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Education

Stanford University, Stanford, California.
Ph.D., Computer Science.
September 1987 – August 1991.
Advisor: Jeffrey D. Ullman.

University of Melbourne, Melbourne, Australia.
B.Sc. (honors), Mathematics and Computer Science.
March 1983 – December, 1986.

Employment

Professor, Columbia University.	July 2005 - present
Associate Professor, Columbia University.	July 1996 - June 2005
Assistant Professor, Columbia University.	August 1991 - June 1996
Research Assistant and Teaching Assistant, Stanford University.	Sept 1987 - August 1991
Summer Intern, IBM T.J. Watson Research Laboratory, Hawthorne, NY.	June - Sept 1990
Teaching Assistant, Melbourne University.	1986, July - August 1988
Experimental Scientist, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia.	Feb - August 1987

Honors

NSF Young Investigator Award, 1994.
Sloan Foundation Fellowship, 1994.
Packard Foundation Fellowship, 1993.
NSF Research Initiation Award, 1992.
IBM Graduate Fellowship, 1990.
Melbourne University Pure Mathematics Prize, 1983 & 1984.
Represented Australia at the International Mathematical Olympiad, 1981 & 1982.

Publications

Journal publications indicated with a *.

Journal Publications and Refereed Conference Publications

1. “Permutation Index: Exploiting Data Skew for Improved Query Performance,” W. Zhang, K. A. Ross, *Proceedings of the 36th IEEE International Conference on Data Engineering (ICDE)*, April 2020.
2. “Towards Practical Vectorized Analytical Query Engines,” O. Polychroniou, K. A. Ross, *Proceedings of the 13th Workshop on Data Management on New Hardware*, June 2019.
3. “Master of None Acceleration: A Comparison of Accelerator Architectures for Analytical Query Processing,” A. Lottarini, J. P. Cerqueira, T. J. Repetti, S. A. Edwards, K. A. Ross, M. Seok, M. A. Kim *Proceedings of the 46th International Symposium on Computer Architecture (ISCA)*, June 2019.
4. * “Distributed Joins and Data Placement for Minimal Network Traffic,” O. Polychroniou, W. Zhang, K. A. Ross, in **ACM Transactions on Database Systems**, 43(3), pages 14:1–14:45, November 2018.
5. “Network Synthesis for Database Processing Units,” A. Lottarini, M. A. Kim, S. A. Edwards, K. A. Ross, in *Proceedings of the Design Automation Conference (DAC)* 2017.

6. “Deadlock-Free Joins in DB-Mesh, an Asynchronous Systolic Array Accelerator,” B. Cao, K. A. Ross, S. A. Edwards, M. A. Kim, *Proceedings of the 11th Workshop on Data Management on New Hardware*, 2017.
7. “Massively-Parallel Lossless Data Decompression,” E. A. Sitaridi, R. Miller, T. Kaldewey, G. M. Lohman, K. A. Ross, *International Conference on Parallel Processing* 2016: 242-247.
8. “SIMD-accelerated regular expression matching,” E. A. Sitaridi, O. Polychroniou, K. A. Ross, in *Proceedings of the 10th Workshop on Data Management on New Hardware*, 2016.
9. * “Exploiting SSDs in Operational Multiversion Databases,” M. Sadoghi, K. A. Ross, M. Canim, B. Bhattacharjee, **VLDB Journal** 25(5): 651-672 (2016)
10. * “GPU-Accelerated String Matching for Database Applications,” E. Sitaridi and K. A. Ross, **VLDB Journal** 25(5): 719-740 (2016)
11. “A Course on Programming and Problem Solving,” S. Sheth, C. Murphy, K. A. Ross, D. Shasha, in *Proceedings of the ACM SIGCSE Conference*, 2016.
12. “Implementing Latency-Insensitive Dataflow Blocks,” B. Cao, K. A. Ross, M. A. Kim, S. A. Edwards, in *MEM-OCODE*, 2015.
13. “Efficient Lightweight Compression Alongside Fast Scans,” O. Polychroniou, K. A. Ross, in *Proceedings of the 9th Workshop on Data Management on New Hardware*, 2015.
14. * “The Q100 Database Processing Unit,” L. Wu, A. Lottarini, T. K. Paine, M. A. Kim, K. A. Ross. **IEEE Micro** 35(3):34–46, 2015.
15. “Rethinking SIMD Vectorization for In-Memory Databases,” O. Polychroniou, A. Raghavan, K. A. Ross in *Proceedings of the ACM SIGMOD Conference on Management of Data*, 2015.
16. * “Hardware Partitioning for Big Data Analytics,” L. Wu, R. J. Barker, M. A. Kim, K. A. Ross. **IEEE Micro** 34(3):109–119, 2014.
17. * “Reducing Database Locking Contention Through Multi-version Concurrency,” M. Sadoghi, M. Canim, B. Bhattacharjee, F. Nagel, K. A. Ross in *Proceedings of the 39th International Conference on Very Large Databases (VLDB)*, September 2014, [PVLDB 7(13):1331–1342].
18. * “Energy Analysis of Hardware and Software Range Partitioning,” L. Wu, O. Polychroniou, R. J. Barker, M. A. Kim, K. A. Ross. *ACM Transactions on Computer Systems (TOCS)* 32(3):8, 2014.
19. “Vectorized Bloom filters for advanced SIMD processors,” O. Polychroniou, K. A. Ross, in *Proceedings of the 8th Workshop on Data Management on New Hardware*, 2014.
20. “A comprehensive study of main-memory partitioning and its application to large-scale comparison- and radix-sort,” O. Polychroniou, K. A. Ross in *Proceedings of the ACM SIGMOD Conference on Management of Data*, 2014.
21. “Track join: distributed joins with minimal network traffic,” O. Polychroniou, R. Sen, K. A. Ross in *Proceedings of the ACM SIGMOD Conference on Management of Data*, 2014.
22. * “Multicore Processors and Database Systems: The Multicore Transformation,” K. A. Ross. *ACM Ubiquity*, August 2014.
23. * “Coherent Somatic Mutation in Autoimmune Disease,” K. A. Ross, *PLoS One* 9(7), July 2014.
24. “Q100: The Architecture and Design of a Database Processing Unit,” L. Wu, A. Lottarini, T. K. Paine, M. A. Kim, K. A. Ross, in *Proceedings of the 19th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, March 2014.
25. * “Making Updates Disk-I/O Friendly Using SSDs,” M. Sadoghi, K. A. Ross, M. Canim, B. Bhattacharjee, in *Proceedings of the 39th International Conference on Very Large Databases (VLDB)*, September 2013. [PVLDB 6(11):997–1008.]

