Kenneth P. Birman

Cornell University
Computer Science Department
435 Gates Hall
Ithaca, NY 14853

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, Cornell University Research in trusted distributed computing, fault tolerance, security, scalability.
2001-2009	Founder and Senior Partner, Web Sciences LLC, Ithaca, NY
1997-2000	President and CEO, Reliable Network Solutions, Inc., Ithaca, NY
1993-1996	Chief Scientist and Vice President, Stratus Computer (Isis Division)
1988-1993	President and CEO, ISIS Distributed Systems Inc., Ithaca, New York
1988-1994	Associate Professor, Computer Science Department, Cornell University
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

IEEE Technical Committee on Distributed Processing Outstanding Achievement Award: 2009

Cisco "Technology Visionary" award: 2007

Stephen and Marilyn Miles Excellence in Teaching Award: 2000

ACM SIGOPS Hall of Fame Award (with T. Joseph), 2013. Recognized for "Exploiting Virtual Synchrony in Distributed Systems. 11th SOSP, Dec 1987.

Invited Lectures

Enabling the Intelligent IoT Edge. The 2022 IEEE 12th Annual Computing and Communication Conference (Keynote), Jan 28, 2022; Toronto Machine Learning Symposium panel on Cyber Physical Systems and Mobile Security, Nov 16 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, Akraino 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!.

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

SOSP History Day: *Reflections on the History of Operating Systems Research in Fault Tolerance.* ACM 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, Ber Shevit, 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.

The Horus System: 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. Los Alamos National Laboratory, Albuquerque, New Mexico, July 13, 1992. Houston, Texas, November 1990. Bologna, Italy, May 3, 1990.

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.

Transparent fault tolerant computer system. United States Patent 5,802,265, September 1, 1998. 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-)

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

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 *(finalized May 1998)*	Bradford Glade	A Scalable Architecture for Reliable Publish/Subscribe Communication in Distributed Systems
May 1995	Michael Kalantar	The Performance and Scalability Characteristics of Multicast Protocols
Aug 1995	David Cooper	Private Communications for Mobile Computing
Aug 1996	David Karr	Specification, Composition and Automated Verification of Layered Communication Protocols
Jan 1998	Mark Hayden	The Ensemble System
May 1998	Katie Guo	Scalable Group Communication Protocols
May 1998	Alexey Vaysburd	The Maestro Toolkit
Jan 2001	Zhen Xiao	Efficient Error Recovery For Reliable Multicast
May 2004	Tibor Janosi	Automated Stock Brokerage Architecture
July 2004	Ken Hopkinson	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
current	Theodoros Gkountouvas	GridCloud: Scalable Platform for Smart Grid Applications
current	Edward Tremel	Privacy-Preserving Data Mining
current	Sagar Jha	Integrating RDMA into Data Replication Tools

Books

1. *Guide to Reliable Distributed Systems: Building High-Assurance Applications and Cloud-Hosted Services (Texts in Computer Science).* Kenneth P. Birman. Springer. 2012.
2. *Reliable Distributed Systems: Technologies, Web Services, and Applications.* Kenneth P. Birman. Springer. 2010.
3. *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.
4. *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.
5. 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.
4. 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.
5. 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.
6. 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
7. 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.
8. 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.
9. 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.
10. 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.
11. 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
12. 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.

13. 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.

14. 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.

15. Program Committee Overload in Systems. Ken Birman and Fred B. Schneider. Comm. of the ACM, Volume 52, No. 5, pp 34-37.Febrary 2009.

16. 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.

17. 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.

18. 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.

19. 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.

20. The Untrustworthy Services Revolution. Ken Birman. IEEE Computer (ISSN 0018-9162). Volume 39, No .2, pp. 98-100. February 2006.

21. 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.

22. 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.

23. Can Web Services Scale Up? Ken Birman. IEEE Computer. Volume 38, Number 10, pp 107-110. October 2005

24. 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.

25. Reliable Distributed Systems Technologies, Web Services, and Applications. Ken Birman, 2005, 668 p. 145 illus., Springer Verlag. Hardcover ISBN: 0-387-21509-3.

26. 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.

27. 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.

28. 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.

29. 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

30. 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

31. The League of SuperNets, Ken Birman, IEEE Internet Computing, vol. 7, no.5, 2003, pp.92-96

32. 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

33. 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.

34. 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.

35. 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.

36. The Architecture and Performance of the Security Protocols in the Ensemble Group Communication System. Ohad R odeh, Ken Birman, Danny Dolev. ACM Transactions on Information Systems and Security (TISSEC).

37. 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.

38. Next Generation Internet: Unsafe at Any Speed? IEEE Computer, Special Issue on Infrastructure Protection, Vol. 33, No 8, pp54-88. August 2000.

39. 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.)

40. 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)

41. Bimodal Multicast. ACM Transactions on Computer Systems, Vol. 17, No. 2, pp 41-88, May, 1999. Kenneth P. Birman, Mark Hayden, Oznur Ozkasap, Zhen Xiao, Mihai Budiu and Yaron Minsky.

