

Kenneth P. Birman

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Research Areas	Performance of ML systems for inference, knowledge retrieval, fine-tuning. Distributed systems consistency, fault-tolerance, scalability, performance.
Education	1981 Ph.D., University of California, Berkeley; Computer Science Thesis: The relationship between signal representation and learning in ECG analysis. 1979 M.S., University of California, Berkeley; Computer Science 1978 B.A., Columbia University; Computer Science
Professional Experience	1994 - N. Rama Rao Professor of Computer Science Department. 2001-2009 Founder and Senior Partner, Web Sciences LLC, Ithaca, NY 1997-2000 President and CEO, Reliable Network Solutions, Inc., Ithaca, NY 1988-1993 President and CEO, ISIS Distributed Systems Inc., Ithaca, New York 1982-1988 Assistant Professor, Computer Science Department, Cornell University 1982 Visiting Scientist, Cardiology Department, Columbia University Medical database design and development. 1981 Visiting Researcher, Cardiology Department, University of Vienna, Austria Research on medical databases and pattern recognition.
Awards and Honors	ACM Fellow: 1998 IEEE Fellow: 2014 IEEE Tsutomu Kanai Award: 2009 ACM SIGOPS Hall of Fame Award (with T. Joseph), 2013 for “Exploiting Virtual Synchrony in Distributed Systems. 11th SOSP, Dec 1987. Asian-Pacific AI Association Fellow (AAIA): 2023 Academy of the International Artificial Intelligence Industry Alliance (AIIA). 2024 IEEE Technical Committee on Distributed Processing Outstanding Achievement Award: 2009 Cisco “Technology Visionary” award: 2007 Stephen and Marilyn Miles Excellence in Teaching Award: 2000
Invited Lectures	Vortex: A High-Efficiency Framework for ML Inference and Knowledge Retrieval. 14th IEEE Ubiquitous Computing, Electronics and Mobility Conference (UEMCON keynote), Oct. 2024. Cascade: A Platform for Fast, Focused Edge Intelligence. Keynote at the International Symposium on Parallel Computing and Distributed Systems (PCDS) Singapore (Sept 2024), AFRL Rome (May 2024), Microsoft Research (Sept. 2023), Cisco (January 2024), UC Irvine, Oct 2023. MIT CSAIL, April 6, 2023. QSTP/Quark (India) August 2023. EduKCircle Phillipines (April 2023). Enabling the Intelligent IoT Edge: Microsoft Nov. 2022. GE Edge 2022. Univ. Bologna Industrial Affiliates Program. January 2022 (3-lecture tutorial version); ApPLIED 2022 (Keynote), July 2022; IEEE Computing and Communication Conference (Keynote), Jan 2022; Toronto ML Symp., Nov 2021. IEEE Future Networks AI/ML Workshop 2021. Amity University, Kolkata (India). April 20, 2020. STEMY 2020 (high school event for pre-college STEM students), August 16, 2020. IEEE 5G World Forum 2020, Sept 10, 2020. Derecho: Blindingly Fast RDMA Replication for Cloud and Edge Services. Tutorial at the ACM Symposium on operating systems principles, Oct 2019.

Derecho: Group Communication over RDMA. 10th IEEE Ubiquitous Computing, Electronics and Mobility Conference (UEMCON 2019) (keynote), WCF (Cornell-Weill Workshop on Research in Cloud Computing) Sept 2019, Akraio Summit (Aug. 19), 18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid '18), Workshop on Clusters, Clouds, and Data for Scientific Computing (CCDSC '18), 2018 IEEE Sarnoff Symposium, U.T.Dallas, Huawei Research Labs, University of Cambridge, Oxford University, Technion University, Microsoft Research, Yahoo!. Tel Aviv University, Luxembourg University, U.C. Berkeley, Stanford University, University of Chicago, Argonne National Labs, University of Virginia, Mellanox, Infinidat, Intel, VMWare, SanDisk.

Building a Smart World: Ethical puzzles posed by the Internet of Things. Princeton Envision the Future 2018 (organized by Princeton undergraduates).

Leveraging RDMA to Build a Real-Time Cloud for the Internet of Things. Keynote talk: MesosCon (Denver, June 1, 2016); IBM (July 14, 2016); Sandia (July 26, 2016); JaneStreet (August 9, 2016), Google (August 10, 2016).

Ultra-fast RDMA Networks and Fast Persistent Memories Will Enable a Smarter World. International SanDisk Technology Conference. March 9, 2016

CTO Forum: Leveraging the Hybrid Cloud. Rethinking Innovation, Palo Alto, February 2016

Can the Cloud Support Demanding Real-Time Applications? (Distinguished lecture). UT San Antonio: 1-19-16. UConn Storrs: 11-16-15.

Reflections on the History of Operating Systems Research in Fault Tolerance. SOSP History Day, Monterey CA, November 2015. Video and associated essay available at <http://sigops.org/sosp/sosp15/history/index.html>.

Keynote speaker, Internet of Energy Virtual Summit on Tuesday, Dec. 16. Topic: "Building a Scalable Platform to Query Smart Meters While Preserving Customer Privacy"

Keynote speaker, 4th Workshop on Autonomic Distributed Systems - WoSiDA 2014 (at the 32nd Brazilian Symposium on Computer Networks and Distributed Systems). Florianópolis, Brazil, 05/09/2014

Keynote speaker, Workshop on Assured Cloud Computing – WACC 2014, University of Illinois Urbana Champaign, 05/26/2014

Invited Speaker, Cloud Computing & Assurance for Critical DoD Initiatives, Washington, DC, April 23 – 25, 2013.

Invited Speaker, Advanced Energy Conference. "Advanced Data Center and Strategic Directions", New York, NY, April 30 – May 1, 2013.

Invited Speaker, Microsoft. "Adapting High Assurance Distributed Computing Techniques for Cloud- Scale Settings". May 20, 2013

Keynote Speaker, DSN, 43rd Annual IEEE/IFIP International Conference on Dependable Systems and Networks. "Adapting High Assurance Distributed Computing Techniques for Cloud-Scale Settings". Budapest, June 24 – 27, 2013.

