

## DAVID MAIER

Department of Computer Science  
Portland State University  
PO Box 751  
Portland, Oregon 97207-0751  
(503) 725-2406  
maier@cs.pdx.edu

### Born

2 June 1953, Eugene, Oregon

### Education

B.A., Honors College	University of Oregon, 1974 Double major: Mathematics and Computer Science
Ph.D.	Princeton University, 1978 Electrical Engineering and Computer Science

### Positions Held

2023 – present	Maseeh Professor Emeritus Department of Computer Science Portland State University
2004 - 2022	Maseeh Professor of Emerging Technologies Department of Computer Science Portland State University
2012 - 2017	Faculty Member Intel Science and Technology Center for Big Data
2012 - 2015	Shaw Visiting Professor Department of Computer Science National University of Singapore
2007 - 2010	Visiting Researcher Microsoft Research, Redmond, Washington (3 stays)
2006 - present	Adjunct Professor; Affiliate Professor (since 2014) Department of Medical Informatics & Clinical Epidemiology Oregon Health & Science University
2004 - 2017	Professor (joint appointment) Environmental and Biomolecular Systems Oregon Health & Science University
1988 - 2006	Professor (joint appointment as of 2004) Department of Computer Science and Engineering Oregon Graduate Institute
1997 - 1998	Visiting Professor Computer Sciences Department, University of Wisconsin
1989 -1990	Visiting Scientist GIP Altair, INRIA-Rocquencourt, France (Institute National de Recherche en Informatique et en Automatique)
1988	Acting Chair (Jan. - June)
1983 - 1988	Associate Professor
1982 - 1983	Assistant Professor Department of Computer Science and Engineering Oregon Graduate Institute

1978 - 1982

Assistant Professor  
Department of Computer Science  
State University of New York at Stony Brook

## AWARDS AND HONORS

1. NSF Presidential Young Investigator Award, *Foundations of Knowledge Management Systems*, IST 83 51730, June 1984 - May 1985, renewed to May 1989. Industrial sponsors: Tektronix Foundation, Intel, Digital Equipment, Servio Logic, Mentor Graphics, Xerox, Beaverton Area Chamber of Commerce.
2. Distinguished Teaching Award, Oregon Graduate Institute, 1985-1986, 1987-1988, 1993-1994.
3. President's Award for Research Excellence, Oregon Graduate Institute, 1988-1989.
4. Outstanding Teacher Award CSE, OGI Student Council, 1987-1988, 1988-1989, 1990-1991, 1993-1994, 1994-1995.
5. 1997 SIGMOD Innovations Award.
6. ACM Fellow, 1998.
7. Branford Price Millar award for faculty excellence, PSU, 2014.
8. Cultural Competency Recognition Award, PSU, 2015.
9. Microsoft Research Outstanding Collaborator Award, 2016.

## GRANTS, GIFTS AND CONTRACTS

1. Department of Energy Emergency Information Management System (EEMIS), *Logical Data Base Design for EEMIS*. Principal Investigator, Jack Heller. February - August 1979. Supervised by Brookhaven National Laboratory.
2. University Awards Committee Fellowship, State University of New York, *Applications of Minimal Covers in Relational Databases*. June - July 1979.
3. NSF, *The Relational Theory of Databases: Research Initiation*, IST 79 18264. September 1979-February 1982.
4. NSF, *Representing Semantic Information within Databases*, IST 81 04834, with David S. Warren and Sharon C. Salveter. May 1981 - October 1983.
5. NSF, *Verbs in Databases*, IST 82 14622, with Sharon C. Salveter, October 1982 -September 1984.
6. NSF, *Theory of Database Systems*, MCS 82 07216, November 1982 - October 1984.
7. Tektronix Computer Research Laboratory, *Data Models for Networked Workstations*, November 1983 - September 1986.
8. Tektronix Information Display Group (Artificial Intelligence Machines), *Smalltalk Short Course*, November 1984 - March 1985.
9. Microelectronics and Computer Technology Corporation (MCC), *Update in the Logical Data Language*, November 1985 - January 1987.
10. NSF, *Automatic Generation of Interactive Displays*, IST 86 04977, with Alan H. Borning and Ralph London, June 1986 - November 1988 (separate grant to Washington).
11. Apple Computer, Graduate Student Support in Object-Oriented Databases, 1988-1989.
12. NSF, *Generating Interactive Displays from Declarative Specifications*, IRI 88 05564, with Alan H. Borning, June 1988 - November 1990 (separate grant to Washington).
13. NSF, *Query Optimization in Object-Oriented Database Management Systems with Encapsulated Behavior*, IRI 89 20642, with Goetz Graefe, September 1989 - February 1991 (separate grant to Colorado).
14. Battelle Pacific Northwest Laboratories, *Establishment of Affiliated Laboratory for Computation Science*, 097714-A-L2, with David Novick, Steve Otto, Jonathan Walpole, Mike Wolfe, January 1991 - September 1991.
15. Battelle Pacific Northwest Laboratories and OACIS, *Database Support for Computational Chemistry*, 097714-A-L2, #5, March - September 1991.

16. Sequent Computer Systems, *Scientific Database Systems*, equipment donation, July 1991.
17. NSF, *Database Support for Scientific Computing*, IRI 91 17008, with Michael Wolfe, James Stanley and Jonathan Walpole, September 1991 - February 1994.
18. DARPA, *Architectures for Query Processing in Persistent Object Bases*, ARPA order #8230, CECOM contract DAAB07-91-C-Q518, with Michael Carey, David DeWitt and Stanley Zdonik, September 1991 - September 1994. Extended to March 1996.
19. OACIS, *Graduate Fellowship*: Desktop Material Scientist, James Stanley, PI, January - December 1992.
20. Battelle Pacific Northwest Laboratories and OACIS. *Computational Proxies: Controlling and Capturing Computational Chemistry Experiments*, 097714-A-L2, #5, rev. 2 with Judy Cushing, January - December 1992.
21. U.S. West Advanced Technologies, Graduate Student Support in Object Oriented Database Technology, 1992.
22. NSF, *Collaborative Research: The REVELATION Project: Query Processing in Behavioral Object-Oriented Database*, IRI-9118360, with Goetz Graefe, September 1992-February 1995 (separate grant to Portland State)
23. DOD AASERT Award, *Query Processing in Loosely-Coupled Object Bases*, P-3223-RT-AAS, June 1993-May 1996.
24. Pacific Power and Light and OACIS, *The Capture and Analysis of Application Semantics*, with Lois Delcambre and Leonard Shapiro, April 1993-March 1994.
25. NSF, *Supporting Predictable Latency and Throughput in Large Storage Systems*, IRI-9223788, with Jonathan Walpole, PI, August 1993-January 1995.
26. Battelle Pacific Northwest Laboratories, *Computational Chemistry Database*, Task order 248003, Contract 206010-A-L2, with Judy Cushing, July-December 1993.
27. Battelle Pacific Northwest Laboratories, *Multidisciplinary Scientific Database*, Task Order 246273, Contract 206010-A-L2, with Lois Delcambre, April - September 1994.
28. Battelle Pacific Northwest Laboratories, *HEIS Data Management*, Task Order 266643, Contract 206010-4-L2, with Lois Delcambre, Tim Sheard and Andrew Black, August - September 1994.
29. DOD, *Quality of Service Specification and Use in Massive Digital Data Systems*, MDA904-95-C-5547, with Calton Pu and Jonathan Walpole, March 1995 - February 1998.
30. NSF, *An Effective Framework for Processing OODB Languages*, IRI-9509955, with Leonidas Fegaras, September 1995 - August 1998.
31. NSF, *SGER: Content-Based Connections for Navigating on the NII*, IRI-9502084, with Lois Delcambre, July 1995 - June 1996.
32. ONR, *Control and Scaling of Distributed Agent Systems*, N00014-95-1-1164, with Philip Cohen, Sharon Oviatt, David Novick, Jonathan Walpole and Calton Pu, May 1995 - April 1998.
33. Rik Smoody, *Gift to Support Purchase of Workstation*, with Jonathan Walpole, 1995.
34. Goetz Graefe and Microsoft, *Gift to Support Research and Education*, 1995.
35. Intel, *QoS-Based Adaptive Resource Management for Multimedia Systems*, with Jonathan Walpole and Calton Pu, 1996, 1997.
36. DARPA, *Heterodyne: A Regenerative Receiver for Dynamic Specialization Technology*, F30602-96-1-0302, with Andrew Black, Charles Consel, Lois Delcambre, Calton Pu and Jonathan Walpole, September 1996 - August 1999.
37. DOE, *Information Technology for Coordinated Long Term Care*, subcontract from OHSU 6398171 (DOE F603-94ER61918/A004), with Lois Delcambre, October 1996 - September 1997.
38. NSF, *Enhancing Researcher Site Productivity at Shared Research Facilities: Database Tools for Analyzing Forest Canopy Structure Data*, subcontract from The Evergreen State College on grant 96-30316, with Lois Delcambre, September 1996 - August 1997.
39. NSF, *Query Optimization Engineering*, IRI-9619977, Companion proposal to one by Len Shapiro of PSU, September 1997 - August 2000.

40. DARPA, *Systemic Quality of Service Support for Adaptive Distributed Systems*, N66001-97-C-8522, with Jonathan Walpole, PI, Calton Pu, Dylan McNamee, July 1997 - June 2000.
41. DARPA, *Broadcast Objects for Effective Data Dissemination in BADD*, F30602-97-2-0241, subcontract from Brown University, Stanley Zdonik, PI, July 1997 - November 1998.
42. NSF, *A Wide-Spectrum Infrastructure for Software Research* (Research Infrastructure Award), CDA-9703218, Andrew Black and Calton Pu, PIs, 6 Co-PIs, August 1997 - July 2002.
43. DARPA, *Robust Agent-based Systems Incorporating Teams of Communicating Agents*, F30602-98-2-0098, with Philip Cohen, PI, Calton Pu and Ling Liu, July 1998 - September 2002.
44. NSF/DLI2, *Tracking Footprints Through an Information Space: Leveraging the Document Selections of Expert Problem Solvers*, IIS-9817492, with Paul Gorman (OHSU) and Lois Delcambre, PIs, January 1999 - December 2002.
45. DARPA, *NIAGARA – An Excursion into Net Data Management*, with David DeWitt (Wisconsin) and Jeffrey Naughton, PIs, N66001-99-1-8908, June 1999 – June 2002.
46. NSF, *RUI: Databases and Database Tools for Canopy Science – What Trees Can Teach Us about Integrating Database Use in the Research Process*, with Nalini Nadkarni (Evergreen) and Judy Cushing (Evergreen), PIs, and Lois Delcambre, Co-PI, DBI-9975510, June 1999 – June 2002.
47. DARPA, Autonomic Information Assurance program, *Autonomix: Component, System and Network Autonomy*, with C. Cowan (Wirex) and L. Delcambre, DAAH01-99-C-R206, September 1999 – October 2002.
48. NSF, Digital Government, *Harvesting Information to Sustain Our Forests*, with L. Delcambre, F. Phillips (MST) and P. Toccalino (ECE). In cooperation with Tim Tolle (US Forest Service), Eric Landis (consultant) and Craig Palmer (UNLV), EIA-9983518 plus REU and technology transfer supplements, August 2000 – July 2003.
49. NSF ITR, *A Petabyte in Your Pocket*, with D. DeWitt (Wisconsin) and J. Naughton (Wisconsin), IIS 0086002, September 2000 – August 2005.
50. NSF, Digital Government: *Workshop on Biodiversity Informatics*, EIA-0084541, September 2000 – April 2001.
51. NIH, National Library of Medicine, *Training Program in Health Informatics/Biomedical Information Science and Technology Initiative (BISTI)*, with Christopher Dubay (OHSU), July 2000 – June 2001. Supplement to existing training grant, Kent Spackman (OHSU), PI.
52. NSF ITR, *Quality-Scalable Information Flow Systems for Environmental Observation and Forecasting*, with A. Baptista (ESE), PI, W.-C. Feng, T. Leen, and J. Walpole, ACI 0121475, September 01 – September 06. REU Supplement, Summer 2004.
53. NSF, *DELOS/NSF Study Panel on Information Extraction for Digital Libraries*, IIS 0226501, August 02 – August 03.
54. PNNL, *Stream Queries for Network Monitoring*, (Part of ARDA Network Data Transformation and Analysis Project), with L. Delcambre (PI) and W.-C. Feng, June 02 – August 02.
55. NSF, Forensix: *Larger-Scale Tamper Resistant Computer Forensic System*, with W.-C. Feng (PI), W.-C. Feng, J. Walpole, STI 0230960, October 02 – September 05.
56. Intel-Oregon University System, *Curriculum Fellowship: Undergraduate Research Institute*, with D. Hansen (George Fox University) and W-C. Feng. January 04 – December 04.
57. Agency for Healthcare Research and Quality (AHRQ), *Using IT to Improve Medication Safety of Rural Elders*, with P. Gorman (PI, OHSU), M. Pavel (OGI), K. Ordelheide (PI, Samaritan North Lincoln Hospital), L. Fagnan (ORPRN), J. Logan (OHSU), others, October 04 – September 08.
58. NSF NSDL, *Superimposed Tools for Active Arrangement and Elaboration of Educational Resources*, with L. Delcambre, E. Fox (Virginia Tech), Lillian Cassel (Villanova), and R. Kelapure (Virginia Tech), DUE 0435496, October 04 – September 06.
59. NSF, *Adapting Information using Superimposed Models and Structures*, with L. Delcambre (PI), IIS 0534762, February 2006 – January 2009.