26. “Navigating Big Data with High-Throughput, Energy-Efficient Data Partitioning,” L. Wu, R. J. Barker, M. A. Kim, K. A. Ross. *Proceedings of the 40th International Symposium on Computer Architecture (ISCA)*, June 2013.
27. “Optimizing Select Conditions on GPUs,” E. Sitaridi, K. A. Ross. *Proceedings of the 9th Workshop on Data Management on New Hardware*, June 2013.
28. “High Throughput Heavy Hitter Aggregation for Modern SIMD Processors,” O. Polychroniou, K. A. Ross. *Proceedings of the 9th Workshop on Data Management on New Hardware*, June 2013.
29. “Path Processing Using Solid State Storage,” M. Athanassoulis, B. Bhattacharjee, M. Canim, K. A. Ross, *Proceedings of the 3rd International Workshop on Accelerating Data Management Systems Using Modern Processor and Storage Architectures*, August 2012.
30. “Ameliorating Memory Contention of OLAP Operators on GPU Processors,” E. Sitaridi, K. A. Ross, *Proceedings of the 8th Workshop on Data Management on New Hardware*, May 2012. *Winner: Best Paper Award*.
31. “Column-Oriented Query Processing for Row Stores,” A. El-Helw, K. A. Ross, B. Bhattacharjee, C. Lang, G. Mihaila. *Proceedings of the 14th International Workshop on Data Warehousing and OLAP*, October 2011.
32. “Thread-Level Parallel Indexing of Update Intensive Moving-Object Workloads,” D. Sidlauskas, K. A. Ross, C. S. Jensen, S. Saltenis. *Proceedings of the 12th Symposium on Spatial and Temporal Databases*, August 2011.
33. “Scalable Aggregation on Multicore Processors,” Y. Ye, K. A. Ross, N. Vespapunt. *Proceedings of the 7th Workshop on Data Management on New Hardware*, June 2011.
34. “Enhancing Recovery Using an SSD Buffer Pool Extension,” B. Bhattacharjee, C. Lang, G. Mihaila, K. A. Ross, M. Banikazemi. *Proceedings of the 7th Workshop on Data Management on New Hardware*, June 2011.
35. * “Evidence for somatic gene conversion and deletion in bipolar disorder, Crohn’s disease, coronary artery disease, hypertension, rheumatoid arthritis, type-1 diabetes, and type-2 diabetes,” K. A. Ross, *BMC Medicine*, 9:12, February 2011.
36. * “Storage Class Memory Aware Data Management,” B. Bhattacharjee, M. Canim, C. Lang, G. Mihaila, K. A. Ross, *IEEE Data Engineering Bulletin*, 33(4), December 2010.
37. “SSD Bufferpool Extensions for Database Systems,” M. Canim, G. Mihaila, B. Bhattacharjee, K. A. Ross, C. Lang, in *Proceedings of the 36th International Conference on Very Large Databases (VLDB)*, September 2010.
38. “Buffered Bloom Filters on Solid State Storage,” M. Canim, G. Mihaila, B. Bhattacharjee, C. Lang, K. A. Ross, in *First International Workshop on Accelerating Data Management Systems Using Modern Processor and Storage Architectures*, September 2010.
39. “Automatic Contention Detection and Amelioration for Data-Intensive Operations,” J. Cieslewicz, K. A. Ross, K. Satsumi and Yang Ye in *Proceedings of the ACM SIGMOD Conference on Management of Data*, June 2010.
40. “Optimizing Read Convoys in Main Memory Query Processing,” K.A. Ross, in *Proceedings of the 6th Workshop on Data Management on New Hardware*, June 2010.
41. “Semantic Ranking and Result Visualization for Life Sciences Publications,” J. Stoyanovich, W. Mee, K. A. Ross, in *Proceedings of the IEEE International Conference on Data Engineering (ICDE)*, March 2010.
42. “Efficient Index Compression in DB2 LUW,” B. Bhattacharjee, L. Lim, T. Malkemus, G. Mihaila, K. A. Ross, S. Lau, C. McCarthur, Z. Toth, R. Sherkat, in *Proceedings of the 35th International Conference on Very Large Databases (VLDB)*, August 2009.