Distinguished Lecture, Adapting High Assurance Distributed Computing Techniques for Cloud-Scale Settings? Drexel University, Philadelphia, October 2013.

Keynote Speaker, LADA, 39th ACM SIGPLAN-SIGACT Principles of Programming Languages. Philadelphia, PA, January 25 – 27, 2012.

Colloquium Speaker, Princeton University. "Adapting High Assurance Distributed Computing Techniques for Cloud-Scale Settings", Princeton, November 13, 2012

Distinguished Lecture, Can Cloud Computing Systems Guarantee Strong Consistency? Purdue University, IN, December 1, 2011.

Distinguished Lecture, Can Cloud Computing Systems Guarantee Strong Consistency? University of Minnesota, Indianapolis, MN, October 2011.

Distinguished Lecture, Can Cloud Computing Systems Guarantee Strong Consistency? University of Minnesota, Indianapolis, MN, October 2011.

Invited Lecture, Cloud Futures 2010: Advancing Research with Cloud Computing. Redmond, WA, April 8 – 9, 2010.

Is Distributed Consistency a Menace? Using Gossip to Rescue Consistency Mechanisms. Keynote speaker: IEEE International Conference on Peer to Peer Systems (P2P) 2009, First Infosys/Microsoft Workshop on Cloud Computing (Mysore, India, 2010).
 Keynote Speaker, 29th Int'l Conference on Distributed Computing Systems (ICDCS 2009). Montreal, Quebec, Canada. June 2009.
 Distinguished Lecture, Technion University Colloquium Series, Haifa, IL. December 2008
 Colloquium Speaker, Ben Gurion University, Beer Sheva, IL, December 2008.
 Invited Lecture, Hebrew University, Jerusalem, IL, December 2008.
 Distinguished Lecture, Triangle Distinguished Lecture Series. University of North Carolina, Chapel Hill, NC. November 2008.
 Distinguished Lecture, Harvard University Colloquium Series. Harvard University, Harvard, MA. November 2008.
 Distinguished Lecture, Cray Colloquium Lecture Series. University of Minnesota, Duluth, MN. October 2008
 Keynote Speaker, 5th IEEE International Conference on Autonomic Computing. Chicago, IL. June 2008.
 Scalable Management for Global Services. Keynote speaker: International Conference on Autonomic Computing (ICAC) 2008.
 Creating a Trustworthy Active Web. Winter School: Hot Topics in Distributed Computing (HTDC 2008), INRIA Rhone Alps, La Plagne France.
 A History of the Virtual Synchrony Model. Invited talk, 30-year perspective on replication, Monte Verita, Ascona, Switzerland, November 2007. (Proceedings to be published by Springer Verlag).
 Challenges of Scale in Massive Data Centers: Keynote speaker: COMSWARE 2007, Third ACM Workshop on Scalable Trusted Computing (2006), International Workshop on Gossip Communication (2006). McGill University, Microsoft Research (Cambridge), Intel Research Forum on Autonomic Computing, University of Glasgow, International Conference on Software Engineering (ICSE-04).
 2004 (varied dates).
 After the Internet: University of California at Berkeley, CITRIS Institute, Feb. 2002, CUNY Graduate Center, Nov. 2002.
 Navigating in the Storm: A Distributed Computing Infrastructure for Autonomic Computing: Almaden Institute, San Jose, California, April 2002.
 Scalability Challenges and Solutions for Emerging Networks: Keynote Speaker: NCA '01, Boston, Massachusetts, February 2002
 Next Generation Internet: Unsafe at any Speed? Keynote Speaker: ISDCS '01, April 2001; University of Rochester, November 2000; IBM T.J. Watson Research Center, March 2000; Keynote: Middleware 2000; U. Michigan (Ann Arbor) Sept. 1999, Brown University, January 1998; University of Virginia, April 1998; CERN, July 1998; Lucent Bell Laboratories, October 13, 1998.
 Building Secure and Reliable Network Applications: Salvador di Bahia, June 1999; Campinas, Brazil, July 8-12, 1996; Bologna, Italy, May 20-24, 1996.
 Costs of Layering in Horus: Tromso, Norway, Summer 1996. Siemens AG Munich, 1996. INRIA (Paris, France), 1996. INESC (Lisbon, Portugal), 1996. University of Paris VI, 1996. EPFL (Lausanne, Switzerland), 1996. Dassault Aviation, 1996. French Air Traffic Control Research Agency (STNA, Toulouse), 1996. Dartmouth College, Summer 1995.

Patents

Reliable time delay-constrained cluster computing. United States Patent 6393581, May 21, 2002. Co-inventors: Roy Friedman; Kenneth P. Birman; Srinivasan Keshav; Werner Vogels.
 Transparent fault tolerant computer system. United States Patent 5,968,185, October 19, 1999. Co-inventors: Thomas C. Bressoud, John E. Ahern, Kenneth P. Birman, Robert C. B. Cooper, Bradford B. Glade, Fred B. Schneider and John D. Service.
 Distributed architecture for an intelligent coprocessor. United States Patent 5,883,939, March 16, 1999. Co-inventors: Roy Friedman and Kenneth P. Birman.

Advisory Roles

Federal Energy Reliability Commission: In 2020, provided written testimony concerning proposed new NERC guidelines for use of cloud computing in “smart” power grid systems

French Civil Aviation Organization, DGAC (Damien Figarol, Director): 4-Flight Platform. (2013-2016)

ISO-NE, ISO-NY and NYPA (Eugene Litvinov, CIO): Designing a cloud-hosted infrastructure to manage the Northeastern Electric Power Grid. (2013-2018)

U.S. Air Force (Offices of the Deputy Chief Management Officer, the XO, CIO, and the CTO). Cloud Computing opportunity and challenges for the USAF. (2008-2014)

National Science Foundation: Chair, CISE/CNS Committee of Visitors, 2009-2010

DARPA: Co-chair, ISAT study to create that agency’s first cybersecurity research programs, 1995. This single ISAT ultimately resulted in 8 DARPA security research efforts. The work was co-funded by then DoD DDR&E Dr. Anita Jones.