60. NSF, *Exploiting Live Plus Archive Data for Intelligent Transportation Systems*, with R. Bertini (co-PI) and K. Tufte, IIS 0612311, July 2006 – June 2008.
61. NSF, *Science and Technology Center for Coastal Margin Observation and Prediction*, with A. Baptista (PI, OHSU), D. Martin (Co-PI, UW APL), B. Menge (Co-PI, OSU) and P. Zuber (Co-PI, OHSU), OCE 0424602, July 2006 – June 2011. Renewed July 2011 – June 2016.
62. NSF, *SGER: From Measurement to Management: Evidence-Based Practice in Natural Resource Management*, with J. Cushing (PI, Evergreen), L. Delcambre (Co-PI) and N. Nadkarni (Co-PI, Evergreen), IIS 0639588, August 2006 – January 2008.
63. Oregon Transportation and Research Consortium (OTREC), *Improving Travel Information Products via Robust Estimation Techniques*, with K. Tufte, 07-64, April 2007 – January 2008.
64. AHRQ, *RxSafe: Shared Medication Management and Decision Support for Rural Clinicians*, with L. J. Fagnan (OHSU), P. Gorman (PI, OHSU), Heather Young (OHSU), 1R18HS017102-01, September 2007 – August 2010.
65. Lockheed, *Pay-as-You-Go Information Integration* (Part of DARPA Information Integration seedling program), with L. Delcambre, September 2007 – June 2008.
66. Oregon Transportation and Research Consortium (OTREC), *Exploiting a Next Generation ITS Data Warehouse for Improved System Performance and Congestion Monitoring*, with R. Bertini (PI) and K. Tufte, 09-269, October 2008 – September 2009.
67. NSF, *Toward More Flexible, Expressive and Robust Stream Systems*, with K. Tufte (PI), IIS 0917349, July 2009 – June 2012.
68. NSF, *Database-As-A-Service for Long Tail Science*. Collaborative grant with U. Washington and U. Michigan, IIS 1064685, August 2011 – July 2015.
69. NSF, *SciDB – An Array Oriented Data Management System for Massive Scale Scientific Data*. Collaborative grant with U. Washington, MIT, Brown U. and U. Wisconsin, IIS 1110917, September 2011 – August 2016.
70. University Industry Research Consortium, *Intel Science and Technology Center for Big Data*, September 2012 – August 2017.
71. NSF, *EAGER: Agile Data Integration to Facilitate Scaling of Air Quality Research*, with K. Tufte (PI) and L. George, CNS 1640749, Sept 2016 – August 2018.

## PUBLICATIONS and PATENTS

### Papers and Reports

1. A construction of the real numbers. With E.A. Maier. *The Two-Year College Mathematics Journal*, Winter 1973.
2. The complexity of some problems on subsequences and supersequences. *Journal of the ACM* 25(2), April 1978.
3. An efficient method for storing ancestor information in trees. *SIAM Journal on Computing* 8(4), November 1979.
4. On finding minimal length superstrings. With J. Gallant and J.A. Storer. *Journal of Computer and System Sciences* 20(1), February 1980.
5. Representing databases in segmented name spaces. With V. Gligor. In *Databases: Improving Usability and Responsiveness*, B. Shneiderman, editor, Academic Press, 1978.
6. Minimum covers in the relational database model. *Journal of the ACM* 27(4), October 1980.
7. Testing implication of data dependencies. With A.O. Mendelzon and Y. Sagiv. *ACM Transactions on Database Systems* 4(4), December 1979.
8. Generalized mutual dependencies and the decomposition of database relations. With A.O. Mendelzon. *Proceedings of the Fifth International Conference on Very Large Data Bases*, October 1979.

9. Adequacy of decompositions of relational databases. With A.O. Mendelzon, F. Sadri and J.D. Ullman. *Advances in Data Base Theory*, vol. 1, H. Gallaire, J. Minker, and J.M. Nicolas, editors, Plenum, 1981. Also in *Journal of Computer and System Sciences* 21(3), December 1980.
10. Hysterical B-trees. With S.C. Salveter. *Information Processing Letters* 12(4), August 1981.
11. On the complexity of testing implications of functional and join dependencies. With Y. Sagiv and M. Yannakakis. *Journal of the ACM* 28(4), October 1981.
12. Finding augmented set bases. With V. Gligor. *SIAM Journal of Computing* 11(3), August 1982.
13. Discarding the universal instance assumption. Stony Brook Computer Science Report 80/008. Presented at the XPI Workshop on Relational Database Theory, Stony Brook, June-July 1980.
14. Properties of acyclic database schemes. With C. Beeri, R. Fagin, A.O. Mendelzon, J.D. Ullman and M. Yannakakis. *Proceedings of the Thirteenth Symposium on the Theory of Computing*, May 1981.
15. Maximal objects and the semantics of universal relation databases. With J.D. Ullman. *ACM Transactions on Database Systems*, 8(1), March 1983.
16. Incorporating computed relations in relational databases. With D.S. Warren. *Proceedings of the 1981 ACM Conference on Management of Data*, April 1981.
17. Tools for template dependencies. With R. Fagin, J.D. Ullman and M. Yannakakis. *SIAM Journal on Computing* 12(1), February 1983.
18. On the desirability of acyclic database schemes. With C. Beeri, R. Fagin and M. Yannakakis. *Journal of the ACM* 30(3), July 1983.
19. Connections in acyclic hypergraphs. With J.D. Ullman. *Theoretical Computer Science*, 32(1-2), July 1984.
20. Fragments of relations. With J.D. Ullman. *Proceedings of the 1983 ACM SIGMOD Conference on Management of Data*, May 1983.
21. Specifying connections for a universal relation scheme database. With D.S. Warren. *Proceedings of the 1982 ACM SIGMOD Conference on Management of Data*, June 1982.
22. Toward logical data independence: A relational query language without relations. With D. Rozenshtein, S.C. Salveter, J. Stein and D.S. Warren. *Proceedings of the 1982 ACM SIGMOD Conference on Management of Data*, June 1982.
23. Using write-once memory for database storage. *Proceedings of the ACM Symposium on Principles of Database Systems*, March 1982.
24. Verbs in Databases. With S.C. Salveter. *Proceedings of the Fourth National Conference of the Canadian Society for Computational Studies of Intelligence*, May 1982.
25. Natural language database updates. With S.C. Salveter. *Proceedings of the 20th Meeting of the Association for Computational Linguistics*, June 1982.
26. Natural language updates. With S.C. Salveter. *Proceedings of the Ninth International Conference on Computational Linguistics*, July 1982.
27. Supporting natural language updates in database systems. With S.C. Salveter. *Proceedings of the European Conference on Artificial Intelligence*, July 1982. Also in *Progress in Artificial Intelligence*, L. Steels and J. A. Campbell, editors, Ellis Horwood Ltd., 1985.
28. On the foundations of the universal relation model. With J.D. Ullman and M.Y. Vardi. *ACM Transactions on Database Systems* 9(2), June 1984.
29. Window functions. With D. Rozenshtein and D.S. Warren. In *Advances in Computing Research: The Theory of Databases*, P. C., F. Preparata, editors, JAI Press, 1986.
30. Correcting faults in write-once memory. With D. Dolev, H. Mairson, and J.D. Ullman. *Proceedings of the Sixteenth Symposium on the Theory of Computing*, May 1984.
31. Representing roles in universal scheme interfaces. With D. Rozenshtein and J. Stein. *IEEE Transactions on Software Engineering* SE-11(7), July 1985.
32. Natural language database access. With S.C. Salveter. *Proceedings of the IEEE Fall COMPCON Conference*, September 1983.

33. Capturing more meaning in databases. *Journal of Management Information Systems*, 1(1), Summer 1984.
34. Databases in the Fifth Generation project: Is Prolog a database language? *New Directions for Database Systems*, G. Ariav, J. Clifford, editors, Ablex Publishing Co., 1986.
35. Making Smalltalk a database system. With G. P. Copeland. *Proceedings of the 1984 ACM SIGMOD Conference on Management of Data*, June 1984. Also in *Readings in Database Systems*, M. Stonebraker, editor, Morgan Kaufmann, 1988.
36. Universal scheme interfaces and the theory of window functions. *Proceedings of the Theoretical Issues in Database Systems Workshop*, Benodet, France, July 1984.
37. Data model requirements for engineering applications. With D. Price. *Proceedings of the First International Workshop on Expert Database Systems*, Kiawah Island, South Carolina, October 1984.
38. Relaxing the universal relation scheme assumption. With J. Stein. *Proceedings of the Fourth ACM SIGACT-SIGMOD Symposium on Principles of Database Systems*, March 1985.
39. Object oriented database systems and knowledge systems. With C. Zaniolo, H. Ait-Kaci, D. Beech, S. Cammarata and L. Kerschberg. *Expert Database Systems*, L. Kerschberg, editor, Benjamin/Cummings Publishing Company, 1986.
40. Object-oriented database development at Servio Logic. With A. Otis and A. Purdy. *Database Engineering*, 8(4), December 1985.
41. The OGC Cognitive Architecture Project. With D. Hammerstrom and S. Thakkar. *SIGARCH Computer Architecture News* 14(1), January 1986.
42. A dynamic tree-locking protocol. With A. Croker. *Proceedings of the 1986 IEEE International Conference on Data Engineering*, February 1986.
43. Magic sets and other strange ways to implement logic programs. With F. Bancilhon, Y. Sagiv, and J.D. Ullman. *Proceedings Fifth ACM SIGACT-SIGMOD Symposium on Principles of Database Systems*, March 1986.
44. Displaying database objects. With P. Nordquist and M. Grossman. *Proceedings of the First International Conference on Expert Database Systems*, April 1986. Also in *Readings in Object-Oriented Database Systems*, S. Zdonik and D. Maier, editors, Morgan Kaufmann, 1990.
45. Development of an object-oriented DBMS. With J. Stein, A. Otis and A. Purdy. *Proceedings of the 1986 ACM Conference on Object-Oriented Programming Systems, Languages and Applications*, September-October 1986. Also in *Research Foundations in Object-Oriented and Semantic Database Systems*, A.F. Cardenas and D. McLeod, editors, Prentice Hall, 1990.
46. QUICKTALK: A Smalltalk-80 dialect for defining primitive methods. With M. B. Ballard and A. Wirfs-Brock. *Proceedings of the 1986 ACM Conference on Object-Oriented Programming Systems, Languages and Applications*, September- October 1986.
47. The PROTEUS bibliography: Representation and interactive display in databases. With T. Lougenia Anderson and Earl Ecklund. *SIGMOD Record* 15(3), September 1986.
48. Indexing in an object-oriented DBMS. With J. Stein. *Proceedings of the International Workshop on Object-Oriented Databases*, September 1986.
49. PROTEUS: Objectifying the DBMS user interface. With T. L. Anderson and E. F. Ecklund, Jr. *Proceedings of the International Workshop on Object-Oriented Databases*, September 1986.
50. Integrating an object server with other worlds. With A. Purdy and B. Schuchardt. *ACM Transactions on Office Information Systems* 5(1), January 1987. Also in *Object-Oriented Databases with Applications to CASE, Networks and VLSI CAD*, R. Gupta and E. Horowitz, editors, Prentice-Hall, 1991.
51. The filter browser—Defining interfaces graphically. With R. K. Ege and A. Borning. *Proceedings of the European Conference on Object-Oriented Programming*, June 1987.
52. PIQUE: A relational query language without relations. With D. Rozenshtein, S. Salveter, J. Stein and D. S. Warren. *Information Systems* 12(3), 1987.

53. Development and Implementation of an Object-Oriented DBMS. With J. Stein. In *Research Directions in Object-Oriented Programming*, B. D. Shriver, P. Wegner, editors, MIT Press, 1987. Also in *Readings in Object-Oriented Database Systems*, S. Zdonik and D. Maier, editors, Morgan Kaufmann, 1990.
54. Is the disk half full or half empty?: Combining optimistic and pessimistic concurrency mechanisms in a shared, persistent object base. With D. J. Penney and J. Stein. *Proceedings of the Workshop on Persistent Object Systems*, Appin, Scotland, August 1987.
55. Representing database programs as objects. In *Advances in Database Programming Languages*, F. Bancilhon and P. Buneman, editors, ACM Press, 1990.
56. Concepts in object-oriented data management. With J. Stein. *Database Programming & Design* 1(4), April 1988.
57. Abstract objects in an object-oriented data model. With J. Zhu. *Proceedings of the Second International Conference on Expert Database Systems*, Tysons Corner, Virginia, April 1988.
58. Making database systems fast enough for CAD applications. *Object-Oriented Concepts, Databases and Applications*, W. Kim, F. Lochovsky, editors, ACM Press, 1989.
59. The GemStone data management system. With B. Bretl, A. Otis, D. J. Penney, B. Schuchardt, J. Stein, E. H. Williams and M. Williams. *Object-Oriented Concepts, Databases and Applications*, W. Kim, F. Lochovsky, editors, ACM Press, 1989.
60. Associative access support in GemStone. With J. Stein. In *On Object-Oriented Database Systems, Topics in Information Systems* series, K. Dittrich, U. Dayal, A. Buchmann, editors, Springer-Verlag, 1991.
61. PROTEUS: The DBMS user interface as an object. With T.L. Anderson and E.F. Ecklund, Jr. In *On Object-Oriented Database Systems, Topics in Information Systems* series, K. Dittrich, U. Dayal, A. Buchmann, editors, Springer-Verlag, 1991.
62. Query optimization in object-oriented database systems: a prospectus. With G. Graefe. *Advances in Object-Oriented Database Systems: Proceedings of the 2nd International Workshop on Object-Oriented Database Systems*, K. Dittrich, editor, Bad Muenster, West Germany, September 1988. Lecture Notes in Computer Science 334, Springer-Verlag.
63. Multilanguage object-oriented systems: New answer to old database problems? With F. Bancilhon. *Programming of Future Generation Computer II*, K. Fuchi and L. Kott, editors, North-Holland, 1988.
64. Representing CSG solids using a logic-based object data model. With T.L. Anderson, H. Ohkawa, J. Gjovaag and Sheryl Shulman. *Proceedings of the IFIP Working Conference on Visual Database Systems*, Tokyo, Japan, April 1989.
65. Why not change the languages to fit the databases? *Proceedings of the 1989 ACM SIGMOD Workshop on Software CAD Databases*, Napa, California, February 1989.
66. Computational objects in object-oriented data models. With J. Zhu. *Database Programming Languages: Proceedings of the Second International Workshop*, R. Hull, R. Morrison and D. Stemple, editors, Morgan Kaufmann, 1989.
67. Mistaking identity. With T.L. Anderson and J. Stein. In *Database Programming Languages: Proceedings of the Second International Workshop*, R. Hull, R. Morrison and D. Stemple, editors, Morgan Kaufmann, 1990.
68. Why isn't there an object-oriented data model? Invited paper, *Proceedings of the IFIP 11th World Computer Conference (Information Processing 89)*, San Francisco, California, August-September 1989.
69. Features of the TEDM Object Model. With J. Zhu and H. Ohkawa. *Deductive and Object-Oriented Databases, Proceedings of the First International Conference*, Kyoto, Japan, December 1989, W. Kim, J.-M. Nicolas and S. Nishio, editors, Elsevier Science, 1990.
70. The object-oriented database system manifesto. With M. Atkinson, F. Bancilhon, D. DeWitt, K. Dittrich and S. Zdonik. *Deductive and Object-Oriented Databases*, Proceedings of the First International Conference, Kyoto, Japan, December 1989, W. Kim, J.-M. Nicolas and S. Nishio, editors, Elsevier Science, 1990.
71. A study of three alternative workstation-server architectures for object oriented database systems. With D. DeWitt, P. Futersack and F. Velez. *Proceedings of 16th International Conference on Very Large*