42. A Review of Experiences with Reliable Multicast. K. P. Birman. Software Practice and Experience 29(9), pp 741-774. July 1999.

43. Virtual Synchrony. The Encyclopedia of Distributed Computing. Joseph Urban and Partha Dasgupta, eds. Kluwer Academic Publishers, K. Birman.

44. Middleware Support for Distributed Multimedia and Collaborative Computing. Software: Practice and Experience, July, 1999. Kenneth P. Birman, Roy Friedman, Mark Hayden and Injong Rhee.

45. 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.

46. 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.

47. Building Secure and Reliable Network Applications. (book) Manning Publications and Prentice Hall. Dec 1996. Ken Birman.

48. Software for Reliable Networks. Scientific American, May 1996, 274(5): 64-69. K. Birman and R. van Renesse.

49. Horus: A Flexible Group Communications System. Communications of the ACM. 39(4): 76-83. Apr 1996. R. van Renesse, S. Maffeis, and K. Birman.

50. 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.

51. Theory and Practice in Distributed Systems. (book) K. Birman, F. Mattern and A. Schiper, eds. Springer Verlag LNCS, Jul 1995 938. Jul 1995.
52. Reliability Through Consistency. IEEE Software (Special Issue on Safety and Reliability), May 1995. With Bradford Glade.
53. 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.
54. A Response to Cheriton and Skeen's Criticism of Causal and Totally Ordered Communication. Operating Systems Review, Jan 1994, 28(1).
55. Fault-Tolerant Programming using Process Groups. Distributed Open Systems, R. van Renesse and K. Birman. Jan 1994, 96-112.
56. Reliable Distributed Computing with the Isis Toolkit (book) IEEE Computer Society Press, 1994, Los Alamitos, Ca. K. Birman and R. van Renesse, eds.
57. 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.
58. How to Securely Replicate Services. M. Reiter and K. Birman. ACM Transactions on Programming Languages and Systems. 16(3): 986-1009. May 1994.
59. Integrating Runtime Consistency Models for Distributed Systems. Journal of Parallel and Distributed Systems, Nov 1994, 23:158-176. Kenneth Birman.
60. The Process Group Approach to Reliable Distributed Computing. Communications of the ACM, Dec 1993, 36(12): 37-53. Kenneth Birman.
61. Lightweight Causal and Atomic Group Multicast. ACM Transactions on Computer Systems, Aug 1991, (3): 272-314. K. Birman, A. Schiper and P. Stephenson.
62. Tools for Distributed Application Management. IEEE Computer, Aug. 1991, 24(8): 42-51. K. Marzullo, M. Wood, K. Birman and R. Cooper.
63. The ISIS Project: Real Experience with a Fault Tolerant Programming System Operating Systems Review. Ken Birman and R. Cooper. pp 103-107. April 1991.
64. Communication Support for Reliable Distributed Computing Lecture Notes in Computer Science (1990), 124-137, (with T. Joseph)
65. Reliable communication in presence of failures. Kenneth P. Birman, Thomas A. Joseph. ACM Transactions on Computer Systems, Vol. 5, No. 1, Feb. 1987
66. The Relationship Between Signal Representation and Learning in ECG Analysis. Ph.D. Thesis, University of California, Berkeley, June 1981.

Conference Papers

1. DerechoDDS: Strongly Consistent Data Distribution for Mission-Critical Applications. Lorenzo Rosa, Weijia Song, Luca Foschini, Antonio Corradi, Ken Birman. IEEE MILCOM, Nov. 2021 (San Diego, CA).
2. DerechoDDS: Efficiently leveraging RDMA for fast and consistent data distribution. Lorenzo Rosa, Sagar Jha, Ken Birman. 6th International Workshop on Critical Automotive Applications: Robustness & Safety (CARS 2021), Munich Germany, Sept. 2021.
3. Reliable, Efficient Recovery for Complex Systems with Replicated Subsystems. Edward Tremel, Sagar Jha, Weijia Song, David Chu, Ken Birman. IEEE DSN 2020.
4. Cloud-based Data Exchange Infrastructure for Wide Area Monitoring of Bulk Electric Power Grids. D. Anderson, S. Sahasrabuddhe, A. Bose, C. Hauser, T. Gkountouvas, W. Song, Y. Liao, K. Birman, E. Litvinov, X. Luo, F. Zhang, A. Darvishi, G. Stefopoulos, A. Ettlinger. Council on Large Electric Systems (CIGRE), Paris, France, pp 1-10, August 26 - 31, 2018.
5. RDMC: A Reliable Multicast for Large Objects. Jonathan Behrens, Sagar Jha, Ken Birman, Edward Tremel. IEEE DSN '18, Luxembourg, June 2018.
6. The Freeze-Frame File System. Weijia Song, Theo Gkountouvas, Ken Birman, Qi Chen, and Zhen Xiao. Seventh ACM Symposium on Cloud Computing (SoCC '16), Marcos K. Aguilera, Brian Cooper, and Yanlei Diao (Eds.). ACM, New York, NY, USA, 307-320. Nov. 2016.
7. A Cloud-Hosted Synchrophasor Data Sharing Platform. Eugene Litvinov, Xiaochuan Luo, Qiang Zhang, Ken Birman, Theodoros Gkountouvas, Dave Anderson, Carl Hauser, Anjan Bose.