U.S. Dept of Treasury (Brian Peretti, Deputy Undersecretary for Critical Infrastructure Protection). Security and Reliability risks to the Financial Sector (2002-2008).

PhD Students Advised

Jan 1986	Thomas A. Joseph	Low Cost Management of Replicated Data
May 1987	Thomas Raeuchle	Efficient Concurrency Control for Typed Objects
May 1988	Frank Schmuck	The Use of Efficient Broadcasts Protocols in Asynchronous Distributed Systems
Dec 1989	Ken Kane	Log-Based Recovery in Asynchronous Distributed Systems
Dec 1990	Pat Stephenson	Fast Ordered Multicasts
Sep 1992	Aleta Ricciardi	Implementing Fail-Stop Processes in Asynchronous Distributed Systems
May 1993	Michael Reiter	A Security Architecture for Fault-Tolerant Systems
Jan 1995	Guerney Hunt	Multicast Flow Control on Local Area Networks
Dec 1996	Bradford Glade	Multicast Flow Control on Local Area Networks
May 1995	Michael Kalantar	A Scalable Architecture for Reliable Publish/Subscribe Communication in Distributed Systems
Aug 1995	David Cooper	The Performance and Scalability Characteristics of Multicast Protocols
Aug 1996	David Karr	Private Communications for Mobile Computing
Jan 1998	Mark Hayden	Specification, Composition and Automated Verification of Layered Communication Protocols
May 1998	Katie Guo	The Ensemble System
May 1998	Alexey Vaysburd	Scalable Group Communication Protocols
May 2001	Zhen Xiao	The Maestro Toolkit
May 2004	Tibor Janosi	Efficient Error Recovery For Reliable Multicast
July 2004	Ken Hopkinson	Automated Stock Brokerage Architecture
		Overcoming Communication, Distributed System, and Simulation Challenges: A Case Study Involving the Protection and Control of the Electric Power Grid Using a Utility Intranet Based on Internet Technology
May 2004	Ben Atkin	Network Aware Adaptation in Mobile File Systems
May 2004	Indranil Gupta	Building Scalable Solutions to Distributed Computing Using Probabilistic Components
Sept 2005	Ranveer Chandra	MultiNet: Connecting to Multiple IEEE 802.11 Networks Using a Single Wireless Card
May 2008	Krzysztof Ostrowski	Quicksilver Scalable Multicast Platform
May 2008	Mahesh Balakrishnan	Proactive Error Correction in Scalable Communication Protocols
May 2014	Qi Huang	Caching in Cloud Computing Platforms
Aug 2016	Zhiyuan Teo	IronStack: Networking for Mission-Critical Systems

Aug 2018	Theo Gkountouvas (MS)	GridCloud: Scalable Platform for Smart Grid Applications
May 2021	Edward Tremel	Privacy-Preserving Data Mining
Aug 2022	Sagar Jha	Integrating RDMA into Data Replication Tools
	Alicia Yang	Vortex System
	Yifan Wang	Arca System
	Tianchen Yuan	Multicomponent ML Inference and Knowledge Retrieval Pipelines

Books

Guide to Reliable Distributed Systems: Building High-Assurance Applications and Cloud-Hosted Services (Texts in Computer Science). Kenneth P. Birman. Springer. 2012.

Reliable Distributed Systems: Technologies, Web Services, and Applications. Kenneth P. Birman. Springer. 2010.

Theory and Practice in Distributed Systems. International Workshop, Dagstuhl Castle, Germany, September 5 - 9, 1994. Selected Papers (Lecture Notes in Computer Science). Kenneth P. Birman, Friedemann Mattern and Andre Schiper (Eds.) Springer. 1995.

Reliable Distributed Computing with the Isis Toolkit. Kenneth P. Birman and Robbert Van Renesse. IEEE Computer Society Press. Los Alamitos, Ca. 1994.

Journal Articles

1. Derecho: Fast State Machine Replication for Cloud Services. Sagar Jha, Jonathan Behrens, Theo Gkountouvas, Matthew Milano, Weijia Song, Edward Tremel, Robbert Van Renesse, Sydney Zink, and Kenneth P. Birman. ACM Trans. Comput. Syst. 36, 2, Article 4 (April 2019), 49 pages. DOI: <https://doi.org/10.1145/3302258>
2. GridCloud: Infrastructure for Cloud-based Wide Area Monitoring of Bulk Electric Power Grids. Dave Anderson, Theo Gkountouvas, Ming Meng, Ken Birman, Anjan Bose, Carl Hauser, Eugene Litvinov, Xiaochuan Luo, Frankie Zhang. in IEEE Transactions on SmartGrid. June 2019.
3. A Cloud-Hosted Synchrophasor Data Sharing Platform. Eugene Litvinov, Xiaochuan Luo, Qiang Zhang, Ken Birman, Theodoros Gkountouvas, Dave Anderson, Carl Hauser, Anjan Bose. Chapter in Power System Grid Operation Using Synchrophasor Technology, pp. 477-498. Sarma Nuthalapati (editor), Springer-Verlag Series on Power Electronics and Power Systems. June 2018. ISBN: 978-3319893778.
4. Anonymous, Fault-Tolerant Distributed Queries for Smart Devices. Edward Tremel, Ken Birman, Robert Kleinberg, and Márk Jelasity. ACM Trans. Cyber-Phys. Syst. (TCPS) 3, 2, Article 16 (October 2018), 29 pages. DOI: <https://doi.org/10.1145/3204411>.
5. Building a Secure and Privacy-Preserving Smart Grid. Ken Birman, Márk Jelasity, Robert Kleinberg, Edward Tremel. SIGOPS Oper. Syst. Rev. 49, 1 (January 2015), 131-136.
6. Integrated Approach to Data Center Power Management. Lakshmi Ganesh, Hakim Weatherspoon, Tudor Marian, Kenneth P. Birman. IEEE Transactions on Computers. Volume 62, Issue 6, pp 1086-1096. June 2013.
7. Toward a reliable, secure and fault tolerant smart grid state estimation in the cloud. Ketan Maheshwari, Marcus Lim, Lydia Wan, Ken Birman, Robbert van Renesse. Published in the proceedings of IEEE/PES ISGT. pp 1-6. February 2013
8. Overcoming CAP with Consistent Soft-State Replication. Kenneth P. Birman, Daniel A. Freedman, Qi Huang and Patrick Dowell. IEEE Computer Magazine (special issue on "The Growing Impact of the CAP Theorem"). Volume 45. pp 50-58. February 2012.
9. Routers for the Cloud. Can the Internet Achieve 5-Nines Availability? Andrei Agapi, Kenneth P. Birman, Robert Broberg, Chase Cotton, Thilo Kielmann, Martin Millnert, Rick Payne, Robert Surton, and Robbert VanRenesse. IEEE Internet Computing. Volume 15. Issue 5. pp.72 - 77. September, October 2011.
10. Maelstrom: Transparent Error Correction for Communication Between Data Centers. Mahesh Balakrishnan, Tudor Marian, Kenneth P. Birman, Hakim Weatherspoon, Lakshmi Ganesh. ACM Transactions on Networking. Volume 19, No 3, pp 617-629. June 2011.