43. “An Object Placement Advisor for DB2 Using Solid State Storage,” M. Canim, B. Bhattacharjee, G. Mihaila, C. Lang, K. A. Ross, in *Proceedings of the 35th International Conference on Very Large Databases (VLDB)*, August 2009.
44. “Cache-Conscious Buffering for Database Operators with State,” J. Cieslewicz, W. Mee, and K.A. Ross, in *Proceedings of the 5th Workshop on Data Management on New Hardware*, June 2009.
45. “Optimal Splitters for Database Partitioning with Size Bounds.” K. A. Ross and J. Cieslewicz. *Proceedings of the ICDT Conference*, March 2009.
46. * “Evaluating Application Mapping Scenarios on the Cell/B.E..” A. L. Varbanescu, H. J. Sips, K. A. Ross, Q. Liu, A. Natsev, J. R. Smith, L. K. Liu. *Concurrency and Computation: Practice and Experience*, 21(1), January 2009.
47. “Modeling the Performance of Algorithms on Flash Memory Devices,” K.A. Ross, in *Proceedings of the 4th Workshop on Data Management on New Hardware*, June 2008.
48. “Data Partitioning on Chip Multiprocessors,” J. Cieslewicz and K.A. Ross, in *Proceedings of the 4th Workshop on Data Management on New Hardware*, June 2008.
49. * “Database Optimizations for Modern Hardware,” J. Cieslewicz and K. A. Ross. **Proceedings of the IEEE** 96(5), pages 863–878, May 2008.
50. “Schema Polynomials and Applications,” K. A. Ross and J. Stoyanovich, in *International Conference on Extending Database Technology (EDBT)*, March 2008.
51. “Adaptive Aggregation on Chip Multiprocessors,” J. Cieslewicz and K.A. Ross, in *Proceedings of the 33rd International Conference on Very Large Databases (VLDB)*, September 2007.
52. “An Effective Strategy for Porting C++ Applications on Cell,” A. L. Varbanescu, L. K. Liu , K. A. Ross, Q. Liu, A. Natsev, J. R. Smith and H. Sips, in *Proceedings of the International Conference on Parallel Processing*, September 2007.
53. “Digital Media Indexing on the Cell Processor,” L. K. Liu, Q. Liu, A. Natsev, K. A. Ross, J. R. Smith and A. Varbanescu, in *Proceedings of the IEEE International Conference on Multimedia and Expo (ICME)*, July 2007.
54. “Parallel Buffers for Chip Multiprocessors,” J. Cieslewicz, K.A. Ross, I. Giannakakis, in *Proceedings of the 3rd Workshop on Data Management on New Hardware*, June 2007.
55. * “A Faceted Query Engine Applied to Archeology,” K. A. Ross, A. Janevski and J. Stoyanovich, in *Internet Archeology* (21), 2007.
56. “Efficient Hash Probes on Modern Processors,” K. A. Ross, in *Proceedings of the IEEE International Conference on Data Engineering (ICDE)*, April 2007.
57. “Practical Preference Relations for Large Data Sets,” K. A. Ross, P. J. Stuckey and A. Marian in *Proceedings of the Workshop on Ranking in Databases (DBRank)*, April 2007.
58. “On the Adequacy of Partial Orders for Preference Composition,” K. A. Ross, in *Proceedings of the Workshop on Ranking in Databases (DBRank)*, April 2007.
59. * “Partitioned Optimization of Complex Queries,” D. Chatziantoniou and K. A. Ross. **Information Systems** 32(2), pages 248–282, April 2007.
60. * “Finding Shapes in a Set of Points,” K. A. Ross, D. Vespe, D. Hessian, and P. Jain. **ACM Sigmod Record** 36(1), pages 7–12, March 2007.
61. * “Alpha Radiation is a Major Germ-Line Mutagen over Evolutionary Timescales,” K. A. Ross. **Evolutionary Ecology Research** 8(6), pages 1013–1028, 2006.
62. “Realizing Parallelism in Database Operations: Insights from a Massively Multithreaded Architecture,” J. Cieslewicz, J. Berry, B. Hendrickson and K. A. Ross, in *Proceedings of the Workshop on Data Management on New Hardware*, June 2006. (Winner: best paper award.)

63. * “Academic Dishonesty and the Internet,” K. A. Ross, *Communications of the ACM*, 48(10), pages 29–31, October 2005.
64. “Improving Database Performance on Simultaneous Multithreading Processors,” J. Zhou, J. Cieslewicz, K. A. Ross and M. Shah, in *Proceedings of the 31st International Conference on Very Large Databases (VLDB)*, pages 49–60, August 2005.
65. “Querying Faceted Databases,” K. A. Ross and A. Janevski, in *Semantic Web and Databases (SWDB)*, August 2004.
66. “Symmetric Relations and Cardinality Bounded Multisets in Database Systems,” K. A. Ross and J. Stoyanovich, in *Proceedings of the 30th International Conference on Very Large Databases (VLDB)*, August 2004.
67. “Buffering Database Operations for Enhanced Instruction Cache Performance,” J. Zhou and K. A. Ross, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, June 2004.
68. * “Selection Conditions in Main Memory,” K. A. Ross, in **ACM Transactions on Database Systems**, 29(1), pages 132–161, March 2004.
69. “Buffering Accesses to Memory-Resident Index Structures,” J. Zhou and K. A. Ross, in *Proceedings of the 29th International Conference on Very Large Databases (VLDB)*, September 2003.
70. “A Multi-resolution Block Storage Model for Database Design,” J. Zhou and K. A. Ross, in *Proceedings of the International Database Engineering and Applications Symposium*, July 2003.
71. “Conjunctive Selection Conditions in Main Memory,” K. A. Ross, in *Proceedings of the ACM Symposium on Principles of Database Systems (PODS)*, June 2002.
72. “Implementing Database Operations Using SIMD Instructions,” J. Zhou and K. A. Ross, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, June 2002.
73. “Cost-Based Unbalanced R-Trees,” K. A. Ross, I. Sitzmann, P. J. Stuckey, *Proceedings of the 2001 SSDBM Conference*, July 2001.
74. * “Adapting Materialized Views After Redefinitions: Techniques and a Performance Study,” A. Gupta, I. S. Mumick, J. Rao, K. A. Ross, **Information Systems**, Special Issue on Data Warehousing, Volume 26, Number 5, July 2001, pages 323–362.
75. “Filtering Algorithms and Implementation for Very Fast Publish/Subscribe,” F. Fabret, H. A. Jacobsen, F. Llirbat, J. Pereira, K. A. Ross, D. Shasha, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, May 2001.
76. * “Independence Diagrams: A Technique for Data Visualization,” S. Berchtold, H. V. Jagadish, K. A. Ross, **Journal of Electronic Imaging**, Volume 9, Issue 4, October 2000, pages 375–384.
77. “Optimizing Selections over Datacubes,” K. A. Ross and K. A. Zaman, *Proceedings of the 2000 SSDBM Conference*, July 2000.
78. “Serving Datacube Tuples from Main Memory,” K. A. Ross and K. A. Zaman, *Proceedings of the 2000 SSDBM Conference*, July 2000.
79. “Making B+-Trees Cache-Conscious in Main Memory,” J. Rao and K. A. Ross, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, May 2000.
80. “Cache Conscious Indexing for Decision-Support in Main Memory,” J. Rao and K. A. Ross, *Proceedings of the 25th International Conference on Very Large Databases (VLDB)*, September 1999.
81. * “Fast Joins Using Join Indices”, Z. Li and K. A. Ross. **VLDB Journal**, Volume 8, Number 1, 1999, pages 1–24.
82. * “Faster Joins, Self-Joins and Multi-Way Joins using Join Indices,” H. Lei and K. A. Ross. **Data and Knowledge Engineering**, Volume 28, 1998, pages 277–298.
83. “Independence Diagrams: A Technique for Visual Data Mining,” S. Berchtold, H. V. Jagadish, and K. A. Ross, in *International Conference on Knowledge Discovery and Data Mining (KDD)*, August 1998.

