TBD.* Expected Completion: 2007.
3. David Richardson. *Topic TBD.* Expected Completion: Unknown.
4. Mike Swift. *Reliable Operating Systems.* Expected: 2005. (In 2004, Mike's thesis work was recognized by the ACM with an award for the "Best Graduate Student Research.") Mike is currently interviewing everywhere.
5. Marc Fiuczynski. *Safe and Extensible Systems.* PhD 2004. Currently on research staff at Princeton.
6. Robert Grimm. *Ubiquitous Computing.* PhD 2003. Currently Assistant Professor of Computer Science at NYU.
7. Emin Gun Sirer. *Distributed Virtual Machines.* PhD 2002. Currently Assistant Professor of Computer Science at Cornell.
8. Stefan Savage. *Network Measurement.* 2001. Currently Assistant Professor of Computer

Science at UC San Diego.

9. Yasushi Saito. *Massively Scalable Internet Services.* PhD 2000. Currently on research staff at HP Labs.
10. Ted Romer. *Memory Measurement.* PhD 1999. Currently at Amazon.com.
11. Chris Maeda. *Operating System Decomposition.* PhD 1995. Currently "living in seclusion and semi-retirement in the woods of New Hampshire."
12. Richard Draves. *Very Fast Messaging.* PhD 1994. Currently on research staff at Microsoft.
13. Brad Chen. *Operating System Memory Behavior*. PhD 1993. Currently Senior Scientist at Intel.

## Recent Undergraduates

1. Micah Brodsky. *Nooks on Windows.* 2004/5. *Internet Media.* 2003.
2. Tushar Jain. Undergraduate research (paid). *Port Fishnet to Java*. 2004
3. Ilya Maykov. Undergraduate research. *Infrastructure for Emulab Content Distribution*. 2005.
4. Saurav Chatterjee. Undergraduate research. *Wireless Broadcast + Forward Error Correction for Local Area Media Distribution.* 2005
5. Evan Dower. *Grid Services.* 2004.
6. Fred Potter. *Incredible Autonomous Flying Machines.* 2004.
7. Pyotr Novodvorsky. *VM Migration. 2003/04,*
8. Emma Brunskill. *Measuring Clusters.* 1999. (Emma has since gone off to MIT for graduate school in computer science; in 2001, she won a Rhodes Scholarship).
9. Vince Lam. *IP V6.* 1997.