11. Towards A Cloud Computing Research Agenda. Kenneth P. Birman, Gregory Chockler, Robbert van Renesse. ACM SIGACT News Distributed Computing Column. Volume 40, Issue 2, pp. 68-80. June 2009.
12. Edge Mashups for Service-Oriented Collaboration. Kenneth P. Birman, Jared Cantwell, Daniel Freedman, Qi Huang, Petko Nikolov, and Krzysztof Ostrowski. IEEE Computer. Volume 42, Number 5, pp 90-94. May 2009
13. Slicing Distributed Systems. Vincent Gramoli, Ymir Vigfusson, Ken Birman, Anne-Marie Kermarrec, Robbert van Renesse. IEEE Transactions on Computers, Special Issue on Autonomic Network Computing. Volume 58, Issue 11, pp 1444-1455. June 2009.
14. Adaptive Gravitational Gossip: A Gossip-Based Communication Protocol with User-Selectable Rates. Kenneth Hopkinson, Kate Jenkins, Kenneth Birman, James Thorp, Gregory Toussaint, and Manu Parashar. IEEE Transactions on Parallel and Distributed Systems. Volume 20, No. 12, pp 1830 - 1843. February 2009.
15. The Monoculture Risk Put into Context. Fred B. Schneider and Ken Birman. IEEE Security & Privacy. Volume 7, No. 1, pp 14-17. January/February 2009.
16. Program Committee Overload in Systems. Ken Birman and Fred B. Schneider. Comm. of the ACM, Volume 52, No. 5, pp 34-37. February 2009.
17. SENSTRAC: Scalable Querying of SENSOR Networks from Mobile Platforms Using TRACKing- Style Queries. Stefan Pleisch and Ken Birman. International Journal of Sensor Networks. Volume 3, Issue 4, pp 266-280. June 2008.
18. Active and Passive Techniques for Group Size Estimation in Large-Scale and Dynamic Distributed Systems. Dionysios Kostoulas, Dimitrios Psaltoulis, Indranil Gupta, Ken Birman, Al Demers. Journal of Systems and Software. Volume 80, Issue 10, pp 1639-1658. October 2007.
19. Extensible Architecture for High-Performance, Scalable, Reliable Publish-Subscribe Eventing and Notification. Krzysztof Ostrowski, Ken Birman, and Danny Dolev. International Journal of Web Services Research. Volume 4, Number 4, pp 18-58. October-December 2007.
20. SENSTRAC: Scalable Querying of SENSOR Networks from Mobile Platforms Using TRACKing- Style Queries. Stefan Pleisch and Ken Birman. International Journal of Sensor Networks (IJSNet). Volume 76, Issue 3, pp 185-204. May 2007.
21. The Untrustworthy Services Revolution. Ken Birman. IEEE Computer (ISSN 0018-9162). Volume 39, No. 2, pp. 98-100. February 2006.
22. Navigating in the Storm: Using Astrolabe to Adaptively Configure Web Services and Their Clients. Ken Birman, Robbert van Renesse, and Werner Vogels. Cluster Computing Special Issue: Autonomic Computing. (ISSN 1386-7857 (Paper) 1573-7543 (Online)). Volume 9, No. 2. pp127-139. April 2006.
23. EPOCHS: Integrated Cots Software For Agent-Based Electric Power And Communication Simulation. Hopkinson, K.M.; Giovanini, R.; Wang, X.; Birman, K.P.; Coury, D.V.; Thorp, J.S. Proceedings of the 2003 Winter Simulation Conference, later published in IEEE Transactions on Power Systems. Volume 21, No. 2, pp 548 - 558. February 2006.
24. Can Web Services Scale Up? Ken Birman. IEEE Computer. Volume 38, Number 10, pp 107-110. October 2005
25. Autonomic Computing - A System-Wide Perspective. Robbert van Renesse and Kenneth P. Birman. "Autonomic Computing: Concepts, Infrastructure, and Applications". pp 35-48. ed. Manish Parashar and Salim Hariri, CRC press. January 2006.
26. Reliable Distributed Systems Technologies, Web Services, and Applications. Ken Birman, 2005, 668 p. 145 illus., Springer Verlag. Hardcover ISBN: 0-387-21509-3.
27. Like it or not, Web Services are Distributed Objects! K.P. Birman, Communications of the ACM, Volume 47, No.12, pp 60-62. December 2004.
28. Scalable, Self-Organizing Technology for Sensor Networks. Kenneth P. Birman, Saikat Guha, Rohan Murty. Advances in Pervasive Computing and Networking, Bulent Yeler, ed. Springer Science+Business Media, Inc. New York, NY, Pg. 1-15.