84. "Reusing Invariants: A New Strategy for Correlated Queries," J. Rao and K. A. Ross, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, June 1998.
85. "Complex Aggregation at Multiple Granularities," K. A. Ross, D. Srivastava, and D. Chatziantoniou, in *International Conference on Extending Database Technology (EDBT)*, March 1998.
86. * "Foundations of Aggregation Constraints," K. A. Ross, D. Srivastava, P. J. Stuckey and S. Sudarshan, **Theoretical Computer Science B** Volume 193, Number 1–2, February 1998, pages 149–179.
87. "Attribute-Oriented View Definitions in Relational and Deductive Databases," I. S. Mumick and K. A. Ross, in *Proceedings of the International Conference on Deductive and Object Oriented Databases*, December, 1997.
88. "Groupwise Processing of Relational Queries," D. Chatziantoniou and K. A. Ross, *Proceedings of the 23rd International Conference on Very Large Databases (VLDB)*, August 1997.
89. "Fast Computation of Sparse Datacubes," K. A. Ross and D. Srivastava, *Proceedings of the 23rd International Conference on Very Large Databases (VLDB)*, August 1997.
90. "Implementing Incremental View Maintenance in Nested Data Models," A. Kawaguchi, D. Lieuwen, I. S. Mumick and K. A. Ross, *International Workshop on Database Programming languages*, August, 1997.
91. "Faster Joins, Self-Joins and Multi-Way Joins using Join Indices," H. Lei and K. A. Ross, *International Workshop on Next Generation Information Technologies and Systems*, June 1997.
92. "Supporting Multiple View Maintenance Policies", L. Colby, A. Kawaguchi, D. Lieuwen, I. S. Mumick, and K. A. Ross, *Proceedings of the ACM SIGMOD Conference on Management of Data*, May, 1997.
93. * "Monotonic Aggregation in Deductive Databases," K. A. Ross and Y. Sagiv. **Journal of Computer and System Sciences**, Volume 54, Number 1, February 1997, pages 79–97.
94. "Concurrency Control Theory for Deferred Materialized Views", A. Kawaguchi, D. Lieuwen, I. S. Mumick, D. Quass and K. A. Ross, *International Conference on Database Theory (ICDT)*, January 1997.
95. "Querying Multiple Features of Groups in Relational Databases", D. Chatziantoniou and K. A. Ross, *Proceedings of the 22nd International Conference on Very Large Databases (VLDB)*, September 1996.
96. "Materialized View Maintenance and Integrity Constraint Checking: Trading Space for Time," K. A. Ross, D. Srivastava and S. Sudarshan, *Proceedings of the 1996 ACM SIGMOD Conference*, June 1996.
97. * "Tail Recursion Elimination in Deductive Databases," K. A. Ross, in **ACM Transactions on Database Systems**, Volume 21, Number 2, June 1996, pages 208–237.
98. "Efficiently Following Object References for Large Object Collections and Small Main Memory," K. A. Ross, *Proceedings of the Fourth International Conference on Deductive and Object-Oriented Databases*, December, 1995.
99. "PERF Join: An Alternative To Semijoin and Bloom Join," Z. Li and K. A. Ross, *Proceedings of the International Conference on Information and Knowledge Management*, November, 1995.
100. "Adapting Materialized Views After Redefinitions," A. Gupta, I. S. Mumick, K. A. Ross, *Proceedings of the ACM SIGMOD Conference*, May 1995.
101. "Structural Totality and Constraint Stratification," K. A. Ross, in *Proceedings of the Fourteenth ACM Symposium on Principles of Database Systems (PODS)*, May 1995.
102. "Efficient Incremental Evaluation of Queries with Aggregation," R. Ramakrishnan, K. A. Ross, D. Srivastava, and S. Sudarshan, *International Symposium on Logic Programming*, November 1994.
103. "A Syntactic Stratification Condition Using Constraints," K. A. Ross, *International Symposium on Logic Programming*, November 1994.
104. "Foundations of Aggregation Constraints," K. A. Ross, D. Srivastava, P. J. Stuckey and S. Sudarshan, *Workshop on Principles and Practice of Constraint Programming*, May 1994.