- Databases*, Brisbane, Australia, August 1990. Also in *Building an Object-Oriented Database System: The Story of O2*, F. Bancilhon, C. Delobel and P. Kanellakis, editors, Morgan Kaufmann, 1991.
72. Implementing the O2 object manager: some lessons. With F. Velez, V. Darnis, D. DeWitt, P. Fattersack, G. Harrus and M. Raoux. In *Implementing Persistent Object Bases: Proceedings of the Fourth International Workshop on Persistent Object Systems*, A. Dearle, G.M. Shaw, S.B. Zdonik, eds., Morgan Kaufmann 1991.
  73. Comments on the "Third-generation database system manifesto," OGI CSE Technical Report 91-012, April 1991.
  74. Efficient assembly of complex objects. With T. Keller and G. Graefe. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Denver, Colorado, May 1991.
  75. Introduction to languages. With F. Bancilhon. In *Building an Object-Oriented Database System: The Story of O2*, F. Bancilhon, C. Delobel and P. Kanellakis, editors, Morgan Kaufmann, 1992.
  76. Query optimization in Revelation, an overview. With S. Daniels, G. Graefe, T. Keller, D. Schmidt and B. Vance. *IEEE Data Engineering Bulletin* 14(2), June 1991.
  77. The O2 system. O. Deux et al. *Communications of the ACM* 34(10), October 1991.
  78. Specifying a database system to itself. Invited paper, *Specifications of Database Systems*, D.J. Harper and M.C. Norrie, editors, Springer-Verlag, 1992.
  79. Supporting display generation for complex database objects. With B.B. Flynn. *ACM SIGMOD Record* 21(1), March 1992.
  80. Challenges for query processing in object-oriented databases. With S. Daniels, T. Keller, B. Vance, G. Graefe, and W. McKenna. In *Query Processing for Advanced Database Systems*, J.C. Freytag, D. Maier and G. Vossen, editors, Morgan Kaufmann, 1993.
  81. Object-oriented database support for computational chemistry. With J.B. Cushing, M. Rao, D.M. DeVaney and D. Feller. *Proceedings of the Sixth International Working Conference on Scientific and Statistical Database Management*, Ancona, Switzerland, June 1992.
  82. Issues in distributed object assembly. With G. Graefe, L. Shapiro, S. Daniels, T. Keller and B. Vance. In *Distributed Object Management*, M.T. Oszu, U. Dayal and P. Valduriez, editors, Morgan Kaufmann, 1994.
  83. The Role of Metadata in Managing Large Environmental Science Datasets: Annotative metadata in scientific applications. With L.M.L. Delcambre. In *Proceedings of SDM'92, Scientific Data Management Workshop*, Pacific Northwest Laboratories, Report PNL-5A-26092, June 1995.
  84. An object-oriented heterogeneous database for materials science. With D. Hansen, J. Stanley and J. Walpole. *Scientific Programming* 1(2), Winter 1992.
  85. Connecting scientific programs and data using object databases. With J.B. Cushing, D. Hansen and C. Pu. *IEEE Data Engineering Bulletin* 16(1), March 1993.
  86. Object data models for shared molecular structures. With J.B. Cushing, D.M. Hansen, G.D. Purvis III, R.A. Bair, D.M. DeVaney, D.F. Feller, M.A. Thompson. In *Computerized Chemical Data Standards: Databases, Data Interchange, and Information Systems*, R. Lysalcowski and D.E. Cragg, editors, ASTM STP 1214, 1994.
  87. A call to order. Invited Paper. With B. Vance. *Proceedings of the ACM Symposium on Principles of Database Systems*, May 1993.
  88. Storage system architectures for continuous media data. Invited Paper. With J. Walpole and R. Staehli. *Proceedings of the 4th International Conference on Foundations of Data Organization and Algorithms (FODO '93)*, Chicago, October 1993.
  89. Specifying rule-based query optimizers in a reflective framework. With L. Fegaras and T. Sheard. *Proceedings of the 3rd International Conference on Deductive and Object-Oriented Databases (DOOD '93)*, Phoenix, December 1993.
  90. Treating programs as objects: The computational proxy experiment. Invited Paper. With J.B. Cushing. *Proceedings of the 3rd International Conference on Deductive and Object-Oriented Databases (DOOD '93)*, Phoenix, December 1993.

91. Using an object-oriented database to encapsulate heterogeneous scientific data sources. With D.M. Hansen. *Proceedings of the Twenty-seventh Annual Hawaii International Conference on System Sciences*, Wailea, January 1994.
92. Bambi Meets Godzilla: Object databases for scientific computing. With D.M. Hansen. Invited Paper, *Proceedings of the Seventh International Working Conference on Scientific and Statistical Database Management*, Charlottesville, Virginia, September 1994.
93. Computational proxies: Modeling scientific applications in object databases. With J.B. Cushing, M. Rao, D. Abel, D. Feller and D. M. DeVaney. *Proceedings of the Seventh International Working Conference on Scientific and Statistical Database Management*, Charlottesville, Virginia, September 1994.
94. Applications of object database technology in thermodynamics and materials science. With R. Venkatesh, D. Hansen and J. M. Stanley. *Proceedings of the Symposium on Applications of Thermodynamics in the Synthesis and Processing of Materials*, Rosemont, Illinois, October 1994.
95. Quality of service specifications for multimedia presentation. With R. Staehli and J. Walpole. *Multimedia Systems* 3 (5/6), November 1995.
96. Towards an effective calculus for object query languages. With L. Fegarar. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, San Jose, May 1995.
97. An algebraic framework for physical OODB design. With L. Fegarar. *Proceedings of the 5th International Workshop on Database Programming Languages*, Gubbio, Italy, September 1995.
98. Interoperating with DIF data. With P. Benninghoff. *Proceedings of RIDE-NDS'96 – Sixth International Workshop on Research Issues in Data Engineering*, New Orleans, February 1996.
99. Device and physical data independence. With R. Staehli and J. Walpole. *ACM Computing Surveys* 27(4), December 1995.
100. Bringing knowledge to bear: Challenges for decision support databases. Invited Paper. With M.E. Meredith and L. Shapiro. *Proceedings of the 7th International Hong Kong Computer Society Database Workshop*, 1996.
101. Rapid bushy join-order optimization with Cartesian products. With B. Vance. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Montreal, June 1996.
102. Proxies in practice: Object Architectures from distributed computational workbenches. With J.B. Cushing, T. Keller, and T. Marr. *Journal of the Brazilian Computer Society* 2(3), November 1996.
103. Structured maps: Modeling explicit semantics over a universe of information. With L.M.L. Delcambre, R. Reddy and L. Anderson. *International Journal on Digital Libraries* 1(1), 1997.
104. A player for adaptive MPEG video streaming over the Internet. With J. Walpole, R. Koster, S. Cen, C. Cowan, D. McNamee, D. Steere, and L. Yu. *Proceedings 26th Applied Imagery and Pattern Recognition Workshop*, AIPR-97, SPIE, Washington DC, October 1997.
105. Database support for forest canopy researchers – Metadata as a byproduct of the research process. With J. Cushing, N. Nadkarni,, S. Knackstedt, E. Lyons and L. Delcambre, *Proceedings of the Conference on Scientific and Technical Data Exchange (CoDATA)*, NRC, 1997.
106. Stackguard: Automatic adaptive detection and prevention of buffer-overflow attacks. With C. Cowan, C. Pu, H. Hinton, P. Bakke, S. Beattie, A. Grier, P. Wagle, and Q. Zhang. *Proceedings of the 7th USENIX Security Conference*, San Antonio, January 1998.
107. Precis-based navigation for familiarization. With L. Delcambre, P. Gorman, and S. Rehfuess. *Proceedings of the 9th World Congress on Medical Informatics*, Seoul, Korea, August 1998.
108. Selected research issues in decision support databases. With M.E. Meredith and L. Shapiro. *Journal of Intelligent Information Systems* 11(2), September-October 1998.
109. Quality of service semantics for multimedia database systems. With J. Walpole, C. Krasic, L. Liu, C. Pu, D. McNamee and D. Steere. *Proceedings of Data Semantics 8: Semantic Issues in Multimedia Systems*, IFIP TC-2 Working Conference, Rotorura, New Zealand, January 1999.
110. The Asilomar report on database research. With P. Bernstein, M. Brodie, S. Ceri, D. DeWitt, M. Franklin, H. Garcia-Molina, J. Gray, J. Held, J. Hellerstein, H. Jagadesh, M. Lesk, J. Naughton, H. Pirahesh, M. Stonebraker and J. Ullman. *SIGMOD Record* 27(4), December 1998.

111. Superimposed information for the Internet (Invited Paper). With L. Delcambre. *Proceedings of the Second International Workshop on the Web and Databases, WebDB '99*, Philadelphia, June 1999.
112. Querying XML data. With A. Deutsch, M. Fernandez, D. Florescu, A. Levy, and Dan Suciu. *IEEE Data Engineering Bulletin* 22(3), September 1999.
113. Models for superimposed information. With L. Delcambre. *Advances in Conceptual Modeling* (Proceedings of the ER '99 Workshops on Evolution and Change in Data Management, Reverse Engineering in Information Systems, and the World Wide Web and Conceptual Modeling), LNCS 1727, Paris, November 1999.
114. Architecting a Network Query Engine for Producing Partial Results. With J. Shanmugasundaram, K. Tufte, D. DeWitt, and J. Naughton. *Proceedings of the Third International Workshop on the Web and Databases, WebDB 2000*, Dallas, May 2000, (Lecture Notes in Computer Science 1997, Springer, 2001).
115. The hybrid technique for reference materialization in object query processing. With Q. Wang and L. Shapiro. *Proceedings of the 4<sup>th</sup> International Conference on Database Engineering and Applications (IDEAS'2000)*, Tokyo, Japan, September 2000.
116. Optimizing object queries using an effective calculus. With L. Fegaras. *ACM Transactions on Database Systems* 25(4), December 2000.
117. Bundles in the wild: Tools for managing information to solve problems and maintain situation awareness. With P. Gorman, J. Ash, M. Lavelle, J. Lyman, L. Delcambre, S. Bowers and M. Weaver. *Library Trends* 49(2), pages 266-289, Fall 2000.
118. Bundles in captivity: An application of superimposed information. With L. Delcambre, S. Bowers, L. Deng, M. Weaver, P. Gorman, J. Ash, M. Lavelle, and J. Lyman. *Proceedings of the IEEE International Conference on Data Engineering*, Heidelberg, Germany, April 2001.
119. Bundles: Meeting Clinical Information Needs. With J. Ash, P. Gorman, M. Lavelle, J. Lyman, L. Delcambre, S. Bowers and M. Weaver. *Bulletin of the Medical Library Association* 89(3), July 2001.
120. Research Directions in Biodiversity and Ecosystem Informatics. With E. Landis, J. Cushing, A. Frondorf, A. Silberschatz, M. Frame and J. L. Schnase. Report of an NSF, USGS, NASA Workshop, Greenbelt, MD, June 2000.
121. The NIAGARA Internet Query System. With J. F. Naughton, D. J. DeWitt, A. Aboulmaga, J. Chen, L. Galanis, J. Kang, R. Krishnamurthy, Q. Luo, N. Prakash, R. Ramamurthy, J. Shanmugasundaram, F. Tian, K. Tufte, S. Viglas, Y. Wang, C. Zhang, B. Jackson, A. Gupta and R. Chen. *IEEE Data Engineering Bulletin* 24(2), June 2001.
122. Aggregation and Accumulation of XML Data. With K. Tufte. *IEEE Data Engineering Bulletin* 24(2), June 2001.
123. Exploiting upper and lower bounds in top-down query optimization. With L. Shapiro, P. Benninghoff, K. Billings, Y. Fan, K. Hatwal, B. Vance, and Q. Wang. *Proceedings of the 5<sup>th</sup> International Conference on Database Engineering and Applications (IDEAS'2001)*, Grenoble, France, July 2001.
124. A Superimposed Architecture for Enhanced Metadata. With M. Weaver and L. Delcambre. *Proceedings of the Third DELOS Network of Excellence Workshop on Interoperability and Mediation in Heterogeneous Digital Libraries*, Darmstadt, Germany, September 2001.
125. Mutant Query Plans. With V. Papadimos. *Information & Software Technology* 44(4), March 2002.
126. Enriching Documents in an Information Portal using Superimposed Schematics. With S. Bowers and L. Delcambre. *Proceedings Dg.o 2002 National Conference on Digital Government Research*, Los Angeles, May 2002.
127. Representing, Exploiting, and Extracting Metadata using Metadata++. With M. Weaver, B. Howe, L. Delcambre and T. Tolle. *Proceedings Dg.o 2002 National Conference on Digital Government Research*, Los Angeles, May 2002.
128. Using Controlled Vocabularies as a Knowledge Base for Natural Resource Managers. With T. Tolle, P. Toccalino, L. Delcambre, J. Norman and F. Phillips. *Proceedings Dg.o 2002 National Conference on Digital Government Research*, Los Angeles, May 2002.
129. Spatial Infrastructure for Ecological Research. With J. Cushing, N. Nadkarni and L. Delcambre. *Proceedings Dg.o 2002 National Conference on Digital Government Research*, Los Angeles, May 2002.