29. Overcoming Communications Challenges in Software for Monitoring and Controlling Power Systems. K.P. Birman, J. Chen, K. Hopkinson, R.J. Thomas, J.S. Thorp, R. van Renesse, and W. Vogels. Proceedings of the IEEE. Vol. 9, No. 5. May 2005.
30. Scalable, Self-Organizing Technology for Sensor Networks. Kenneth P. Birman, Saikat Guha, Rohan Murty. Advances in Pervasive Computing and Networking, Bulent Yeler, ed. Springer Science+Business Media, Inc. New York, NY, Pg. 1-15
31. Overcoming Communications Challenges in Software for Monitoring and Controlling Power Systems. Kenneth P. Birman, Jie Chen, Ken Hopkinson, Bob Thomas, Jim Thorp, Robbert van Renesse, Werner Vogels. October 2003
32. The League of SuperNets, Ken Birman, IEEE Internet Computing, vol. 7, no.5, 2003, pp.92-96
33. Astrolabe: A Robust and Scalable Technology for Distributed System Monitoring, Management, and Data Mining. Robbert van Renesse, Kenneth Birman and Werner Vogels. ACM Transactions on Computer Systems, May 2003, Vol.21, No. 2, pp 164-206
34. Fighting Fire with Fire: Using Randomized Gossip to Combat Stochastic Scalability Limits. Indranil Gupta Kenneth P. Birman and Robbert van Renesse. (ed. Nong Ye) Special Issue of Quality and Reliability of Computer Network Systems, Journal of Quality and Reliability Engineering International, May/June 2002, Vol. 18, No. 3, pp 165-184.
35. An Agent Based Current Differential Relay for use with a Utility Intranet. D.V. Coury, K. M. Hopkins, K. P. Birman. IEEE Transactions on Power Delivery, January 22, 2002, Vol. 17, No. 1, pp. 47-53.
36. Using AVL Trees for Fault-Tolerant Group Key Management. Ohad Rodeh, Ken Birman, Danny Dolev. International Journal of Information Security (IJIS), Vol. 1, No 2, pp 84-99. February 2002; published online: October 26, 2001.
37. The Architecture and Performance of the Security Protocols in the Ensemble Group Communication System. Ohad Rodeh, Ken Birman, Danny Dolev. ACM Transactions on Information Systems and Security (TISSEC).
38. Technology Requirements for Virtual Overlay Networks. IEEE Systems, Man and Cybernetics: Special issue on Information Assurance, Vol. 31, No 4, pp 319-327. July 2001.
39. Next Generation Internet: Unsafe at Any Speed? IEEE Computer, Special Issue on Infrastructure Protection, Vol. 33, No 8, pp54-88. August 2000.
40. Optimized Group Rekey for Group Communications Systems, Ohad Rodeh, Ken Birman, Danny Dolev, Network and Distributed System Security 2000, February 2000, San Diego, California. (Extended version available as Cornell University, Computer Science TR99-1764.)
41. A Dynamic Light-Weight Group Service. Luis Rodrigues, Katherine Guo, Paulo Verissimo, and Kenneth P. Birman. Journal of Parallel and Distributed Computing 2000, Vol. 60, pp 1449-1479. (2002)
42. Bimodal Multicast. ACM Transactions on Computer Systems, Vol. 17, No. 2, pp 41-88, May, 1999. Kenneth P. Birman, Mark Hayden, Ozgur Ozkasap, Zhen Xiao, Mihai Budiu and Yaron Minsky.
43. A Review of Experiences with Reliable Multicast. K. P. Birman. Software Practice and Experience 29(9), pp 741-774. July 1999.
44. Virtual Synchrony. The Encyclopedia of Distributed Computing. Joseph Urban and Partha Dasgupta, eds. Kluwer Academic Publishers, K. Birman.
45. Middleware Support for Distributed Multimedia and Collaborative Computing. Software: Practice and Experience, July, 1999. Kenneth P. Birman, Roy Friedman, Mark Hayden and Injong Rhee.
46. Building Adaptive Systems Using Ensemble. Software Practice and Experience, 28(9), pp. 963- 979, July 1998. R. van Renesse, K. Birman, M. Hayden, A. Vaysburd, D. Karr.

47. The Maestro Approach to Building Reliable Interoperable Distributed Applications with Multiple Execution Styles. *Theory and Practice of Object Systems*. 1998. 4:2. Alexey Vaysburd and Ken Birman.
48. Building Secure and Reliable Network Applications. (book) Manning Publications and Prentice Hall. Dec 1996. Ken Birman.
49. Software for Reliable Networks. *Scientific American*, May 1996, 274(5): 64-69. K. Birman and R. van Renesse.
50. Horus: A Flexible Group Communications System. *Communications of the ACM*. 39(4): 76-83. Apr 1996. R. van Renesse, S. Maffei, and K. Birman.
51. The Design and Implementation of a Private Message Service for Mobile Computers. *WINET: Journal of Wireless Network; Issue - Recent Advances in Wireless Networking Technology*, 1(3), 297-309, Oct 1995. D. Cooper and K. Birman.
52. Theory and Practice in Distributed Systems. (book) K. Birman, F. Mattern and A. Schiper, eds. Springer Verlag LNCS, Jul 1995 938. Jul 1995.
53. Reliability Through Consistency. *IEEE Software (Special Issue on Safety and Reliability)*, May 1995. With Bradford Glade.
54. A Security Architecture for Fault-Tolerant Systems. *ACM Transactions on Computer Systems*, 12 (4): 340-371, Nov 1994. M. Reiter, K. Birman and R. van Renesse.
55. A Response to Cheriton and Skeen's Criticism of Causal and Totally Ordered Communication. *Operating Systems Review*, Jan 1994, 28(1).
56. Fault-Tolerant Programming using Process Groups. *Distributed Open Systems*, R. van Renesse and K. Birman. Jan 1994, 96-112.
57. Reliable Distributed Computing with the Isis Toolkit (book) IEEE Computer Society Press, 1994, Los Alamitos, Ca. K. Birman and R. van Renesse, eds.
58. Light-Weight Process Groups in the ISIS System. *Distributed Systems Engineering*. Mar 1994. 1:29-36. B. Glade, R. Cooper, R. van Renesse and K. Birman.
59. How to Securely Replicate Services. M. Reiter and K. Birman. *ACM Transactions on Programming Languages and Systems*. 16(3): 986-1009. May 1994.
60. Integrating Runtime Consistency Models for Distributed Systems. *Journal of Parallel and Distributed Systems*, Nov 1994, 23:158-176. Kenneth Birman.
61. The Process Group Approach to Reliable Distributed Computing. *Communications of the ACM*, Dec 1993, 36(12): 37-53. Kenneth Birman.
62. Lightweight Causal and Atomic Group Multicast. *ACM Transactions on Computer Systems*, Aug 1991, (3): 272-314. K. Birman, A. Schiper and P. Stephenson.
63. Tools for Distributed Application Management. *IEEE Computer*, Aug. 1991, 24(8): 42-51. K. Marzullo, M. Wood, K. Birman and R. Cooper.
64. The ISIS Project: Real Experience with a Fault Tolerant Programming System *Operating Systems Review*. Ken Birman and R. Cooper. pp 103-107. April 1991.
65. Communication Support for Reliable Distributed Computing *Lecture Notes in Computer Science (1990)*, 124-137, (with T. Joseph)
66. Reliable communication in presence of failures. Kenneth P. Birman, Thomas A. Joseph. *ACM Transactions on Computer Systems*, Vol. 5, No. 1, Feb. 1987
67. The Relationship Between Signal Representation and Learning in ECG Analysis. Ph.D. Thesis, University of California, Berkeley, June 1981.