105. * “Modular Stratification and Magic Sets for Datalog Programs with Negation,” K. A. Ross, in **Journal of the Association for Computing Machinery**, Vol. 41, No. 6, pages 1216–1266, 1994.
106. * “On Negation in HiLog,” K. A. Ross, in **Journal of Logic Programming**, Vol. 18, No. 1, pages 27–54, 1994.
107. “Noodle: A Language for Declarative Querying in an Object-Oriented Database,” I. S. Mumick and K. A. Ross, *Proceedings of the Third International Conference on Deductive and Object-Oriented Databases*, December, 1993.
108. “Relations with Relation Names as Arguments: Algebra and Calculus,” K. A. Ross, in *Proceedings of the Eleventh ACM Symposium on Principles of Database Systems (PODS)*, pages 346–353, June 1992.
109. “Monotonic Aggregation in Deductive Databases,” K. A. Ross and Y. Sagiv, in *Proceedings of the Eleventh ACM Symposium on Principles of Database Systems (PODS)*, pages 114–126, June 1992.
110. * “A Procedural Semantics for Well-Founded Negation in Logic Programs,” K. A. Ross, in **Journal of Logic Programming.**, Vol. 13, No. 1, pages 1–22, 1992.
111. * “The Well-Founded Semantics for General Logic Programs,” A. Van Gelder, K. A. Ross and J. S. Schlipf, in **Journal of the Association for Computing Machinery**, Vol. 38, No. 3, pages 620–650, July 1991.
112. “Modular Acyclicity and Tail Recursion in Logic Programs,” K. A. Ross, in *Proceedings of the Tenth ACM Symposium on Principles of Database Systems (PODS)*, pages 92–101, May, 1991.
113. “On Negation in HiLog,” K. A. Ross, in *Proceedings of the Tenth ACM Symposium on Principles of Database Systems (PODS)*, pages 206–215, May, 1991.
114. “Glue-Nail: A Deductive Database System,” G. Phipps, M. A. Derr, and K. A. Ross, in *Proceedings of the ACM SIGMOD Conference on Management of Data*, pages 308–317, May, 1991.
115. * “Blending in the Ends of Chevron Stockpiles,” G. K. Robinson and K. A. Ross, in **Bulk Solids Handling**, Vol. 11, No. 3, pages 595–602, 1991.
116. “Modular Stratification and Magic Sets for Datalog Programs with Negation,” K. A. Ross, in *Proceedings of the Ninth ACM Symposium on Principles of Database Systems (PODS)*, pages 161–171, April, 1990.
117. “The Well-Founded Semantics for Disjunctive Logic Programs,” K. A. Ross in *Proceedings of the First International Conference on Deductive and Object Oriented Databases*, pages 385–402, December, 1989.
118. “A Procedural Semantics for Well-Founded Negation in Logic Programs,” K. A. Ross, in *Proceedings of the Eighth ACM Symposium on Principles of Database Systems (PODS)*, pages 22–33, March, 1989.
119. “Unfounded Sets and Well-Founded Semantics for General Logic Programs,” A. Van Gelder, K. A. Ross and J. S. Schlipf, in *Proceedings of the Seventh ACM Symposium on Principles of Database Systems(PODS)* , pages 221–230, March, 1988.
120. * “Inferring Negative Information From Disjunctive Databases,” K. A. Ross and R. W. Topor, in **Journal of Automated Reasoning**, Vol. 4, No. 2, pages 397–424, 1988.
121. * “Iteration of Some Discretizations of the Nonlinear Schrodinger Equation,” K. A. Ross and C. J. Thompson, in **Physica**, 135A, pages 551–558, 1986.
122. * “Chaotic Planar States of the Discrete Dynamical Anisotropic Heisenberg Spin Chain,” C. J. Thompson, K. A. Ross, B. J. P. Thompson and M. Lakshmanan, in **Physica**, 133A, pages 330–336, 1985.

Invited Papers and Book Chapters

123. “Preface to the Special Issue of Best Papers from VLDB 2008,” P. Buneman, V. Markl, B. C. Ooi and K. A. Ross, **VLDB Journal**, Vol. 19, No. 1, pages 1–2, January 2010.
124. “View Adaptation,” K. A. Ross. Entry in the *Encyclopedia of Database Systems*, Springer 2009. (Second edition, 2018.)

125. “Cache-Conscious Query Processing,” K. A. Ross. Entry in the *Encyclopedia of Database Systems*, Springer 2009. (Second edition, 2018.)
126. “Architecture-Conscious Database System,” J. Cieslewicz and K. A. Ross. Entry in the *Encyclopedia of Database Systems*, Springer 2009. (Second edition, 2018.)
127. “Architecture Sensitive Database Design: Examples from the Columbia Group,” K. A. Ross, J. Cieslewicz, J. Rao and J. Zhou. *IEEE Data Engineering Bulletin*, 28(2), June 2005.
128. “Preface to the Special Issue on Data Warehousing,” P. O’Neill and K. A. Ross, **Information Systems**, Vol. 26, No. 5, pages 321–322, July 2001.
129. “Database Research at Columbia University,” S. F. Chang, L. Gravano, G. E. Kaiser, K. A. Ross, and S. Stolfo, *ACM SIGMOD Record*, September 1998.
130. “The New Jersey Data Reduction Report,” D. Barbara, W. DuMouchel, C. Faloutsos, P. J. Haas, J. M. Hellerstein, Y. Ioannidis, H. V. Jagadish, T. Johnson, R. Ng, V. Poosala, K. A. Ross, and K. C. Sevcik, in *Bulletin of the Technical Committee on Data Engineering*, 20(4), pages 3-45, Dec 1997.
131. “Design and Implementation of the Sword Declarative Object-Oriented Database System,” I. S. Mumick, K. A. Ross and S. Sudarshan, *AT&T Database Day*, 1993.

Refereed Project Demonstrations

132. “SkylineSearch: Semantic Ranking and Result Visualization for PubMed,” J. Stoyanovich, M. Lodha, W. Mee, K. A. Ross. ACM SIGMOD Conference (demonstration program), June 2011.
133. “QueryScope: visualizing queries for repeatable database tuning,” L. Hu, K. A. Ross, Y. Chang, C. A. Lang, D. Zhang in *Proceedings of the International Conference on Very Large Databases (VLDB)*, pages 1488–1491, August 2008.
134. “A Faceted Query Engine Applied to Archeology,” K. A. Ross, A. Janevski, J. Stoyanovich, in *Proceedings of the International Conference on Very Large Databases (VLDB)*, pages 1334–1337, August 2005.
135. “Publish/Subscribe on the Web at Extreme Speed,” J. Pereira, F. Fabret, F. Llibat, R. Preotiuc-Pietro, K. A. Ross, D. Shasha, in *Proceedings of the International Conference on Very Large Databases (VLDB)*, pages 627–630, September 2000.

Theses

136. “The Semantics of Deductive Databases,” K. A. Ross, PhD Thesis. Stanford University Technical Report STAN-CS-91-1386, August 1991.

Workshop Publications (without published proceedings), and Technical Reports

137. “High Throughput Heavy Hitter Aggregation.” O. Polychroniou and K. A. Ross. *Columbia University Technical Report CUCS-009-12*, 2012.
138. “Hardware-Accelerated Range Partitioning.” L. Wu, R. J. Barker, M. A. Kim, K. A. Ross. *Columbia University Technical Report CUCS-014-12*, 2012.
139. “Partitioned Blockmap Indexes for Multidimensional Data Access.” K. A. Ross and E. Sitaridi. *Columbia University Technical Report CUCS-006-12*, 2012.
140. “Semantic Ranking and Result Visualization for Life Sciences Publications.” J. Stoyanovich, W. Mee, K. A. Ross. *Columbia University Technical Report CUCS-028-09*, 2009.
141. “ReoptSMART: A Learning Query Plan Cache.” J. Stoyanovich, K. A. Ross, J. Rao, W. Fan, V. Markl, G. Lohman. *Columbia University Technical Report CUCS-010-08*, 2008.
142. “Optimal Splitters for Database Partitioning with Size Bounds.” K. A. Ross and J. Cieslewicz. *Columbia University Technical Report CUCS-023-08*, 2008.
143. “Running Applications on Cell BE - a Performance Study.” A. L. Varbanescu, H. J. Sips, K. A. Ross, Q. Liu, A. Natsev, J. R. Smith, L. K. Liu. *Workshop on Compilers for Parallel Computers*, July 2007.