130. Distributed Queries without Distributed State. With V. Papadimos. *Proceedings of the Fifth International Workshop on the Web and Databases, WebDB 2002*, Madison, Wisconsin, June 2002.
131. Template-driven End-User Ecological Database Design. With J. Cushing, N. Nadkarni, K. Healy, E. Ordway, and L. Delcambre. *Proceedings of the 6th World Multi-conference on Systemics, Cybernetics and Informatics (SCI 2002)*, Orlando, FL, July 2002.
132. Superimposed Schematics: Introducing E-R Structure for In-Situ Information Selections. With S. Bowers and L. Delcambre, *Proceedings Conceptual Modeling - ER 2002, 21st International Conference on Conceptual Modeling*, Tampere, Finland, October 2002, (Lecture Notes in Computer Science 2503, Springer, 2002).
133. Following Experts at Work in their Own Information Spaces: Using Observational Methods to Develop Tools for the Digital Library. With P. Gorman, M. Lavelle, and L. Delcambre. *Journal of the American Society of Information Science and Technology* 53(14), November 2002.
134. Harvesting Information to Sustain Forests. With L. Delcambre, T. Tolle, and the Forest Project Team. *Communications of the ACM* 46(1), January 2003.
135. Distributed Query Processing and Catalogs for Peer-to-Peer System, With V. Papadimos and K. Tuft. *Proceedings CIDR 2003: First Biennial Conference on Database Systems Research*, Asilomar, CA, January 2003.
136. Exploiting Punctuation Semantics in Continuous Data Streams. With P. Tucker, T. Sheard and L. Fegaras. *IEEE Transactions on Knowledge and Data Engineering* 15(3), May/June 2003.
137. Information System Challenges of Biodiversity and Ecosystem Informatics. With J. L. Schnase, J. Cushing, M. Frame, A. Frondorf, E. Landis and A. Silberschatz. *Information Systems* 28(4), June 2003.
138. Knowledge Management: A Reassessment. With F. Phillips, T. Tolle, E. Landis, L. Delcambre, M. Koch, N. Steckler, P. Tocalino and B. Banga. To appear in *Global Knowledge Management: Challenges and Opportunities*, H. R. Nemati, P. Palvia and R. Ajami, editors.
139. Will Databases Fail Bioinformatics, Too? *OMICS: A Journal of Integrative Biology* 7(1), January 2003.
140. Harvesting information to Sustain Forests. With L. Delcambre, T. Tolle and The Forest Project Team, *Communications of the ACM* 46(1), January 2003.
141. Applying Punctuation Schemes to Queries Over Continuous Data Streams. With P. Tucker and Tim Sheard. *IEEE Data Engineering Bulletin* 26(1), March 2003.
142. The Forest Portal: A Multidisciplinary Project. With M. Koch, L. Delcambre, P. Tocalino, E. Landis, F. Phillips, T. Tolle, L. Shapiro, N. Steckler, M. Weaver, S. Bowers, B. Banga, J. Brewster, A. Gutema, S. Murthy, B. Howe, R. Tummala, J. Norman, K. Zillman, D. Drake, C. Palmer, and A. Burt. *Proceedings Dg.o 2002 National Conference on Digital Government Research*, Boston, MA, May 2003.
143. The Lowell Database Research Self Assessment. With S. Abiteboul, R. Agrawal P. Bernstein, M. Carey, S. Ceri, B. Croft, D. DeWitt, M. Franklin, H. Garcia Molina, D. Gawlick, J. Gray, L. Haas, A. Halevy, J. Hellerstein, Y. Ioannidis, M. Kersten, M. Pazzani, M. Lesk, J. Naughton, H. Schek, T. Sellis, A. Silberschatz, M. Stonebraker, R. Snodgrass, J. Ullman, G. Weikum, J. Widom and S. Zdonik. June 2003. *Communications of the ACM* 48(5), June 2005.
144. Dealing with Disorder. With P.A. Tucker. Presented at the Workshop on Management and Processing of Data Streams, San Diego, June 2003.
145. Environmental Observation and Forecasting Systems: Vision, Challenges and Successes of a Prototype. With A. Baptista, T. Leen, Y. Zhang, A. Chawla, W.-Chi Feng, W.-Chang Feng, J. Walpole, C. Silva and J. Freire. Accepted for International Society for Environmental Information Sciences Annual Conference (ISEIS'2003), Regina, SA, July 2003.
146. Superimposing Spatial Enrichments in Traditional Information [Extended Abstract]. With L. Delcambre, M. Weaver, L. Shapiro and J.B. Cushing. International Workshop on Next Generation Geospatial Information (NG2I'03), Cambridge, Massachusetts, October 2003.
147. A Language for Environmental Data Manipulation. With B. Howe and A. Baptista. *Journal of Environmental Informatics* 2(3), December 2003.

148. Putting Integrated Information in Context: Superimposing Conceptual Models with SPARCE. With S. Murthy, L. Delcambre, and S. Bowers. *Proceedings of the First Asia-Pacific Conference on Conceptual Modeling*, Dunedin, New Zealand, January 2004.
149. Querying Bi-Level Information. With S. Murthy and L. Delcambre. *Proceedings of the Seventh International Workshop on the Web and Databases (WebDB2004)*, Paris, June 2004.
150. Emergent Semantics: Towards Self-Organizing Scientific Metadata. With B. Howe and P. Turner. *Proceedings of the International Conference on Semantics of Networked World: Semantics for Grid Databases*, Paris, June 2004. Springer-Verlag LNCS 3226.
151. Distribution Alternatives for Superimposed Information Services in Digital Libraries. With S. Murthy and L. Delcambre. *Peer-to-Peer, Grid, and Service-Oriented in Digital Library Architectures, 6th Thematic Workshop of the EU Network of Excellence DELOS*, Cagliari, Italy, June 2004. Springer-Verlag LNCS 3664, 2005
152. Algebraic Manipulation of Scientific Datasets. With B. Howe. *Proceedings 30<sup>th</sup> International Conference on Very Large Databases*, Toronto, August-September 2004. Extended version in *The VLDB Journal* 14(4), November 2005.
153. Linear Road: A Stream Data Management Benchmark. With A. Arasu, M. Cherniack, E. F. Galvez, A. Maskey, E. Ryvkina, M. Stonebraker and R. Tibbetts. *Proceedings 30<sup>th</sup> International Conference on Very Large Databases*, Toronto, August-September 2004.
154. Logical and Physical Data Independence for Native Scientific Data Repositories. With Bill Howe. *IEEE Data Engineering Bulletin* 27(4), December 2004.
155. Semantics of Data Streams and Operators (Invited Paper), With J. Li, V. Papadimos, P. Tucker and K. Tufte. *Proceedings 10<sup>th</sup> International Conference on Database Theory*, Edinburgh, Scotland, January 2005.
156. Deriving and Managing Data Products in an Environmental Observation and Forecasting System. With L. Bright. *Proceedings CIDR 2005: Second Biennial Conference on Database Systems Research*, Asilomar, CA, January 2005.
157. No pane, no gain: efficient evaluation of sliding-window aggregates over data streams. With J. Li, K. Tufte, V. Papadimos and P. Tucker. *SIGMOD Record* 34(1), March 2005.
158. Forensix: A Robust, High-Performance Reconstruction System. With A. Goel, W.-C. Feng, W.-C. Feng and J. Walpole. *Proceedings of the Fourth International Workshop on Assurance in Distributed Systems and Networks (ADSN)*, Columbus, Ohio, June 2005.
159. Semantics and Evaluation Techniques for Window Aggregates in Data Streams. With J. Li, K. Tufte, V. Papadimos and P. Tucker. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Baltimore, June 2005.
160. Retrofitting a Data Model to Existing Environmental Data. With B. Howe. *Proceedings of the 17th International Conference on Scientific and Statistical Database Management*, Santa Barbara, California, June 2005.
161. Efficient Scheduling and Execution of Scientific Workflow Tasks. With L. Bright. *Proceedings of the 17th International Conference on Scientific and Statistical Database Management*, Santa Barbara, California, June 2005.
162. Digital Library Information-Technology Infrastructures. With Y. Ioannidis, S. Abiteboul, P. Buneman, S. B. Davidson, E. A. Fox, A. Y. Halevy, C. A. Knoblock, F. Rabitti, H.-J. Schek and G. Weikum. *International Journal on Digital Libraries* 5(4), August 2005.
163. Managing the Forecast Factory. With L. Bright and B. Howe. *Proceedings of the Workshop on Scientific Workflows (SciFlo 2006)*, Atlanta, Georgia, April 2006.
164. Principles of Dataspace Systems (keynote). With A. Y. Halevy and M. J. Franklin. *Proceedings of the Twenty-Fifth ACM SIGACT-SIGMOD-SIGART Symposium on Principles of Database Systems*, Chicago, Illinois, June 2006.
165. Mash-o-matic. With S. Murthy and L. Delcambre. *Proceedings of the 2006 ACM Symposium on Document Engineering*, October 2006, Amsterdam.

166. Explicitly Representing Superimposed Information in a Conceptual Model. With S. Murthy and L. Delcambre. *Proceedings of the 25<sup>th</sup> International Conference on Conceptual Modeling (ER 2006)*, Tucson, Arizona, November 2006.
167. Smoothing the ROI Curve for Scientific Data Management Applications. With B. Howe and L. Bright. *Proceedings of the Third Biennial Conference on Innovative Data Systems Research (CIDR 2007)*, Asilomar, CA, January 2007.
168. Automatic High-Performance Reconstruction and Recovery. With A. Goel, W.-C. Feng, and W.-C. Feng. *Computer Networks* 51(5), April 2007.
169. Travel Time Estimation Using NiagaraST and latte. (Demo paper) With K. Tufte, J. Li, V. Papadimos, R. Bertini and J. Rucker. *Proceedings of the ACM SIGMOD International Conference on the Management of Data*, Beijing, June 2007.
170. Component-Based End-User Database Design for Ecologists. With J. Cushing, N. Nadkarni, A. Fiala, M. Finch, E. Murphy-Hill and L. Delcambre. *Journal of Intelligent Information Systems* 29(1), August 2007.
171. Using Punctuation Schemes to Characterize Strategies for Querying over Data Streams. With P. Tucker, T. Sheard and P. Stephens. *IEEE Transactions on Knowledge and Data Engineering* 19(9), September 2007.
172. Quarrying Dataspaces: Schemaless Profiling of Unfamiliar Information Sources. With B. Howe, N. Rayner and J. Rucker. *Proceedings of the 24<sup>th</sup> International Conference on Data Engineering Workshops: Information Integration Methods, Architectures, and Systems (IIMAS)*, Cancún, April 2008.
173. Speeding Up On-the-fly Integration of DB and Exo-DB Data. With S. Murthy and L. Delcambre. *Proceedings of the 24<sup>th</sup> International Conference on Data Engineering Workshops: Information Integration Methods, Architectures, and Systems (IIMAS)*, Cancún, April 2008.
174. Scientific Exploration in the Era of Ocean Observatories. With A. Baptista, B. Howe, J. Freire and C. Silva. *Computing in Science and Engineering* 10(3), May-June 2008.
175. Out-of-Order Processing: A New Architecture for High-Performance Stream Systems. With J. Li, K. Tufte, V. Shkapenyuk, V. Papadimos and T. Johnson. *Proceedings of the VLDB Endowment* 1(1), August 2008.
176. Superimposed Information Architecture for Digital Libraries. With D. Archer, L. Delcambre, F. Corubolo, L. Cassel, S. Price, U. Murthy, E. Fox, S. Murthy, J. McCall, K. Kuchibhotla and R. Suryavanshi. *Research and Advanced Technology for Digital Libraries, 12<sup>th</sup> European Conference (ECDL 2008)*, Aarhus, Denmark, September 2008. Springer LNCS 5173.
177. Declaratively Producing Data Mash-ups. With S. Murthy. *Proceedings of the 14<sup>th</sup> International Conference on the Management of Data (COMAD 2008)*, Mumbai, India, December 2008.
178. AdaptWID: An Adaptive, Memory-Efficient Window Aggregation Implementation. With J. Li, K. Tufte and V. Papadimos. *IEEE Internet Computing* 12(6), December 2008.
179. Requirements for Science Data Bases and SciDB. (Perspectives Paper) With M. Stonebraker, J. Becla, D. DeWitt, K.-T. Lim, O. Ratzenberger and S. Zdonik. *Proceedings of the Fourth Biennial Conference on Innovative Data Systems Research*, Asilomar, California, January 2009.
180. A Framework for Fine-grained Data Integration and Curation. With D. Archer and L. Delcambre. *Proceedings of the Workshop on the Theory and Practice of Provenance (Usenix)*, San Francisco, February 2009.
181. Scientific Mashups: Runtime-Configurable Data Product Ensembles. With B. Howe and H. Green-Fishback. *Proceedings of the 21st International Conference on Scientific and Statistical Database Management (SSDBM 2009)*, New Orleans, LA, June 2009.
182. Microsoft CEP Server and Online Behavioral Targeting. (Demo Paper) With M. Ali, C. Gereia, B. Raman, B. Sezgin, T. Tarnavski, T. Verona, P. Wang, P. Zaback, A. Kirilov. A. Ananthanarayan, M. Liu, A. Raizman, R. Krishnan, R. Schindlauer, T. Grabs, S. Bjeletich, B. Chandramouli, J. Goldstein, S. Bhat, Y. Li, V. Di Nicola, X. Wang, I. Santos, O. Nano and S. Grell. *Proceedings of the VLDB Endowment* 2(2), Lyon, August 2009.
183. A Demonstration of SciDB: A Science-Oriented DBMS. (Demo Paper) With P. Cudré-Mauroux, H. Kimura, K.-T. Lim, J. Rogers, R. Simakov, E. Soroush, P. Velikov, D. Wang, M. Balazinska, J. Becla, D.