Conference
Publications

1. Enhancing transparency in buyer-driven commodity chains for complex products: A blockchain-based traceability framework demonstrated through an apparel supply chain simulation. R. Takkar, K. Birman, and H. O. Gao. 6th International Conference on Industry 4.0 and Smart Manufacturing (ISM '24), Prague, Nov. 2024
2. Navigator: A Decentralized Scheduler for Latency-Sensitive AI Workflows. Y. Yang, A. Merlina, W. Song, T. Yuan, K. Birman and R. Vitenberg. IEEE Conference on Edge Computing and Communications (EDGE), Shenzhen, China, 2024, pp. 35-47.

3. Gupta, A., Hao, Y., Yang, Y., Yuan, T., Wieland, M., Basran, P. S., & Birman, K. (2024). Digital Twin-Driven Teat Localization and Shape Identification for Dairy Cow (Student Abstract). Proceedings of the AAAI Conference on Artificial Intelligence, 38(21), 23510-23511. <https://doi.org/10.1609/aaai.v38i21.30450>
4. Verifying a C implementation of Derecho's coordination mechanism using VST and Coq. Ramana Nagasamudram, Lennart Beringer, Ken Birman, Mae Milano, David A. Naumann. Proc. NFM'24: The NASA Formal Methods Symposium, June 2024.
5. Monotonicity and Opportunistically- Batched Actions in Derecho. 25th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS23), Ken Birman, Sagar Jha, Mae Milano, Lorenzo Rosa, Weijia Song, Edward Tremel. New Jersey, Oct 2-4, 2023.
6. Yifan Wang, Weijia Song, Yuting Yang, Charif Mahmoudi, Shashank Shekhar, Kenneth P. Birman. Dash: A Low Code Development Platform for AI Applications in Industry. 2023 IEEE 14th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON). Columbia University, USA. October 12-14, 2023.
7. Cascade: An Edge Computing Platform for Real-time Machine Intelligence (Invited paper). Weijia Song, Yuting Yang, Thompson Liu, Andrea Merlina, Thiago, Garrett, Roman Vitenberg, Lorenzo Rosa, Aahil Awatramani, Zheng Wang, Ken Birman. ApPLIED 2022 (Salerno, Italy).
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9. Spindle: Techniques for optimizing atomic multicast on RDMA. Sagar Jha, Lorenzo Rosa, Ken Birman. ICDCS 2022 (Bologna, Italy).
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Technical Reports