144. "Efficient Hash Probes on Modern Processors," K. A. Ross, *IBM Research Report RC24100*, November 2006.
145. "FlowPuter: A Cluster Architecture Unifying Switch, Server and Storage Processing." A. Aho, A. D. Keromytis, V. Misra, J. Nieh, K. A. Ross, Y. Yemini. *First International Workshop on Data Processing and Storage Networking: Towards Grid Computing*, May 2004.
146. "Digitally Modeling, Visualizing and Preserving Archaeological Sites." P. Allen, S. Feiner, L. Meskell, K. A. Ross, A. Troccoli, B. Smith, H. Benko, E. Ishak, J. Conlon. Poster at *JCDL 2004*.
147. "Querying Faceted Databases." K. A. Ross and A. Janevski. *Columbia University Technical Report CUCS-013-03*, 2003.
148. "A Portal for Access to Complex Distributed Information about Energy," J. L. Ambite, Y. Arens, W. Bourne, P. T. Davis, S. Feiner, E. H. Hovy, J. L. Klavans, A. Philpot, S. Popper, K. A. Ross, J. Shih, P. Sommer, S. Temiyabutr, and L. Zadoff, in *National Conference for Digital Government Research (dg.o)*, May 2002.
149. "Power-Pipelining for Enhanced Query Performance." J. Rao and K. A. Ross. *Columbia University Technical Report CUCS-007-00*, 2000.
150. "Programming and Problem Solving: A Transcript of the Spring 1999 Class." K. A. Ross and S. R. Shamoun. *Columbia University Technical Report CUCS-018-99*, 1999.
151. "Adapting Materialized Views After Redefinitions: Techniques and a Performance Study," A. Gupta, I. S. Mumick, J. Rao, K. A. Ross. *Columbia University Technical Report CUCS-010-97*, 1997.
152. "View Maintenance in Nested Data Models," A. Kawaguchi, D. Lieuwen, I. S. Mumick and K. A. Ross, in *SIGMOD Workshop on Materialized Views*, June, 1996.
153. "Constraint Stratification in Deductive Databases," K. A. Ross, *ICLP Workshop on Deductive Databases*, pages 101–116, June 1994.
154. "Better Semijoins Using Tuple Bit-Vectors," Z. Li and K. A. Ross, *Columbia University Technical Report CUCS-010-94*.
155. "On the Cost of Transitive Closures in Relational Databases," Z. Li and K. A. Ross, *Columbia University Technical Report CUCS-004-93*, April, 1993.
156. "An Architecture for Declarative Object-Oriented Databases," I. S. Mumick and K. A. Ross, in *Proceedings of the JILPS Workshop on Deductive Databases*, pages 21–30, November 1992.
157. "Monotonic Aggregation in Deductive Databases," K. A. Ross and Y. Sagiv, (preliminary version), in *Proceedings of the ILPS Workshop on Deductive Databases*, pages 53–61, October 1991.
158. "A Programming and Problem Solving Seminar," K. A. Ross and D. E. Knuth, Stanford University Technical Report STAN-CS-89-1269, July 1989.
159. "What Shape is a Chevron Stockpile?" G. K. Robinson and K. A. Ross, Technical Report Number VT88/14, 1988, CSIRO Division of Mathematics and Statistics.

Grant Awards

1. Unrestricted research gift, Oracle corporation. \$110,000, February 2020.
2. Unrestricted research gift, Oracle corporation. \$110,000, December 2018.
3. Alopecia Areata Center for Research Translation, NIH Center grant 1P50AR070588-01, \$7,857,501 from 9/16 to 8/21. PI: A. Christiano.
4. Unrestricted research gift, Oracle corporation. \$113,000, April 2016.
5. "IIS: Small: Database Algorithms for Modern CPU Memory Hierarchies," NSF regular grant IIS-1422488. \$499,998, from 9/14 to 8/18.
6. Unrestricted research gift, Oracle corporation. \$107,000, February 2014.
7. Unrestricted research gift, Oracle corporation. \$96,000, December 2012.