- DeWitt, B. Heath, S. Madden, J. Patel, M. Stonebraker and S. Zdonik. *Proceedings of the VLDB Endowment* 2(2), Lyon, August 2009.
184. On-the-fly Progress Detection in Iterative Stream Queries. With B. Chandramouli and J. Goldstein. *Proceedings of the VLDB Endowment* 2(1), Lyon, August 2009.
  185. Toward Formal Semantics for Data and Schema Evolution in Data Stream Management Systems. With R. Fernández-Moctezuma, J. Terwilliger and L. Delcambre. *Advances in Conceptual Modeling – Challenging Perspectives, ER 2009 Workshops: First International Conference on Evolving Theories of Conceptual Modelling (ETheCoM 2009)*, Gramado, Brazil, November 2009. Springer LNCS 5833.
  186. Dedalus: Datalog in Time and Space. With P. Alvaro, W. Marczak, N. Conway, J. Hellerstein and R. Sears. *Datalog Reloaded – First International Workshop (Datalog 2.0)*, Oxford, March 2010. Springer LNCS 6702.
  187. Towards Execution Guarantees for Stream Queries. With R. Fernández-Moctezuma and K. Tufte. *Proceedings of the Third International Workshop on Scalable Stream Processing Systems (SSPS)*, Atlanta, April 2010.
  188. High-Performance Dynamic Pattern Matching over Disordered Streams. With B. Chandramouli and J. Goldstein. *Proceedings of the VLDB Endowment* 3(1), Singapore, September 2010.
  189. Updatable and Evolvable Transforms for Virtual Databases. With J. Terwilliger, L. Delcambre, S. Britell and J. Steinhauer. *Proceedings of the VLDB Endowment* 3(1), Singapore, September 2010.
  190. Enabling Revisitation of Fine-Grained Clinical Information. With J. Terwilliger, L. Delcambre, J. Logan, D. Archer, J. Steinhauer and S. Britell. *Proceedings of the 1<sup>st</sup> ACM International Health Informatics Symposium (IHI 2010)*, Arlington, VA, November 2010.
  191. Support for Schema Evolution in Data Stream Management Systems. With J. Terwilliger, R. Fernández-Moctezuma and L. Delcambre. *Journal of Universal Computer Science* 16(20), 2010.
  192. Framing the Question: Detecting and Filling Spatial-Temporal Windows. With J. Whiteneck, K. Tufte, A. Bhat and R. Fernández-Moctezuma. *Proceedings of the First ACM SIGSPATIAL International Workshop on Geostreaming (IWGS)*, San Jose, November 2010.
  193. Tags in Domain-specific Sites: New Information? With J. Steinhauer, L. Delcambre, M. Lykke and V. Tran. *Proceedings of the 2011 Joint Conference on Digital Libraries (JCDL 2011)*, Ottawa, June 2011.
  194. Finding Haystacks with Needles: Ranked Search for Data Using Geospatial and Temporal Characteristics. With V. Megler. *Proceedings of the 23<sup>rd</sup> International Conference on Scientific and Statistical Database Management (SSDBM '11)*, Portland, OR, July 2011. Springer LNCS 6809.
  195. Cloaking Data to Ease View Creation, Query Expression, and Query Execution. With S. Murthy and L. Delcambre. *Conceptual Modelling and Its Theoretical Foundations – Essays Dedicated to Bernhard Thalheim on the Occasion of His 60<sup>th</sup> Birthday*. Springer LNCS 7260, 2012.
  196. The Curriculum Forecast for Portland: Cloudy with a Chance of Data. With M. Grossniklaus. *SIGMOD Record* 41(1). March 2012.
  197. Physically Independent Stream Merging. With B. Chandramouli and J. Goldstein. *Proceedings of the 28<sup>th</sup> International Conference on Data Engineering (ICDE '12)*, IEEE, Washington, DC, April 2012.
  198. Navigating Oceans of Data. With V. Megler, A. Baptista, A. Jaramillo, C. Seaton and P. Turner. *Proceedings of the 24<sup>th</sup> International Conference on Scientific and Statistical Database Management (SSDBM '12)*, Chania, Crete, Greece, June 2012. Springer LNCS 7338.
  199. Capturing Episodes: May the Frame be with You. With M. Grossniklaus, S. Moorthy and K. Tufte. *Proceedings of the Sixth ACM International Conference on Distributed Event-Based Systems (DEBS 2012)*, Berlin, Germany, July 2012.
  200. Confluence Analysis for Distributed Programs: A Model-Theoretic Approach. With W. Marczak, P. Alvaro, N. Conway and J. Hellerstein. *Datalog in Academia and Industry – Proceedings of the Second International Workshop (Datalog 2.0)*. Vienna, Austria, September 2012. Springer LNCS 7494.
  201. Logic and Lattices for Distributed Programming. With N. Conway, W. Marczak, P. Alvaro and J. Hellerstein. *Proceedings of the ACM Symposium on Cloud Computing (SoCC '12)*. San Jose, October 2012.

202. When Big Data Leads to Lost Data. With V. Megler. *Proceedings of the 5<sup>th</sup> Ph.D. Workshop on Information and Knowledge Management (PIKM 2012)*. Maui, Hawaii, November 2012.
203. Data Near Here: Bringing Relevant Data Closer to Scientists. With V. Megler. *Computing in Science and Engineering*, 15(3), January-February 2013.
204. Towards Dynamic Pricing-Based Collaborative Optimizations for Green Data Centers. With Y. Li, D. Chiu, C. Liu, L. Phan, T. Gill, S. Aggarwal, Z. Zhang, B. Loo and B. McManus. *Workshops Proceedings of the 29<sup>th</sup> IEEE Conference on Data Engineering (ICDE 2013)*. Brisbane, Australia, April 2013.
205. Taming the Metadata Mess. With V. M. Megler. *Workshops Proceedings of the 29<sup>th</sup> IEEE Conference on Data Engineering (ICDE 2013)*. Brisbane, Australia, April 2013.
206. Grand Challenge: SPRINT Stream Processing Engine as a Solution. (Best Paper award) With Y. Wu and K.-L. Tan. *Proceedings of the 7<sup>th</sup> International Conference on Distributed Event-Based Systems (DEBS '13)*. Arlington, Texas, June-July 2013.
207. User Trust and Judgments in a Curated Database with Explicit Provenance. With D. Archer and L. Delcambre. *In Search of Elegance in the Theory and Practice of Computation*. Springer LNCS 8000, 2013.
208. Agrios: A Hybrid Approach to Big Array Analytics. With P. Leyshock and K. Tufte. *Proceedings of the 2013 IEEE International Conference on Big Data*. Santa Clara, California, October 2013.
209. Lightweight Indexing of Observational Data in Log-Structured Storage. With S. Wang and B.C. Ooi. *Proceedings of the VDLB Foundation 7(7)*, March 2014.
210. Blazes: Coordination Analysis for Distributed Programs. With P. Alvaro, N. Conway and J.M. Hellerstein. *Proceedings of the 30<sup>th</sup> International Conference on Data Engineering (ICDE '14)*, IEEE, Chicago, March – April 2014.
211. Challenges for Dataset Search (invited paper). With V.M. Megler and K. Tufte. *Proceedings of the 19<sup>th</sup> International Conference on Database Systems for Advanced Applications (DASFAA 2014)*, Bali, Indonesia, April 2014. Springer LNCS 8421.
212. Data Movement in Hybrid Analytic Systems: A Case for Automation (short paper). With P. Leyshock and K. Tufte. *Proceedings of the 26<sup>th</sup> International Conference on Scientific and Statistical Database Management (SSDBM '14)*, Aalborg, Denmark, June – July 2014.
213. Helping Scientists Reconnect Their Datasets. With A. Alawini, K. Tufte and B. Howe. *Proceedings of the 26<sup>th</sup> International Conference on Scientific and Statistical Database Management (SSDBM '14)*, Aalborg, Denmark, June – July 2014.
214. Federation in Cloud Data Management: Challenges and Opportunities. With H.V. Jagadish, D. Jiang, B.C. Ooi, K.-L. Lee and W.-C. Tan. *IEEE Transactions on Knowledge and Data Engineering* 26(7), July 2014.
215. S-Store: A Streaming NewSQL System for Big Velocity Applications (demo paper). With U. Çetintemel, J. Du, T. Kraska, S. Madden, J. Meehan, A. Pavlo, M. Stonebrake, E. Sutherland, N. Tatbul, K. Tufte, H. Wang and S.B. Zdonik. *Proceedings of the VDLB Foundation 7(13)*, August 2014.
216. Minimizing Data Movement through Query Transformation. With P. Leyshock and K. Tufte. *Proceedings of the 2014 IEEE International Conference on Big Data*. Washington, DC, October 2014.
217. Special Issue on Urban Informatics (editor). With V. M. Megler and K. Tufte. *IEEE Bulletin on Data Engineering* 37(4), December 2014.
218. Are Data Sets Like Documents?: Evaluating Similarity-Based Ranked Search over Scientific Data. With V.M. Megler. *IEEE Transactions on Knowledge and Data Engineering* 27(1), January 2015.
219. Demonstrating “Data Near Here”: Scientific Data Search. With V.M. Megler. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Melbourne, May – June 2015.
220. Data Like This: Ranked Search of Genomic Data (vision paper). With V.M. Megler, D. Bottomly, L. White, S. K. McWeeney and B. Wilmot. *Proceedings of the Second International Workshop on Exploratory Search in Databases and the Web (ExploreDB 2015)*, Melbourne, May – June 2015.
221. The BigDAWG Polystore System. With J. Duggan, A.J. Elmore, M. Stonebraker, M. Balazinska, B. Howe, J. Kepner, T. Mattson and S.B. Zdonik. *SIGMOD Record* 44(2), June 2015.



222. Towards Automated Prediction of Relationships among Scientific Datasets (short paper). *Proceedings of the 27<sup>th</sup> International Conference on Scientific and Statistical Database Management (SSDBM '14)*, La Jolla, California, June – July 2015.
223. A Demonstration of the BigDAWG Polystore System (demo paper). With A.J. Elmore, J. Duggan, M. Stonebraker, M. Balazinska, U. Çetintemel, V. Gadepally, J. Heer, B. Howe, J. Kepner, T. Kraska, S. Madden, T.G. Madden, S. Papadopoulos, J. Parkhurst, N. Tatbul, M. Vartak and S. Zdonik. *Proceedings of the VDLB Foundation* 8(13), August 2015.
224. Query From Examples: An Iterative, Data-Driven Approach to Query Construction. With H. Li and C.-Y. Chan. *Proceedings of the VDLB Foundation* 8(13), September 2015.
225. S-Store: Streaming Meets Transaction Processing. With J. Meehan, N. Tatbul, S. Zdonik, C. Aslantus, U. Çetintemel, J. Du, T. Kraska, S. Madden, A. Pavlo, M. Stonebraker, K. Tufte and H. Wang. *Proceedings of the VDLB Foundation* 8(13), September 2015.
226. Infrastructure for Collaborative Science and Societal Applications in the Columbia River Estuary. With A.M. Baptista, C. Seaton, M. Wilkin, S. Riseman, J. Needoba, P.J. Turner, T. Karna, J. Lopez, L. Herfort, V.M. Megler, C. McNeil, B.C. Crump, T.D. Peterson, Y. Spitz, and H.M. Simon. *Frontiers of Earth Science* 9(4), December 2015.
227. Technical Perspective: In-Situ Database Management. *Communications of the ACM* 58(12), December 2015.
228. Special Issue on Next-Generation Stream Processing (editor). With B. Chandramouli. *IEEE Bulletin on Data Engineering* 38(4), December 2015.
229. Frames: Data-driven Windows. With M. Grossniklaus, J. Miller, S. Moorthy and K. Tufte. *Proceedings of the Tenth ACM International Conference on Distributed Event-Based Systems (DEBS 2016)*, Irvine, California, June 2016.
230. Multiple Diagram Navigation (MDN). With H. Benotman and L. Delcambre. *Proceedings of the Third International Workshop on Exploratory Search in Databases and the Web (ExploreDB 2016)*, San Francisco, July 2016.
231. Fast and Adaptive Indexing of Multi-Dimensional Observational Data. With S. Wang and B. C. Ooi. *Proceedings of the VDLB Foundation* 9(14), September 2016.
232. Indexing in an Actor-Oriented Database. With P. A. Bernstein, M. Dashti and T. Kiefer. *Proceedings of the Eighth Biennial Conference on Innovative Data Systems Research (CIDR 2017)*, Chaminade, California, January 2017.
233. GRETA: Graph-based Real-time Event Trend Aggregation. With O. Poppe, C. Lei and E. A. Rundensteiner. *Proceedings of the VDLB Endowment* 10(1), September 2017.
234. Blazes: Coordination Analysis and Placement for Distributed Programs. With P. Alvaro, N. Conway, and J. M. Hellerstein, *ACM Transactions on Database Systems* 42(4), November 2017.
235. Sharon: Shared Online Event Sequence Aggregation. With O. Poppe, A. Rozet, C. Lei and E. A. Rundensteiner. *Proceedings of the 34th IEEE International Conference on Data Engineering (ICDE 2018)*, Paris, France, April 2018.
236. Datalog: Concepts, History, and Outlook. With K. Tuncay Tekle, M. Kifer and D. S. Warren. In *Declarative Logic Programming*, M. Kifer and Y. A. Liu, editors, ACM / Morgan & Claypool, 2018.
237. Extending Multiple Diagram Navigation with Internal Diagram and Collection Connections. With H. Benotman. *Proceedings of the 18th ACM/IEEE on Joint Conference on Digital Libraries (JCDL 2018)*, Fort Worth, Texas, June 2018.
238. Event Trend Aggregation Under Rich Event Matching Semantics. With O. Poppe, C. Lei, and E. A. Rundensteiner. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Amsterdam, June – July 2019.
239. Towards Agile Integration: Specification-based Data Alignment. With C. Giossi, D. Maier, K. Tufte, E. Gall, M. Barnes. *Proceedings of the IEEE 21st International Conference on Information Reuse and Integration for Data Science (IRI 2020)*, Las Vegas, August 2020.

240. Advice from SIGMOD/PODS 2020. With R. Pottinger, A.H. Doan, E. C. Dragut, B. Howe, J. Lateulere, J. Lateulere, M. Milani, T. Rabl, D. Suciu, Y. Tao, W.-C. Tan, and K. Tufte. *SIGMOD Record* 49(3), September 2020.
241. Comparing Personalized PageRank and Activation Spreading in Wikipedia Diagram-Based Search. With H. Benotman. *Proceedings of the 21st ACM/IEEE on Joint Conference on Digital Libraries (JCDL 2021)*, Champaign, Illinois, September 2021.
242. The DB Community vis-à-vis Environmental, Health, and Societal Grand Challenges: Innovation Engine, Plumber, or Bystander? With A. Ailamaki, L. Battle, J. Gehrke, M. Kitsuregawa, C. Ré, M. Zhang and M. Balazinska. *Proceedings of the ACM-SIGMOD International Conference on Management of Data*, Philadelphia, Pennsylvania, June 2022.
243. Deciding What Not to Do. *SIGMOD Record* 51(2), June 2022.
244. Count-Free Histograms with Race Logic for Single-Photon LiDAR. With A. Ingle. *Proceedings of the 2023 International Imaging Sensor Workshop (IISW23)*, With A. Ingle. Crieff, Scotland, May 2023.
245. Count-Free Single-Photon 3D Imaging with Race Logic. With A. Ingle. 2023 International Conference on Computational Photography (Best Paper award), July 2023. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, August 2023.
246. Effective Entity Augmentation by Querying External Data Sources. With C. Buss, M. Tokarev, J. Mousavi, A. Termehchy and S. Lee. *Proceedings of the VDLB Endowment* 16(11), July 2023.
247. Effective Entity Augmentation by Querying External Data Sources. With C. Buss, M. Tokarev, J. Mousavi, A. Termehchy and S. Lee. *Proceedings of the NeurIPS Second Table Representation Learning Workshop*, New Orleans, December 2023.