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3. Spindle: Techniques for optimizing atomic multicast on RDMA. Sagar Jha, Lorenzo Rosa, Ken Birman. arXiv:2110.00886. Technical report, October 2021.
4. CloudMake: A Tool for Dynamic Configuration of Distributed Applications. Theo Gkountouvas, Ken Birman, David Anderson. November 2017.
5. Quilt: A Patchwork of Multicast Regions. Qi Huang, Ken Birman, Ymir Vigfusson, Haoyuan Li. January 2010
6. Virtually Synchronous Methodology for Building Dynamic Reliable Services. Ken Birman, Dahlia Malkhi, Robert Van Renesse. January 2010
7. Achieving Reliability Through Distributed Data Flows and Recursive Delegation. Krzysztof Ostrowski, Ken Birman, Danny Dolev, and Chuck Sakoda.
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12. Sliver: A Fast Distributed Slicing Algorithm. Vincent Gramoli, Ymir Vigfusson, Ken Birman, Anne- Marie Kermarrec, Robbert van Renesse. Technical Report. December 2007
13. Declarative Reliable Multi-Party Protocols Krzysztof Ostrowski, Ken Birman, Danny Dolev. Cornell University Technical Report (TR2007-2088). April, 2007.
14. Implementing High-Performance Multicast in a Managed Environment Krzysztof Ostrowski, Ken Birman, Danny Dolev. Cornell University Technical Report (TR2007-2088). April, 2007.
15. Properties Framework and Typed Endpoints for Scalable Group Communication. Krzysztof Ostrowski, Ken Birman, Danny Dolev. Cornell University Technical Report (July, 2006).
16. QuickSilver Scalable Multicast. Krzysztof Ostrowski, Ken Birman, and Amar Phanishayee. Cornell University Technical Report (April, 2006).
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19. Kache: Peer-to-Peer Web Caching Using Kelips. Prakash Linga, Indranil Gupta, and Ken Birman. June 2004
20. Practical algorithms for Size estimation in Large and Dynamic groups. D. Psaltoulis, D. Kostoulas, I. Gupta, K. Birman, A. Demers. February 2004.
21. Building Scalable Solutions to Distributed Computing Problems using Probabilistic Components. Kenneth P. Birman and Indranil Gupta. Cornell Technical Report.
22. MFS: An Adaptive Distributed File System for Mobile Hosts. Benjamin Atkin and Kenneth P. Birman. Cornell University Technical Report
23. Ensemble Security. Ohad Rodeh, Kenneth P. Birman, Mark Hayden, Zhen Xiao, and Danny Dolev. (TR98-1703)
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28. Using Software Design patterns to Build Distributed Environmental Monitoring applications. Dag Johansen, Kjetil Jacobsen, Nils P. Sudmann, Kare, J. Lauvset, Kenneth P. Birman, and Werner Vogels. (TR97-1655)
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32. The Maestro Group Manager: A Structuring Tool for Applications with Multiple Quality of Service Requirements. Ken Birman, Roy Friedman and Mark Hayden. (TR97-1619)
33. A Dynamic Light-Weight Group Service. Ken Birman. (TR96-1611).
34. Using Group Communication Technology to Implement a Reliable and Scalable Distributed IN Coprocessor. Roy Friedman and Ken Birman. (TR96-1605).
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36. Trading Consistency for Availability in Distributed Systems. Roy Friedman and Ken Birman. (TR96-1579).
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38. Protocol Composition in Horus. Robbert Van Renesse and Kenneth P. Birman. (TR95-1505).
39. Horus: A Flexible Group Communications System. Robbert Van Renesse, Kenneth P. Birman, Bradford B. Glade, Katie Guo, Mark Hayden, Takako Hickey, Dalia Malki, Alex Vaysburd and Werner Vogels. (TR95-1500).
40. Achieving Critical Reliability with Unreliable Components and Unreliable Glue. Mark Hayden and Kenneth P. Birman. (TR95-1493).
41. Uniform Actions in Asynchronous Distributed Systems. Dalia Malki, Kenneth P. Birman, Aleta M. Ricciardi and Andre Schiper. (TR94-1447).
42. Design and Performance of Horus: A Lightweight Group Communications System. Robbert van Renesse, Takako M. Hickey and Kenneth P. Birman. (TR94-1442).
43. Performance of the ISIS Distributed Computing Toolkit. Kenneth P. Birman and Timothy Clark. (TR94-1432).
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46. Understanding Partitions and the "No Partition" Assumption. Aleta M. Ricciardi, Andre Schiper and Kenneth P. Birman. (TR93-1355).
47. A Security Architecture for Fault-Tolerant Systems. Michael K. Reiter, Kenneth P. Birman and Robbert Van Renesse. (TR93-1354).
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49. Process Membership in Asynchronous Environments. Aleta M. Ricciardi and Kenneth P. Birman. (TR93-1328).
50. Using the ISIS Resource Manager for Distributed, Fault-Tolerant Computing. Timothy Clark and Kenneth P. Birman. (TR92-1289).
51. Integrating Security in a Group Oriented Distributed System. Michael K. Reiter, Kenneth P. Birman and Li Gong. (TR92-1269).
52. Options for Adding Group Semantics to Ports. January 1992, Department of Computer Science, Internal Report, (with R. van Renesse, B. Glade, P. Stepenson).
53. Design Alternatives for Process Group Membership and Multicast. Ken Birman, Robert Cooper and Barry Gleeson. (TR91-1257).
54. Programming with Process Groups: Group and Multicast Semantics. January 1991 (being revised), Department of Computer Science, Technical Report 91-1185, (with R. Cooper and B. Gleeson).
55. Designing Application Software in Wide Area Network Settings. Messac Makpangou and Kenneth P. Birman. (TR90-1165)

56. The ISIS Project-Real Experience with a Fault-Tolerant Programming System. Kenneth P. Birman and Robert Cooper. (TR90-1138)
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59. ISIS and META Projects: Progress Report. Kenneth P. Birman, Robert Cooper and Keith Marzullo. (TR90-1103).
60. Supporting Large Scale Applications on Networks of Workstations. April 1989, Department of Computer Science, (with R. Cooper).
61. Deceit: A Flexible Distributed File System. Alexander Siegel, Kenneth P. Birman and Keith Marzullo. (TR89-1042).
62. How Robust Are Distributed Systems?. Kenneth P. Birman. (TR89-1014).
63. The Role of Order in Distributed Programs. Keith Marzullo and Kenneth P. Birman. (TR89-1001).
64. Causally Consistent Recovery of Partially Replicated Logs. Kenneth P. Kane and Kenneth P. Birman. (TR88-949).
65. ISIS - A Distributed Programming Environment - Version 2.0, User's Guide and Reference Manual. K. Birman R. Cooper, T. A. Joseph, K. P. Kane, F. Schmuck).
66. Reliable Broadcast Protocols. Thomas A. Joseph and Kenneth P. Birman. (TR88-918).
67. Exploiting Virtual Synchrony in Distributed Systems. Kenneth P. Birman and Thomas A. Joseph. (TR87-811).
68. Programming with Shared Bulletin Boards in Asynchronous Distributed Systems. Kenneth P. Birman, Thomas A. Joseph, Frank B. Schmuck and Patrick Stephenson. (TR86-772).
69. Communication Support for Reliable Distributed Computing. Kenneth P. Birman and Thomas A. Joseph. (TR86-753)
70. ISIS: A System for Fault-Tolerance in Distributed Systems. Kenneth P. Birman. (TR86-744).
71. Reliable Communication in the Presence of Failures. Kenneth P. Birman and Thomas A. Joseph. (TR85-694).
72. Low Cost Management of Replicated Data in Fault-Tolerant Distributed Systems. Kenneth P. Birman and Thomas A. Joseph. (TR84-644).
73. An Overview of the ISIS Project. IEEE Distributed Processing Technical Committee Newsletter. Kenneth P. Birman, Amr El Abbadi, Wally Dietrich, Thomas A. Joseph and Thomas Raeuchle. (TR84-642).
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75. ISIS: An Environment for Constructing Fault-Tolerant Distributed Systems. (TR 83-552) (with D. Skeen, A. El Abbadi, W. C. Dietrich and T. Raeuchle).
76. The Relationship Between Signal Representation and Learning in ECG Analysis. Ph.D. Thesis, University of California, Berkeley, June 1981.

Professional Activities

Tutorials: Derecho was selected for a 4-hour tutorial slot at ACM SIGOPS SOSP 2019. These tutorials are a new addition to the event, and we are one of the first to “win” such a slot, in a highly selective process.