8. "Research and Education Activities at ACM SIGMOD/PODS 2013." NSF grant IIS-1246690, \$20,000 from 10/12 to 9/13. Grant to support student participation in the 2013 ACM SIGMOD/PODS Conference in New York City.
9. "IIS: Small: Database processing on GPUs," NSF regular grant IIS-1218222. \$499,996, from 9/12 to 8/15.
10. "SHF: Medium: Type-Specific Instruction Processing." NSF grant IIS-1065338, \$799,990 from 8/11 to 7/15. (Joint grant with M. Kim and S. Edwards.)
11. "EAGER: Rapid Updates and Snapshot-Based Queries Using Multicore Processors." NSF grant IIS-1049898, \$150,000 from 9/10 to 8/13.
12. "Avoiding Contention on Multicore Machines." NSF regular grant IIS-0915956, \$499,978 from 9/09 to 8/14.
13. "High Performance Database Algorithms on Multicore Processors." Jim Gray seed grant, Microsoft, \$30,000 for 2009.
14. "Cache-Aware Database Systems on Modern Multithreading Processors." NSF regular grant IIS-0534389, \$380,000 from 1/06 to 12/10.
15. "National Center for the Multi-Scale Study of Cellular Networks." NIH grant 1U54CA121852-01A1. \$17,000,000, from 9/05 to 7/10. (Joint grant with many Columbia researchers, establishing an NIH National Center at Columbia.)
16. "Romanesque architecture of the Bourbonnais: A Database." Mellon Foundation. \$500,000 from 9/1/04 to 8/31/06. (Joint grant with S. Murray, P. Allen, S. Feiner, and researchers in other departments at Columbia.)
17. "Structural Genomics of Eukaryotic Domain Families." NIH grant. From 7/05 to 6/10. (A large, multi-site grant involving many investigators at several institutions. Continues the grant below.)
18. "Structural Genomics of Eukaryotic Model Organisms." NIH grant. \$3,000,000 per year, from 9/00 to 8/05.
19. "Pervasive Pixels." NSF CISE research infrastructure grant. \$1,485,098 from 9/02 to 7/06. (Joint grant with ten other Columbia faculty members.)
20. "ITR/AP+IM: Computational Tools for Modeling, Visualizing and Analyzing Historic and Archaeological Sites." NSF ITR grant. \$2,000,000 from 9/01 to 8/06. (Joint grant with P. Allen, S. Feiner, and several researchers in other departments at Columbia.)
21. "Database Query Processing in Main Memory." NSF regular grant IIS-01-20939, \$235,000 from 9/01 to 8/05.
22. "Digital Government Research Center (DGRC): Bringing Complex Data to Untrained Users." NSF Digital Government grant. \$600,000 from 7/01 to 6/04. (Joint grant with S. Feiner, J. Klavans, S. Stolfo, and several researchers at USC ISI.)
23. "The CARDGIS Energy Data Collection." NSF Digital Government grant. \$1,631,623 from 7/99 to 6/02. (Joint grant with S. Feiner, L. Gravano, J. Klavans, K. McKeown, S. Stolfo and several researchers at USC ISI.)
24. "Fast Decision Support Queries in Main-Memory: Algorithms, Optimization and Implementation." NSF regular grant IIS-98-12014, \$240,000 from 9/98 to 8/02.
25. "A Large Decision Support Database Prototype." Special-purpose grant from the AT&T/Lucent Technologies Foundation, \$10,000 for 1997.
26. NSF Young Investigator Award. \$312,500. From 9/94 to 8/00.
27. David and Lucile Packard Foundation Fellowship. \$500,000 from 9/93 to 8/99.
28. Sloan Foundation Fellowship. \$30,000 from 9/94 to 9/96.
29. "Managing Patient Data Using an Object-Oriented Database System." Special-purpose grant from the AT&T Foundation, \$23,000 for 1995.
30. "Using an Object-Oriented Database and A Declarative Database Language for Modeling and Processing Patient Data." Center for Advanced Technology grant sponsored by the New York State Science and Technology Foundation, \$70,000 from 11/94 to 9/95. (Joint grant with Prof. S. Johnson.)
31. "Declarative Features for Deductive Databases." NSF Research Initiation Award. \$100,000 from 9/92 to 8/95.

32. “Query Processing in Distributed Declarative Knowledge Bases.” Special-purpose grant from the AT&T Foundation, \$15,000 for 1994.
33. “Distributed Declarative Knowledge.” Special-purpose grant from the AT&T Foundation. \$10,000 for 1993.

Patents

- “System and Method for Performing an Efficient Join Operation in Large Tables with a Small Main Memory.” (Filed 9/21/95; awarded. Number 5,666,525.)
- “System and Method for Performing an Efficient Join Operation.” (Filed 4/16/98; awarded. Number 5,802,357.)
- “System and Method for Performing Joins and Self-Joins in a Database System.” (Filed 5/97; awarded. Number 5,983,215)
- “Cost-Based Maintenance of Materialized Views.” (Filed 7/9/97; awarded. Number 6,026,390.)
- “Method of Calculating Tuples for Data Cubes.” (Filed 8/97; awarded. Number 5,987,467.)
- “Concurrency Control for Materialized Views of a Database.” (Filed 1/98; awarded. Number 6,889,358.)
- “Refreshing materialized views of a database to maintain consistency with underlying data.” (Filed 5/1998; awarded. Number 6,272,502.)
- “Cache sensitive search (CSS) tree indexing system and method.” (Filed 1999; awarded. Number 6,711,562.)
- “Splash tables: An efficient hash scheme for processors.” (Filed 6/19/2006; awarded. Numbers 7,424,591, 7,752,414, and 7,752,418.)
- “Using Asymmetric Memory.” (Filed 6/11/2008; awarded. Number 8,065,304.)
- “Temperature-aware buffered caching for solid state storage.” (Filed 1/12/2010; awarded. Number 8,161,241.)
- “Managing a multi-version database.” (Filed 5/29/2013, 8/17/2013; awarded. Numbers 9,171,027, 9,268,804.)
- “Method and system for automatic space organization in tier2 solid state drive (SSD) cache in databases for multi page support.” (Filed 9/25/2013; awarded. Number 9,286,201.)
- “Compressing a multi-version database.” (Filed 7/31/2013, 8/17/2013; awarded. Numbers 9,275,095, 9,305,046.)
- “Reducing database locking contention using multi-version data record concurrency control.” (Filed 10/25/2013; awarded. Number 9,336,258.)
- “Deferring data record changes using query rewriting.” (Filed 9/6/2013, 9/25/2013; awarded. Numbers 9,904,706, 9,910,891.)
- “Access frequency approximation for remote direct memory access.” (Filed 6/30/2015; awarded. Number 9,959,245.)
- “Supporting transient snapshot with coordinated/uncoordinated commit protocol.” (Filed 10/8/2014; awarded. Number 10,042,870. Filed 6/24/2015; awarded. Number 10,067,958.)

Professional Activities

- Editorial board, VLDB Journal, 2013–2019.
- Area Editor, Information Systems journal, 2001–2013.
- Editorial board, Proceedings of the VLDB Endowment, 2008–2012, 2014–2016, 2021.
- Associate Editor, ACM Transactions on Database Systems, 2005–2011.
- Associate Editor, ACM SIGMOD Record, 1999–2005.
- Program Committee co-chair, International Conference on Data Engineering (**ICDE**) Industrial track, 2012.
- Program Committee co-chair, Very Large Databases Conference (**VLDB**), 2008.
- General co-chair, ACM **SIGMOD** Conference, 2013.
- Associate Editor, Very Large Databases Conference (**VLDB**), 2017.
- Associate Editor, ACM **SIGMOD** Conference, 2018, 2021.
- Associate Editor, **ICDE** Conference, 2019, 2020.