## Books and Book Chapters

*The Theory of Relational Databases*. Computer Science Press, 1983, xv + 637 pp. (Russian Translation 1987, collected in the *ACM SIGMOD Anthology*, vol. 4, 2000.)

Trees. In *The Handbook of Electrical and Computer Engineering*, S.S.L. Chang, editor, Wiley, 1983.

*Computing with Logic: Introduction to Logic Programming*. With D.S. Warren, Benjamin-Cummings, 1988, xxi + 535 pp.

*Readings in Object-Oriented Database Systems*. With S.B. Zdonik, Morgan Kaufmann, San Mateo, California, 1990, x + 629 pp.

*Query Processing for Advanced Database Systems*, J.C. Freytag, D. Maier and G. Vossen, editors, Morgan Kaufmann, 1993, xxiii + 481 pp.

*Persistent Object Systems*, M. Atkinson, D. Maier and V. Benzaken, editors, Springer-Verlag, 1995, xi + 544 pp.

Punctuations. With P. Tucker. In *Encyclopedia of Database Systems*, L. Liu and T. Özsu , editors. Springer, 2009 (2<sup>nd</sup> ed., 2018).

Datalog: Concepts, History and Outlook. With K. T. Tekle, M. Kifer and D. S. Warren. In *Declarative Logic Programming*, ACM / Morgan & Claypool, 2018.

## Patents

*Asynchronous transfer of state information between continuous query plans*. With B. Chandramouli, J. D. Goldstein, P. A. Zabback and D. Wang. US Patent US 8478743 B2, 2 July 2013.

*Search tool that utilizes scientific metadata matched against user-entered parameters*. With V.M. Megler. US Patent US 8560531 B2, 15 October 2013.

*Dynamic pattern matching over ordered and disordered data streams*. With B. Chandramouli, J. D. Goldstein, M. H. Ali and R. Schindlauer. US Patent US 8762297 B2, 24 June 2014.

*Recursive processing in stream queries*. With J. D. Goldstein, US Patent US 9229986 B2, 5 Jan 2016.

*Efficient logical merging over physically divergent streams*. With B. Chandramouli, J. D. Goldstein and P. A. Zabback, US Patent US 9965520 B2, 8 May 2018.

## STUDENT SUPERVISION

## Ph.D. Theses

- Billie S. Goldstein, April 1982.  
*Toward More Expressive Database Specifications: Value Constraints on Relations.*
- Albert Croker, June 1983.  
*Approaches to Increasing Database Concurrency Through Locking.*
- David Rozenstein, June 1983.  
*Query and Role-playing in the Association-Object Data Model.*
- Jacob Stein, October 1984.  
*Constraints in the Association-Object Data Model.*
- Mark Grossman, June 1987.  
*Task Interaction and Control System (TICS).*
- Raimund Ege, August 1987.  
*Automatic Generation of Interactive Displays Using Constraints.*
- Harry Porter, December 1988.  
*A Logic-Based Grammar Formalism Incorporating Feature Structures and Inheritance.*
- Jianhua Zhu, July 1989.  
*Model, Language and Implementation Aspects of a Logic-based Object-Oriented Database System.*
- Hitomi Ohkawa, April 1993.  
*Object-Oriented Database Support for Scientific Data Management: A System for Experimentation.*
- Belinda Flynn, February 1994.  
*A Software Tool for Specifying and Generating Displays in Object-Oriented Database Applications.*
- Judith Bayard Cushing, March 1995.  
*Computational Proxies: An Object-based Infrastructure for Computational Science.*
- David Hansen, May 1995.  
*An Object-Oriented Heterogeneous Database Architecture.*
- Bennet Vance, August 1997.  
*Join-Order Optimization with Cartesian Products.*
- Quan Wang, March 2002.  
*Cost-Based Object Query Optimization.*
- Paul Benninghoff, April 2003.  
*Scalable and Efficient Active Service Integration.*
- Kristin Tufte, December 2004. (Research Supervisor. Thesis Chair: David J. DeWitt)  
*Partial Results and Structural Aggregation over XML Data Streams.*
- Peter Tucker, June 2005.  
*Punctuated Data Streams.*
- Bill Howe, December 2006.  
*Gridfields: Model-Driven Data Transformation in the Physical Sciences.*
- Jin Li, October 2008.  
*Window Queries over Data Streams.*
- Sudarshan Murthy, March 2009.  
*A Framework for Superimposed Applications: Techniques to Represent, Access, Transform, and Interchange Bi-level Information.*
- Rafael de Jesús Fernández-Moctezuma, July 2012.  
*A Data-Descriptive Feedback Framework for Data Stream Management Systems.*
- Veronika Megler, June 2014.  
*Ranked Similarity Search of Scientific Datasets: An Information Retrieval Approach.*
- Patrick Leyshock, December 2014.  
*Optimizing Data Movement in Hybrid Analytic Systems.*

Abdussalam Alawini, February 2016.  
*Identifying Relationships between Scientific Datasets.*

Hisham Benotman, February 2020.  
*Multiple Diagram Navigation.*

Basem Elazabbi, June 2021 (Co-advisor with Kristin Tufte)  
*Storing Intermediate Results in Space and Time: SQL Graphs and Block Referencing*

## **Masters Projects and Theses**

Paula Wolk, September 1979.  
*Implementation of a Minimum Cover Algorithm for Relational Databases*

Stephen C. Strategos, March 1980.  
*Implementation of Third Normal Form Relational Schema Generator.*

Amos Ziv, October 1981.  
*The Avocado Problem.*

Peter Nordquist, March 1985.  
*Automatic Display Generation in Smalltalk.*

Mark Ballard, April 1986.  
*QUICKTALK: A Smalltalk-80 Dialect for Describing Primitive Methods.*

Juliana Lim, May 1989.  
*The FilterManager: Maintaining Constraints Among Processes.*

Brian Kennedy, August 1991.  
*Architectural Alternatives for Connecting a Persistent Programming Language and an Object-Oriented Database System.*

Meenakshi Rao, November 1995.  
*Computational Proxies for Computational Chemistry: A Proof of Concept.*

Donald Abel, 1996, (PSU, research supervisor).  
*The Parser Converter Loader: An Implementation of the Computational Chemistry Output Language.*

Christopher Sells, May 1997.  
*Bridging Object Models: The Faux-Object Idiom.*

Mark Wong, January 2002.  
*Logging Clickstream Data Into a Database on a Consolidated System.*

Amit Bhat, January 2011.  
*Low-latency Estimates for Window-Aggregate Queries over Data Streams.*

Abhinav Sunderrajan (National University of Singapore), November 2013.  
*Archive Streams for History-Enhanced Event Processing.*

Niveditha Venugopal, December 2018.  
*Annotation-Enabled Interpretation and Analysis of Time-Series Data*

## **PROFESSIONAL ACTIVITIES**

### **Professional and Honorary Societies**

Association for Computing Machinery (Fellow)

SIGACT

SIGMOD

Institute for Electrical and Electronic Engineers (Senior Member)

Computer Society

Database Engineering Technical Committee

Society for Industrial and Applied Mathematics

Phi Beta Kappa

Sigma Xi

Oregonians for Rationality

### Advisory Boards

Genetics Resource and Informatics Program, Oregon National Primate Resource Center, 2004  
 Center for Biostatistics, Informatics and Computing in Biology and Medicine, OHSU, 2003-2004.  
 Board on Mathematical Sciences and their Applications, The National Academies, 2011-2020.  
 Maier Math Foundation Board of Directors, 2021-2024.

### Reviewing and Editing

Associate Editor, *ACM Transactions on Database Systems*, 1987-1994.

Associate Editor, *International Journal of Digital Libraries*, 1997-2000.

Review Board, *Proceedings of the VLDB Endowment*, 2008-2010.

Reviewed papers for

*ACM Computing Surveys*  
*ACM Transactions on Database Systems*  
*ACM Transactions on Office Information Systems (now Trans. on Information Systems)*  
*ACM Transactions on Parallel and Distributed Systems*  
*Acta Informatica*  
*Advances in Computing Research*, vol. 3  
*Advances in Database Theory*, vols. 1 and 2  
*Annals of Mathematics and Artificial Intelligence*  
*Bulletin of the American Meteorological Society*  
*Communications of the ACM*  
*Computer Magazine*  
*Data and Knowledge Engineering*  
*IEEE Internet Computing*  
*IEEE Multimedia*  
*IEEE Software*  
*IEEE Transactions on Computers*  
*IEEE Transactions on Knowledge and Data Engineering*  
*IEEE Transactions on Parallel and Distributed Systems*  
*Information Processing Letters*  
*Information Systems*  
*International Journal of Parallel Programming*  
*International Journal of Digital Libraries*  
*Internet Computing*  
*Journal of Automated Reasoning*  
*Journal of Computer and System Sciences*  
*Journal of Intelligent Information Systems*  
*Journal of Logic Programming*  
*Journal of the ACM*  
*Journal of the Urban and Regional Information Systems Association*  
*Logic Programming and its Applications*  
*Proceedings of the IEEE*  
*SIAM Journal on Computing*  
*SIGMOD Record*  
*Theoretical Computer Science*  
*Theory and Practice of Object Systems*

*VLDB Journal*

## Referee for

2nd International Conference on Databases—Improving Usability and User Responsiveness;  
 IFIP '83;  
 1984, 1985, 1986 International Symposia on Logic Programming;  
 1986, 1987 ACM Conference on Object-Oriented Programming Systems, Languages and Applications;  
 1988 Conference on Extending Database Technology;  
 1988 European Conference on Object-Oriented Programming;  
 Twelfth ACM Symposium on Operating System Principles;  
 1990 3rd International Conference on Database Theory;  
 1992 IEEE International Conference on Data Engineering;  
 Persistent Object Systems, 1996;  
 Principles and Practice of Declarative Programming, 2009.

Reviewer for *Zentralblatt für Mathematik*, 1982-1988.

Panelist for NSF Graduate Research Fellowship selections, 1982, 1983, 1985.

Small Business Innovative Research in Information Science and Technology, 1985.

Panelist for NSF Young Investigator Award selections, 1994.

Proposal reviewer for Hong Kong Research Committee (City University of Hong Kong), 2001.

Panelist, NIH Special Emphasis Panel (ZRG1 SSS-H(91)S) on Bioinformatics and Computational Biology Software, 2003.

Review for NSF Computing Innovation Fellows 2020 program.

**Program Committees**

- Program Organizer, XP4.5 Workshop on Database Theory, Stanford University, August 1983.
- 1984, 1988, 1991 ACM SIGACT-SIGMOD Symposium on Principles of Database Systems.
- 1984, 1986, 1988, 1989, 1993, 2001, 2005, 2012 (demos), 2104, 2016 ACM SIGMOD International Conferences on Management of Data (Best Paper sub-committee, 2001).
- Program Co-chair, 1989 ACM SIGMOD Conference on Management of Data.
- 1986 ACM Conference on Object-Oriented Programming Systems, Languages and Applications.
- Tutorial Committee member, 1990 joint European Conference on Object-Oriented Programming—ACM Conference on Object-Oriented Programming Systems, Languages and Applications.
- 1989 International Conference on Extending Database Technology.
- 1991 International Conference on Deductive and Object-Oriented Databases.
- 1991 Third International Workshop on Database Programming Languages.
- 1992 DARPA Software Technology Conference.
- Program Co-chair, Sixth International Workshop on Persistent Object Systems, 1994.
- Program Co-chair, 7th International Hong Kong Computer Society Database Workshop, 1996.
- 1997, 1999, 2004, 2010 International Conference on Very Large Data Bases, including Best 10-Year-Old Paper Award subcommittee (1997).
- International Conference on Scientific and Statistical Database Management, 1999, 2003, 2010.
- SIGMOD Awards Committee, 1998, 1999, 2000 (chair), 2006-2010 (chair 2009), 2024-2028.
- International Workshop on the Web and Databases (WebDB), 2003.

- 2004 ICDE PhD Workshop.
- Workshop on Information Integration, 2006.
- International Conference on Data Engineering, 2004 (Ph.D. Workshop), 2007, 2010, 2015.
- Program Co-chair, Ninth International Conference on Web Information Systems Engineering (WISE), 2008.
- Workshop on Smart Cities and Urban Analytics (UrbanGIS), 2015.
- IEEE 12<sup>th</sup> International Conference on eScience, 2016.
- Workshop on Methods to Manage Heterogeneous Big Data and Polystore Databases, 2016, 2017, 2018.
- IEEE Workshop on Big Data for Digital Twins, 2018.