March 2017. Chapter in Power System Grid Operation Using Synchrophasor Technology, Springer-Verlag. Expected publication date: March 2018.

8.   Treating Software-Defined Networks Like Disk Arrays. Z Teo, Ken Birman, Robbert van Renesse. 2nd IEEE International Conference on Network Software and Virtualization (Netsoft 2016). Seoul, June 2016.

9.   Anonymous Data Collection for the Smart Grid. Edward Tremel, Ken Birman, Márk Jelasity, and Robert Kleinberg. In 2016 IEEE Power and Energy Society General Meeting, Boston, MA, July 2016.

10. Experience with 3 SDN Controllers in an Enterprise Setting. Zhiyuan Teo, Ken Birman, Robbert Van Renesse. IEEE DSN Workshop on Dependability Issues in SDN and IFV (DISN), June 28, 2016.

11. Reflections on the History of Operating Systems Research in Fault Tolerance. Ken Birman. Essay accompanying ACM History Day talk, Monterey CA, November 2015. In SOSP History Day 2015 (SOSP '15).

12. Cache Serializability: Reducing Inconsistency in Edge Transactions. Ittay Eyal; Ken Birman; Robbert van Renesse, "Cache Serializability: Reducing Inconsistency in Edge Transactions," Intl. Conference on Distributed Computing Systems (ICDCS), IEEE 35th International Conference on, June 29 2015–July 2 2015.

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51. Design Alternatives for Process Group Membership and Multicast. Ken Birman, Robert Cooper and Barry Gleeson. (TR91-1257).

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63. Causally Consistent Recovery of Partially Replicated Logs. Kenneth P. Kane and Kenneth P. Birman. (TR88-949).

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66. Exploiting Virtual Synchrony in Distributed Systems. Kenneth P. Birman and Thomas A. Joseph. (TR87-811).
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68. Communication Support for Reliable Distributed Computing. Kenneth P. Birman and Thomas A. Joseph. (TR86-753)
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70. Reliable Communication in the Presence of Failures. Kenneth P. Birman and Thomas A. Joseph. (TR85-694).
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72. 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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74. ISIS: An Environment for Constructing Fault-Tolerant Distributed Systems. (TR 83-552) (with D. Skeen, A. El Abbadi, W. C. Dietrich and T. Raeuchle).
75. 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. |

Advisor to French Civil Aviation Organization, DGAC (Damien Figarol, Director): 4-Flight Platform. (2013-); ISO-NE, ISO-NY and NYPA (Eugene Litvinov, CIO): Designing a cloud-hosted infrastructure to manage the Northeastern Electric Power Grid. (2013-); 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. (200-); Security and Reliability risks to the Financial Sector (2002-2008).Area leader for Secure Information Management Software Tools, NSF TRUST Science and Technology Center: Advisor on Enterprise Integration Strategy, Air Force CIO's Office (2005); Chief Scientist for Air-Force TRUST-GNC program (2005-); Advisor to NATO Exploratory Team on Complex Behavior of Adaptive Systems, 2004; Advisory panel to the US Treasury on Technology for Critical Infrastructure Protection (2005); 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: European Research Foundation, National Science Foundation; ESPRIT, Norwegian Research Council, Israeli Research Foundation, Canadian Research Foundation.

Program Committees (partial list): -Program committee member: 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.

University   Engineering Academic Integrity Committee (2020 -), Chair for PhD admissions (2013-2014, 2021)

Activities   Cornell Faculty Senate (2015-), Member of the University Diversity Advisory Board (2012-2019), Engineering Policy Committee (2016 – 2020); chair in 2018-), Director of the MEng Program (2011 – 2012), Advisor and Liaison to the Office of Faculty Development and Diversity, College of Computer and Information Science. Chairman, Computing and Information Sciences Building Committee (2004-); Engineering College Facilities Strategic Planning Committee (2003); College of Engineering Facilities Task Force (2003); Cornell Research Foundation Long Range Planning Committee (2001- 2002); Chairman, University Subcommittee on Responsible Conduct of Research (2001-2002); Director of Computer Science Graduate Field (1997-2000); University conflicts committee (1998- 2004); CRF President Search Committee (1998-1999); Faculty Leadership Series (1995-1998); Engineering College Policy Committee (1992-2001) (Chairman during 1993-1995); Director of Computer Science M.Eng program (1993-1995); Theory Center Executive Committee (1994-1997); Software Property Rights Policy Committee; Center for Theory and Simulation in Science and Engineering, Cornell; Faculty Council of Representatives; Cornell Applied Mathematics Institute; Computer Science Department; Academic Leadership Series Program (1994); Undergraduate Program Committee (1987-89); Computer Science Department Undergraduate Research (REU) Program.