- Program Committee member, Very Large Databases Conference (**VLDB**), 1994, 1997, 1999, 2002, 2005, 2007, 2008, 2009, 2010, 2011, 2012, 2014, 2015, 2016, 2021.
- Program Committee member, ACM Principles of Database Systems Conference (**PODS**), 1998, 2002, 2004.
- Program Committee member, ACM **SIGMOD** Conference, 1996, 1999, 2003, 2005, 2006, 2007, 2008, 2009, 2012, 2014.
- Program Committee member, International Conference on Data Engineering (**ICDE**), 2000, 2002, 2005.
- Program Committee member, International Conference on Extending Database Technology (**EDBT**), 2015.
- Program Committee member, International Conference on Database Theory (**ICDT**), 1999, 2005, 2009, 2011.
- Program Committee member, International Conference on Information and Knowledge Management (**CIKM**), 2001, 2004, 2013.
- Program Committee member, International Conference on Scientific and Statistical Database Management (**SSDBM**), 2001, 2004, 2007, 2011.
- Program Committee member, Deductive and Object-Oriented Databases Conference (**DOOD**) 1993, 1995, 1997, 2000.
- Program Committee co-chair, SIGMOD Workshop on Data Management on New Hardware (**DaMoN**), 2008, 2009.
- Program Committee member, SIGMOD Workshop on Data Management on New Hardware (**DaMoN**), 2005, 2007, 2010, 2011, 2012, 2019, 2021.
- Program Committee member, ACM SIGMOD Workshop on Materialized Views: Techniques and Applications, 1996.
- Program Committee member, International Workshop on Logic in Databases, 1996.
- Program Committee member, Workshop on Principles of Declarative Knowledge, 1993.
- Program Committee member, ACM SIGMOD Workshop on Combining Declarative and Object-Oriented Databases, 1993.
- Program chair, New York Area DB/IR Day, 2005.
- NSF (National Science Foundation) Grant proposal reviewer.
- NSF Review Panel member.
- NSERC (Natural Sciences and Engineering Research Council of Canada) Grant proposal reviewer.
- ISF (Israel Science Foundation) Grant Proposal Reviewer.
- Guest Editor, Information Systems. Special Issue on Data Warehousing, 2001.
- Editorial board member, ACM Digital Review.
- Proceedings Editor, Principles of Database Systems Conference, 1993.
- Member of the ACM, SIGMOD, SIGACT.
- Treasurer, VLDB conference, 1998.

Teaching

Distinguished Faculty Teaching Award, Columbia Engineering School Alumni Association, 2008.

- Spring 20** Instructor, Introduction to Databases (4111). Introductory database course for undergraduates and graduate students.
- Fall 19** Instructor, Programming and Problem Solving (4444). Course on research-style methods for solving computer science problems.
- Fall 18** Instructor, Programming and Problem Solving (4444).
- Spring 18** Instructor, Database Systems Implementation (4112). Second database course for undergraduates and graduate students.
- Fall 17** Instructor, Programming and Problem Solving (4444).
- Fall 16** Instructor, Programming and Problem Solving (4444).

- Spring 16** Instructor, Database Systems Implementation (4112).
- Fall 15** Instructor, Programming and Problem Solving (4444).
- Spring 15** Instructor, Database Systems Implementation (4112).
- Fall 14** Instructor, Programming and Problem Solving (4444).
Instructor, Introduction to Databases (4111).
- Spring 14** Instructor, Database Systems Implementation (4112).
- Fall 13** Instructor, Programming and Problem Solving (4444).
- Spring 13** Instructor, Database Systems Implementation (4112).
- Fall 12** Instructor, Programming and Problem Solving (4444).
- Fall 11** Instructor, Programming and Problem Solving (4444).
- Spring 11** Instructor, Database Systems Implementation (4112).
- Fall 10** Instructor, Programming and Problem Solving (4444).
- Spring 10** Instructor, Database Systems Implementation (4112).
- Fall 09** Instructor, Programming and Problem Solving (4444).
- Spring 09** Instructor, Database Systems Implementation (4112).
- Fall 08** Instructor, Programming and Problem Solving (4444).
- Spring 08** Instructor, Database Systems (4111). Introductory database course for undergraduates and graduate students.
- Fall 07** Instructor, Programming and Problem Solving (4444).
- Spring 07** Instructor, High Performance Software for Modern Processors (6998-02). Advanced course covering ways to write software to get the best performance from modern hardware.
- Fall 06** Instructor, Programming and Problem Solving (4444).
- Spring 05** Instructor, Database Systems (4111).
- Fall 04** Instructor, Programming and Problem Solving (4444).
- Spring 04** Instructor, Database Systems (4111).
- Fall 03** Instructor, Programming and Problem Solving (4444).
- Spring 03** Instructor, Database Systems (4111).
- Fall 02** Instructor, Programming and Problem Solving (4444).
- Spring 02** Instructor, Database Systems (4111), two sections.
- Fall 01** Instructor, Programming and Problem Solving (4444).
- Spring 01** Instructor, Discrete Mathematics (3203). Introductory course covering mathematical concepts used in computer science.
- Fall 00** Instructor, Programming and Problem Solving (4995).
- Spring 99** Instructor, Programming and Problem Solving (4995). Proposed, designed and taught this as a new course in 1999; in 2001 it became part of the CS curriculum and obtained its own course number (4444).
- Fall 98** Instructor, Database Systems (4111).
- Fall 97** Instructor, Database Systems (4111).
- Fall 96** Instructor, Database Systems (4111). (Replayed during Summer 1997 by video.)
- Fall 95** Instructor, Database Systems (4111).
- Spring 95** Instructor, Topics in Database Systems (6113). Advanced graduate course on deductive databases, object-oriented databases, and special topics.
- Fall 94** Instructor, Database Systems (4111).
- Spring 94** Instructor, Topics in Database Systems (6113).
- Fall 93** Instructor, Database Systems (4111).

- Spring 93** Instructor, Formal Methods in Computer Science (4995). Theoretical foundations course for undergraduates and graduate students. (Proposed and taught this new course to cover a perceived gap in the curriculum.)
- Fall 92** Instructor, Database Systems (4111).
- Spring 92** Instructor, Topics in Database Systems (6113). Advanced graduate course on deductive databases.
- Fall 91** Instructor, Fundamental Algorithms (3232). Undergraduate course for majors.