#### **Conference and Workshop Organization**

- Organizer, XPI Workshop on Relational Database Theory, June-July 1981, Stony Brook, New York.
- Local Arrangements chairman, 1985 ACM SIGACT-SIGMOD Symposium on Principles of Database Systems.
- Local Arrangements committee, 1986 ACM Conference on Object-Oriented Programming Systems, Languages and Applications.
- Director, CRAI International Seminar on Advanced Data and Knowledge Base Systems, 1987.
- Organizer, XP8.5i Workshop on Database Theory, Oregon Graduate Center, July 1987.
- Organizer, Short Course on Next Generation Database Systems, Portland, Oregon, 1988.
- Local arrangements chair, Second International Workshop on Database Programming Languages, 1989.
- Tutorial Arrangements, 1990 ACM SIGMOD International Conference on Management of Data.
- Organizer, Dagstuhl Seminar on Query Processing in Object-Oriented, Complex Object, and Nested Relation Databases, International Conference and Research Center for Computer Science, Germany, 1991.
- Organizer, SDM '92, Scientific Data Management Workshop.
- Session Organizer, Oregon Advanced Computing Conference, 1992.
- Best Paper Co-chair, 1994 ACM SIGMOD Conference on Management of Data.
- Workshop Chair, 1995 International Symposium on Logic Programming.
- General Chair, 9th International Conference on Scientific and Statistical Database Management, Olympia, 1997.
- Organizer, Dagstuhl Seminar on Software Engineering and Database Technology, International Conference and Research Center for Computer Science, Germany, 1997.
- Steering Committee, International Conference on Scientific and Statistical Database Management, 1997 - 2000.
- Organizer, NSF-NASA-USGS Workshop on Biodiversity Informatics, 2000.
- Organizing Committee, 2<sup>nd</sup> ACM + IEEE Joint Conference on Digital Libraries, 2002.
- Organizer, DLI2/IMLS/NSDL Principal Investigators Meeting, 2002.
- Co-leader, DELOS/NSF Study Panel on Information Extraction for Digital Libraries, 2002 – 2003.
- Organizer, National e-Science Center Workshop on Data Provenance and Annotation, Scotland, 2003.
- Executive Committee, Workshop on Information Integration, University of Pennsylvania, 2006.
- Organizer, ICDE Workshop on Information Integration Methods, Architectures and Systems (IIMAS), Cancun, Mexico, 2008.

- General Chair, 23<sup>rd</sup> International Conference on Scientific and Statistical Database Management, Portland, 2011.
- Organizer, National Academies Workshop on Frontiers of Big Data, Modeling, and Simulation in Urban Sustainability, Washington, DC, 2019.
- General co-chair, 2020 ACM-SIGMOD International Conference on the Management of Data, Portland, 2020.

### Consulting

Brookhaven National Laboratories, 1979.  
Bell Laboratories, Holmdel, NJ, 1981.  
Stanford University, Jeffrey D. Ullman (AFOSR grant 80-0212), 1981 - 1984.  
Servio Logic Corporation, 1983 -1989.  
Microelectronics and Computer Technology Corporation, 1985.  
Digital Equipment Corp., 1987 - 1989.  
GiP Altair, 1987, 1990.  
MAD Intelligent Systems, 1987.  
Object Design, Technical Advisory Board, 1987 - 1993.  
Honeywell (including Sweatt Awards selection committee), 1988 - 1989, 1992, 1993.  
Mentor Graphics, 1988.  
Texas Instruments, 1990, 1994.  
Prompt, Inc., 1991 - 1992.  
IBM, 1992.  
Microsoft, 1995 - 1997  
Informix, 1995 - 1996.  
NASA CESDIS, 1995 - 1997.  
Alphatech 1996 - 1999.  
Oracle, 1997 - 1998.  
NCR-Teradata, 1998 - 1999.  
Universtiy of Texas, Arlington, 1999 - 2001.  
Preston|Gates|Ellis LLP, 2000 - 2003.  
CrossGain, Technical Adivsory Board, 2000 - 2001.  
Cycorp, Inc. (for DARPA), 2002.  
Klarquist, Sparkman LLP, 2002 – 2008, 2016, 2018 – 2020  
Howrey LLP, 2007.  
Microsoft Research, 2008, 2011 - 2018.  
Perkins Coie LLP, 2008.  
Eastman Kodak Company, 2010 - 2011.  
Quinn, Emanuel, Urquhart & Sullivan, LLP, 2011, 2012.  
K&L|Gates, 2015.  
Desmarais LLP, 2015 - 2016.  
Schwabe, Williamson & Wyatt 2018.  
Sidley Austin LLP, 2018 – 2020.  
Paul, Weiss, Rifkind, Wharton & Garrison LLP, 2019-2021.  
McKool Smith, P.C, 2021-2022.

### Other Professional Activities

Provided questions for Advanced GRE in Computer Science, 1984, 1985.  
Member of Working Group on Architectures for Interactive Systems, 1986-1988.



## DAVID MAIER

Chairman and Founder, Oregon Database Forum, 1987-1989, sponsor of Database Year in Portland Area, 1987-1988.

Session Leader, ONR Workshop on Critical Research Directions in Programming Languages, 1988.

Participant, Workshop on New Directions in Database Research, International Computer Science Institute, Laguna Beach, California, 1988.

Participant, DARPA Database Systems Workshop, Pacific Grove, California, 1988.

Participant, NSF Invitational Workshop on the Future of Database System Research, Palo Alto, California, 1990.

Participant, NSF-INRIA Workshop on Data Models and Types, New Hope, Pennsylvania, 1990.

Participant, ESPRIT/DARPA/NSF Exploratory Workshop on Information Science and Technology, Washington, DC, 1990.

Participant, OGI/PNL Workshop on Scientific Information Management: Issues and Opportunities, Richland, Washington, 1991.

Participant and Session Leader, Texas Instruments-DARPA Open OODB Workshops (3 workshops, contributed 3 position papers), Dallas, Texas and Boulder, Colorado, 1991-1992.

Participant, DARPA Persistent Object Bases Mini-Workshop, Boulder, Colorado, 1992.

Participant, ARPA Prototech/DSSA Workshop, Steamboat Springs, Colorado, 1993.

Participant, ARPA Persistent Object Bases Program Workshop, Salt Lake City, Utah, 1993.

Participant, TI Workshop on Database Query Optimizer Generators and Rule-Based Optimizers, Dallas, Texas, 1993.

Participant, R & D for the NII: Technical Challenges, Gaithersburg, 1994.

Participant, ARPA Persistent Object Bases Program Workshop, Madison, 1994.

Participant, E.C.-US FIDE Workshop, Tarascon, France, 1994.

Participant, ARPA Interoperability Workshop, LaJolla, 1994.

Participant, ACM/IBM Industrial Advisory Board on Future Applications of Object Technology, Snoqualmie, Washington, 1994.

Participant, NSF Second Invitational Panel on the Future of Database Systems Research (Lagunita 2), San Jose 1995.

Participant, NRC Workshop on HPCC and Crisis Management, Irvine, 1995.

Participant, ONR Tactical Picture Agent Workshops, Washington, DC and San Diego, 1995.

Participant, ARPA Superlink study panel on foreground information systems and ISAT annual meeting, Cape Cod, 1995.

Session Leader, ARPA Persistent Object Base/Intelligent Integration of Information PIs Meeting, San Diego, 1996.

Participant, ACM 50th Anniversary Workshop on Strategic Directions on Computing Research, Database Systems Panel, Cambridge, 1996.

Participant, DARPA study group on Dynamic Databases for Battlefield Awareness, 1996.

Advisor, OGI ACM Student Chapter 1995 - 1999.

Participant, NASA CESDIS Workshop on Data Mapping and Matching, Greenbelt, Maryland, 1996.

Participant, DARPA Working Group on Mediator Languages, College Park, Maryland, 1996.

Participant, Workshop on Curricular Innovations to Promote Software Development Skills, Olympia, WA, 1996.

Participant, DARPA Meeting on High Assurance and Formal Methods, Lake Placid, NY, 1996.

Participant, DARPA/ITO General PI Meeting, Survivability Working Group, Dallas, TX, 1996.

Participant, DARPA Information Management Services Workshop, Miami, FL, 1996.

Participant, DARPA I\*3 Workshop, Miami, 1996.

Participant, DARPA Study Group on Architectures for Dynamic Databases, 1997.

Participant, DARPA EDCS High Assurance and Real Time Cluster, 1996 - 1997.

Participant, Rome Laboratory Information Institute Workshop on Next-Generation Information Environments, Hamilton, NY, 1997.

Group Coordinator, NSF Workshop on Information and Data Management, Washington, DC, 1998.

Participant, Infrastructure 98: 1998 NSF CISE/EIA RI and MII PI's Workshop, Snowbird, UT, 1998.

Participant, Database Directions Workshop, Asilomar, CA, 1998.

Participant, CSTB Workshop on Information Technology to Support Crisis Management, Washington, DC, 1998.

Participant, W3C QL'98 – The Query Languages Workshop, Boston, MA, 1998.

Participant, NSF Information and Data Management Workshop, Los Angeles, CA, 1999.

Participant, EU-US Workshop on Large Scientific Databases, Annapolis, MD, 1999.

Participant, NSF DLI2 (Digital Libraries) All Projects Meeting, Ithaca, NY, 1999.

Participant, RM2000 Workshop on Reflective Middleware, Palisades, NJ, 2000.

Participant, DARPA Cyberpanel meeting, New Orleans, LA, 2001.

Participant, IDM 2001 Workshop on Information and Data Management, Forth Worth, TX, 2001.

Participant, DARPA IXO Study Panel on Information Integration, 2001-2002.

Participant, Dagstuhl Seminar on Foundations of Semistructured Data, 2001.

Participant, IRCS Workshop on Linguistic Databases, 2001.

Participant, Workshop on Data Derivation and Provenance, Chicago, IL, 2002.

Participant, OWEB (Oregon Watershed Enhancement Board) Expertise Workshop, Salem, OR, 2002.

Participant and final report contributor, NSF/NLM/DOE Workshop on Data Management for Molecular and Cell Biology, Bethesda, MD, 2003.

Participant, NSF Biodiversity and Ecosystems Informatics PIs Meeting, Washington, DC, 2003.

Participant, Asilomar++ Database Directions Workshop, Lowell, MA, 2003.

Participant, IDM 2003 Workshop on Information and Data Management, Seattle, 2003.

ORION (Ocean Research Interactive Observatory Networks) Workshop, San Juan, Puerto Rico, 2004.

Participant, OOS Tech Workshop on Data Standards for Ocean Observing Systems, Washington, D.C., 2004.

Participant, SIGIR Workshop on Personal Information Management, Seattle, 2006.

Participant, Workshop on Information Integration, Philadelphia, 2006.

Participant, NSF Biomedical Informatics Workshop, Corbett, Oregon, 2007.

Participant, DARPA Data Integration and Exploitation SystEm that Learns (DIESEL) Workshop, Tampa, 2008.

Participant, National Academies Workshop on Overcoming Barriers to Large-Scale Data Integration, Washington, D.C., 2009.

Participant, US Ignite! Workshop, Cleveland, 2011.

Participant, Neuroimaging Data Access and Sharing workshop, Quebec, 2011.

Study Committee Member, National Academies Study on Strengthening Data Science Methods for DoD Personnel and Readiness Missions, 2014 – 2016.

Participant, NSF Workshop on Translational Data Science, 2017.

Participant, Northwest Database Society Day, Seattle, 2018, 2020, 2022, 2024.

Participant, MEC/DARPA City Pulse Workshop, New York City, 2019.

Study Committee Member, National Academies study on Life Cycle Decisions for Biomedical Data: The Challenge of Forecasting Costs, 2019 – 2020.

Special Master, US District Court, District of Oregon for Judge Michael Simon.

## PANELS, TUTORIALS AND PRESENTATIONS

### Tutorials

Taught 1-week seminar on Object-Oriented Database Systems (5 times), Berlin Continuing Engineering Education Program, 1987-1991.

Lecturer, Western Institute in Computer Science, 1988-1989, 1992-1995.

Tutorial on Object-Oriented Database Systems, with S.B. Zdonik, IEEE Data Engineering Conference, 1989

Tutorial, "Object-Oriented Database Systems: What's Next?" at the International Conference on Extending Database Technology, Venice, 1990.

Short Course on Object-Oriented Database, OGI Continuing Education, with M.J. Carey, S.B. Zdonik and G. Mitchell, Portland, 1992.

Short Course on Object-Oriented, Distributed and Intelligent Database Systems, with W. W. Chu, A. Cardenas, R. Elmasri and G.M. Lohman, UCLA Extension, 1993.

Short Course on Object-Oriented Database Management Systems, with M.J. Carey, S.B. Zdonik and G. Mitchell, UC Berkeley Extension, 1993-1994.

Tutorial, "Introduction to Object-Oriented Database Systems", OOPSLA '92, Vancouver, BC, 1992.

Seminar, "An Object-oriented Database Approach to Systems Integration," SINTEF, Oslo, Norway, 1994.

Tutorial, "Object-Oriented Databases," 7th International Hong Kong Computer Society Database Workshop, 1996.

Seminar, "Principles of Object-Oriented Databases," Tenth Brazilian School of Computation, Campinas, 1996.

Shortcourse, "Object-Interoperation Models," (3 times), Data-Intensive Systems Center, OGI, 1996 - 1998.

Shortcourse, "XML," (2 times), Data Intensive Systems Center, OGI, 1999.

Tutorial, "A First Tutorial on Dataspaces," with M. Franklin and A. Halevy, VLDB 2008.

### Panels

Object-Oriented Database Systems and Knowledge Systems, First International Workshop on Expert Database Systems, 1985

Are Data Models Dead? 1986 ACM SIGMOD International Conference on Management of Data

User Interfaces and Database Management Systems, First International Conference on Expert Database Systems, 1986

Database Systems for Engineering Applications, Stanford University, 1987.

Object-Oriented Database Workshop: Implementation Aspects, 1987 ACM Conference on Object-Oriented Programming Systems, Languages and Applications, 1987.

Object-Oriented Database Systems, 1987 ACM Conference on Object-Oriented Programming Systems, Languages and Applications, 1987.

Constraint-Based Systems: Knowledge about Data, Second International Conference on Expert Database Systems, 1988.

Object-Oriented Database Systems, Fourteenth International Conference on Very Large Data Bases, 1988.

Has Theory Brought Anything to Database Systems and Will it in the Future? International Conference on Extending Database Technology, 1990.

Why are Object-Oriented Folks Producing Systems, While Deductive Folks are Producing Papers? International Conference on Extending Database Technology, 1990.

Database Manifestos, ACM-SIGMOD International Conference on Management of Data, 1990.

What Can We Do to Strengthen the Connection between Theory and System Builders, ACM-SIGMOD International Conference on Management of Data, 1992.

Storage Systems. DARPA High Performance Software First Annual PI Meeting, 1992.

What is the "True Path" to Integrating OO and Declarative Languages? ACM Workshop on Combining Declarative and Object-Oriented Databases, 1993.

How Should Declarative and Object-Oriented Databases be Combined? ACM Workshop on Combining Declarative and Object-Oriented Databases, 1993.