Advisory Roles: The National Academies-GAO Panel, Cybersecurity technologies for critical infrastructure protection, 2003, Washington, DC; ISAT Working Group on Survivability of the Nation's Critical Infrastructure, 1995; Member: Strategic Advisory Board Member, Centre for Strategic Cyberspace + Security Science (2012-), Associated Editor, ACM Computing Classification System (2010); Cap Gemini Cloud Computing Visionary” interview featured in corporate and annual report (2009-2010) Editorial

Activities: Editorial Board: PeerJ CS Journal (2014-2016), Advisory Board, Software Practice and Experience (2002-2014), Wiley; Advisory Board, Kluwer Academic Publishers - International Journal on Network Computing (2002); Editorial Advisory Board, Wiley Press - Cluster Computing (2000- present); Advisory Board, Cluster Computing (1998-present); Editor-in-Chief, Association of Computing Machinery - Transactions on Computer Systems (1993-1998); Associate Editor, Association of Computing Machinery - Transactions on Computer Systems (1988-1993); Editor, IEEE Transactions on Parallel and Distributed Computing (1992-1993); ACM; Advisory Board for The Journal of High Performance Distributed Computing (Wiley) (1996-2004).

Reviewer: National Science Foundation; European Research Foundation, Swiss National Research Council, ESPRIT, Norwegian Research Council, Israeli Research Foundation, Canadian Research Foundation.

Conference PCs: (partial list): NSDI 2026, Eurosys 2026, OSDI 2025, ASPLOS 2024, Eurosys 2024, ApPLIED 2023, NSDI 2023, OSDI 2023, OSDI 2022, ICDCS 2022, Middleware 2021, USENIX ATC 2020, ACM SOCC 2019, ApPLIED 2019, USENIX ATC 2019, ICDCS 2018, DSN 2018, SOCC 2017, ICDCS 2016, DSN 2016, PSCC 2016, OOPSLA 2015, DSN 2015, ICDCS 2015. Program committee chair, ACM Workshop on Timely Results in Operating Systems (TRIOS 2014, at OSDI 2014). Program Committee for the Cloud Computing and Data-Center Systems track of the 33rd IEEE International Conference on Distributed Computing Systems (ICDCS 2013), Middleware '13 PC, ECOOP '13 PC, Program Committee Member, ICAC 2012, ICP2P 2012, ECOOP 2013, ICDCS 2012, " Distributed OS and Middleware", Middleware (2011), LADIS (2011) ACM (SOCC 2011), First ACM Symposium on Cloud Computing (SOCC 2010), Workshop on Large Scale Distributed Computing (LADIS 2008), International Conference on Web Services (ICWS 2007), Program Committee co-chair; International Conference on Distributed Computing Systems (ICDCS-2007), International Conference on Autonomic Computing (ICAC 2007), Network Systems Design and Implementation (NSDI 2008), 20th Symposium on Operating Systems (SOSP-05), Program Committee Chair; 2003 ACM Symposium on Operating Systems Principals (SOSP-03); International Workshop on Future Directions in Distributed Computing (FuDiCo 2002); ICDCS 2001 (International Conference on Distributed Computing Systems); NGC 2000 (Networked Group Communications); ISCIS'99, Ege University, Izmir, Turkey; TINA '99; TINA '96 (The Convergence of Telecommunications and Distributed Systems Technologies) (Program Committee co-chair); HPDC-3 (Conference), FTPDS-9 (Conference), Real-Time Systems Symposium; Software Track; Third International Symposium on High Performance Distributed Computing (HPDC-3); 12th Symposium on Reliable Distributed Systems, to be held October 6-8, 1993; ACM Principles of Distributed Computing, 1993; Cornell Faculty Fellows in Service; Symposium on Reliable Distributed Systems (SRDS-10); Fault Tolerant Computing Systems (FTCS 21); First IEEE Workshop on Replicated Data; IEEE-Purdue Workshop on Design Principles for Experimental Distributed Computing Systems; Sixth Symposium on Reliability in Distributed Systems and Database Systems; Tenth Symposium on Reliable Distributed Systems; First and Second IEEE SIGCOMM Workshop on Workstation Operating Systems; Workshop on Replicated Data Management; General Chair, Fingerlakes '89: An Advanced Course on Distributed Systems; Tenth Symposium on Reliable Distributed Systems, 9/30-10/2/1991, Palazzo Dei Congressi, Pisa, Italy; First and Second IEEE Workshops on Workstation Operating Systems; Workshop on the Management of Replicated Data; Unix International Vision 2000 Steering Committee; Chairman, Unix International High Availability Systems Working Group; Chairman, OSF 1/AD Working Group on High Availability and group services; The 12th Symposium on Reliable Distributed Systems; 14th IEEE Real-Time Systems Symposium, Raleigh-Durham, NC; Workshop on Grand Challenge Applications

and Software Technologies and the Joint Agency HPCC Conference on Grand Challenges for High Performance Computing, Pittsburgh, PA.

Other Professional Activities: IEEE Fellow selection committee (2016-), IEEE Carter Award selection committee (2016-2017), IEEE Fellows selection committee (2015-2017), External advisory panel for Computer Science area review: IST Vienna Austria, April 2013. Academic Evaluation Committee of the Institute of Science and Technology of Austria (2013), Advisory Board of the Scottish National Science Foundation (2010-), Advisor to the CIO and XC of the Air Force, Research studies for the Air Force Research Labs (various), Advisory Board of the Department of Computer Engineering, Ecole Polytechnique Federal de Lausanne, Switzerland (2001-2005); Software architecture consultant to French Air Traffic Control Agency (STNA) 1992-1998, New York Stock Exchange (1991-1993), Swiss Exchange (1993-1996), Hiper-D (prototype of next generation Naval AEGIS system, Motorola Iridium System (1992-1993). Highly Assured Computing Workshop, 1995; Unix International Academic Advisory Panel on Kernel Architectures, 1992; Institutional Infrastructure Grants, 1991; National Science Foundation Review Panel for Research Initiation Awards, 1989; Unix International Technical Advisory Board (1989-1990); Technical Advisory Group of the Center for Computer Applications and Software Engineering, Syracuse University; Kernel Architecture Work Group, Unix International.