What's in the Future of Parallel Architectures? Supercomputing 93.

Research Directions for DOOD Technology, Third International Conference on Deductive and Object-Oriented Databases, 1993.

Strategies and Techniques to Manage System Evolution, Sixth International Workshop on Persistent Object Bases, 1994.

Panel Organizer, The Data You Won't Find in Databases, ACM-SIGMOD International Conference on Management of Data, 1995.

Data Mapping and Matching: Languages for Scientific Datasets, 5th International Workshop on Database Programming Languages, Gubbio, Italy, 1995.

Interoperating with Non-Database Data, Digital Libraries Workshop, CASCON '95, Toronto, 1995.

Data Mapping and Matching: Ad Hoc Art or Well-Grounded Science, NASA CESDIS 1996.

Metadata for Database Interoperations: Why and How? 1997 DBPL Workshop.

Where Are the Objects in Object-Relational Databases? ACM OOPSLA Symposium, 1997.

Future Directions in Database Research, International Conference on Data Engineering, 1998.

Information Technology Context, CSTB Workshop on Information Technology to Support Crisis Management, Washington, DC, 1998.

University R&D and Industry R&D and Commercialization, NSF Workshop on Information and Data Management, Los Angeles, CA, 1999.

Challenges and Opportunities in Scientific and Statistical Databases, 11th International Conference on Scientific and Statistical Database Management, 1999.

Processing Data Streams: Applications, Challenges and Approaches, 18<sup>th</sup> International Conference on Data Engineering, San Jose, CA, 2002.

Issues in National-Level Data Integration and Analysis. Stanford Database Workshop, Palo Alto, CA, 2002.

Data Streams: Fresh Current or Stagnant Backwater? ACM SIGMOD International Conference on Management of Data, Madison, WI, 2002.

Quality of Service; Benchmarking panels. Streams Winter Meeting (SWiM), Stanford, CA, 2003.

Producers and Consumers of Annotation Tools, National e-Science Center Workshop on Data Provenance and Annotation, Edinburgh, Scotland, 2003.

New Challenges and Opportunities for Database Research, International Conference on Database Systems for Advanced Applications (DASFAA), Bali, 2014.

Datalog Perspectives, International Conference on Logic Programming, 2021.

The DB Community vis-a-vis Environmental, Health, and Societal Grand Challenges: Innovation Engine, Plumber, or Bystander?, ACM SIGMOD International Conference on Management of Data, Philadelphia, PA, 2022

### Conference Presentations

Some of the papers listed here later appeared in final form in journals and books. The number in brackets at the end of each item is the number of the final version of the paper given in the section on Papers and Reports.

1. The complexity of some problems on subsequences and supersequences. Conference on Theoretical Computer Science, Waterloo, August 1977. [2]
2. A space-efficient algorithm for the lowest common ancestor problem and an application to finding negative cycles. Eighteenth Symposium on Foundations of Computer Science, October-November 1977. [3]
3. A note on the complexity of the superstring problem. With J.A. Storer. Conference on Information Science and Systems, March 1978. [4]
4. Representing databases in segmented name spaces. With V. Gligor.  
International Conference on Databases: Improving Reliability and Responsiveness, Technion, Haifa, August 1978. [5]
5. Minimum covers in the relational database model. Eleventh Symposium on the Theory of Computing, April-May 1979. [6]
6. Testing implication of data dependencies. With A.O. Mendelzon and Y. Sagiv. 1979 ACM SIGMOD Conference on Management of Data, May-June 1979. [7]
7. Adequacy of decompositions of relational databases. With A.O. Mendelzon, F. Sadri and J.D. Ullman. Workshop on Formal Bases for Databases, Toulouse, December 1979. [9]
8. Hysterical B-trees. With S.C. Salveter. Conference on Information Science and Systems, March 1980. [10]
9. Capturing more meaning in database systems. Conference on Computers in Small Business, Rutgers University, November 1980. [33]
10. DAGs as Lattices. Symposium on Knowledge Representation, IBM Systems Research Institute, New York, November 1980.
11. Connections in acyclic hypergraphs. With J.D. Ullman. XP2 Workshop on Relational Database Theory, June 1981 and ACM Symposium on Principles of Database Systems, March 1982. [19]
12. Fragments of Relations. With J.D. Ullman. XP2 Workshop on Relational Database Theory, June 1981. [20]
13. Revenge of the JD. With J.D. Ullman and M.Y. Vardi. Second ACM SIGACT-SIGMOD Symposium on Principles of Database Systems, March 1983. [28]
14. Windows on the world. With D. Rozenshtein and D.S. Warren. 1983 ACM SIGMOD Conference on Management of Data, May 1983. [29]
15. Is Prolog a database system? XP4.5 Workshop on Database Theory, August 1983 and NYU Symposium on New Directions for Database Systems, May 1984. [34]
16. Representing roles in universal scheme interfaces. With D. Rozenshtein and J. Stein. 1984 IEEE International Conference on Data Engineering, April 1984. [31]
17. Implementing an object-oriented DBMS. With J. Stein. Object-Oriented Programming Workshop, IBM T. J. Watson Research Center, June 1986. [53]
18. Development of an Object-Oriented DBMS. With J. Stein, A. Otis and A. Purdy. XP 7.52 Workshop on Database Theory, August 1986. [45]
19. A logic for objects. Workshop on Foundations of Deductive Databases and Logic Programming, August 1986.
20. Why object-oriented databases can succeed where others have failed. International Workshop on Object-Oriented Databases, September 1986. [58]
21. Building interfaces with constraints. With R. K. Ege and A. Borning. The 2nd International Conference on Human-Computer Interaction, August 1987.
22. Describing and managing interactive tasks using Horn clauses. With M. Grossman. The 2nd International Conference on Human-Computer Interaction, August 1987.
23. Why database languages are a bad idea. Invited paper, Workshop on Database Programming Languages, Roscoff, France, September 1987. [55]

24. Computational objects in object-oriented data models. With J. Zhu, Second International Workshop on Database Programming Languages, Gleneden Beach, Oregon, June 1990. [65]
25. Mistaking identity. With J. Stein and T.L. Anderson, Second International Workshop on Database Programming Languages, Gleneden Beach, Oregon, June 1990. [67]
26. Object-oriented query processing in Revelation. With G. Graefe, Dagstuhl Seminar on Query Processing in Object-Oriented, Complex Object, and Nested Relation Databases, Germany, 1991. [80]
27. Specifying a database system to itself. Invited paper. Workshop on specifications of Database Systems, Glasgow, Scotland, July 1991. [78]
28. The DARPA persistent object bases initiative. DARPA Software Technology Conference, Los Angeles, April 1992.
29. The Revelation project: Query Processing in object-oriented databases. With S. Daniels, L. Fegaras, T. Keller, B. Vance, G. Graefe, B. McKenna, L. Shapiro. Oregon Advanced Computing Conference, Portland, OR, November 1992.
30. Computational Proxies: Modeling computational applications in object databases. With J.B. Cushing, M. Rao, D. Feller and M. DeVaney. AAAS '93, Boston, February 1993.
31. Specifying rewrite-based query optimizers in a reflective framework. With L. Fegaras and T. Sheard. ARPA Persistent Object Bases Workshop, Salt Lake City, May 1993.
32. Issues in distributed object assembly. With G. Graefe, L. Shapiro, S. Daniels, T. Keller and B. Vance. International Workshop on Distributed Object Management, Edmonton, Alberta, Canada, August 1992. [82]
33. Object data models for shared molecular structures. With J.B. Cushing, D.M. Hansen, G.D. Purvis III, R.A. Bair, D.M. DeVaney, D.F. Feller, M.A. Thompson. ASTM First International Symposium on Computerized Chemical Data Standards, Atlanta, May 1993. [86]
34. Processing OQL. ARPA Persistent Object Bases Program Workshop, Madison, May 1994.
35. Object databases as middleware. Workshop on Curricular Innovations to Promote Software Development Skills, Olympia, June 1996.
36. Approaching object/relational databases from the OODBMS side. The Object/Relational Summit, Burlingame, CA, October 1996.
37. Database desiderata for an XML query language. Invited Paper. W3C QL'98 – The Query Languages Workshop, Boston, MA, December 1998.
38. A petabyte in your pocket: Directions for Net Data Management. Invited talk. DIMACS Workshop Data Processing on the Web, New Brunswick, NJ, March 2000.
39. Automatic coordination and configuration of Net Data Management applications, RM2000 Workshop on Reflective Middleware, Palisades, NY, April 2000.
40. Mutant Query Plans. Invited talk. With V. Papadimos. OOPSLA '01 Workshop on Objects, XML and Databases, Tampa Bay, FL, October 2001. [125]
41. An Architecture for Superimposed Information. Invited talk. IRCS Workshop on Linguistic Databases, Philadelphia, PA, December 2001.
42. Exploiting Punctuation Semantics in Data Streams. Poster. With P. Tucker. 18<sup>th</sup> International Conference on Data Engineering, San Jose, CA, 2002.
43. Relational Database Theory at Princeton and Beyond. Computer Science Symposium in Honor of Jeffrey D. Ullman, Stanford, CA, 2002.
44. Data Models for Superimposed Information, Invited talk. The 24<sup>th</sup> International Conference on Conceptual Modeling (ER 2005), Klagenfurt, Austria, 2005.
45. Charting a Dataspace: Lessons from Lewis and Clark. Invited talk. Advances in Database Technology, EDBT 2006, Munich.
46. Object-Oriented Databases: From Asilomar to the Manifestos. Invited talk. Klaus Dittrich Symposium, Zurich, 2008.
47. Dynamic Datalog. Invited talk. Datalog 2.0, Oxford, 2010.

48. Navigating Oceans of Data. Invited talk. Workshop on Neuroimaging Data Access and Sharing, Quebec City, 2011.
49. Array and Grid Databases. Invited talk. Workshop on Global Scientific Data Infrastructures: The Big Data Challenges, Capri, Italy, 2011.
50. Why Database Language are Simpler than Turing Complete. Invited Talk. Program on Alan M. Turing – Simplification in Intelligent Computing Theory and Algorithms, sponsored by Foundation for Advancement of Education and Research and Computer Society of India, Bangalore, India, 2013.
51. A Tour of the Database Landscape. Invited Talk. Program on Alan M. Turing – Simplification in Intelligent Computing Theory and Algorithms, sponsored by Foundation for Advancement of Education and Research and Computer Society of India, Bangalore, India, 2013.
52. The Three C's of Big Data Applications. Workshop on How Far Can Big Data Take Us Towards Understanding Cities, Santa Fe Institute, Santa Fe, 2013.
53. Are Green Buildings Healthy? Keynote talk. 30th International Conference on Scientific and Statistical Database Management Bolzano-Bozen, Italy, July 2018.

#### Invited Talks

1978

University of Maryland, Department of Computer Science  
University of Southern California, Department of Computer Science  
SUNY at Stony Brook, Department of Computer Science  
Columbia University, Department of Electrical Engineering and Computer Science  
University of California at Santa Barbara, Computer Science Program

1979

Bell Laboratories, Murray Hill

1980

IBM, Watson Research Center  
University of Maryland, Department of Computer Science  
IBM, Systems Research Institute  
IBM, San Jose Research Center  
Rutgers University, Newark, School of Business Administration

1981

Pennsylvania State University, Department of Computer Science  
Johns Hopkins University, Department of Electrical Engineering  
Harvard University, Division of Applied Sciences  
University of California at Santa Barbara, Department of Computer Science  
University of Michigan, Department of Computer Science  
Oregon Graduate Center  
Purdue University, Department of Computer Science  
Vanderbilt University, Department of Computer Science  
Bell Laboratories, Murray Hill

1982

University of Toronto, Computer Systems Research Group  
Oregon State University, Department of Computer Science

1983

University of Oregon, Department of Computer and Information Science

1984

University of Washington, Department of Computer Science  
Brandeis University, Department of Computer Science  
Boston University, Department of Computer Science

IASI-CNR (Italian Computer Science Institute)/University of Rome  
 University of British Columbia, Department of Computer Science  
 Puget Sound Chapter of the ACM, Seattle

1985

Northwest Computers in Education Conference, Eugene  
 Microelectronics and Computer Technology Corporation (MCC)  
 University of Illinois, Department of Computer Science  
 Mentor Graphics Corporation  
 Southern Methodist University, Department of Computer Science  
 Willamette Valley Chapter of the ACM

1986

Oregon State University, Department of Computer Science  
 Cullinet Software, Inc.  
 Wang Institute  
 Brown University, Department of Computer Science  
 New York University, Graduate School of Business Administration  
 Rutgers University, Department of Computer Science  
 University of Pennsylvania, Department of Computer and Information Science  
 Hewlett-Packard Laboratories, Palo Alto, California  
 Stanford University, Department of Computer Science

1987

University of California at San Diego, Department of Electrical Engineering and Computer Science  
 Digital Equipment Corp., Colorado Springs, Advanced Database Development  
 CRAI Seminar on Advanced Data and Knowledge Base Systems, Capri, Italy  
 Massachusetts Institute of Technology, Department of Computer Science  
 GiP Altair, Rocquencourt, France  
 University of Wisconsin at Madison, Department of Computer Science,  
 Distinguished Lecture Series in Database Systems

1988

Pike's Peak Chapter of the ACM  
 Florida International University, Department of Computer Science  
 Apple Computer, Inc.  
 Oregon Computer Consultants Association

1989

State University of New York at Stony Brook, Department of Computer Science  
 Digital Equipment Corporation, Cambridge Research Laboratory.  
 GIP Altair, O2 Day, Paris, France  
 INRIA, VERSO-SABRE-Altair joint seminar, Rocquencourt, France  
 University of Grenoble, IMAG research group, France

1990

University of Zurich, Department of Computer Science, Switzerland  
 ETH Zurich (Swiss Federal Technical University), Department of Computer Science, Switzerland  
 University of Aachen, School of Applied Mathematics, Institute for Computer Science, Germany  
 IBM Almaden Research Center  
 University of Colorado, Boulder, Department of Computer Science  
 Digital Equipment Corp., Colorado Springs, Advanced Database Development  
 US West Advanced Technologies, Edgewood, Colorado  
 Texas Instruments, Information Technologies Laboratory



Senter for Industriforskning (Center for Industrial Research), Oslo, Norway  
University of Helsinki, Department of Computer Science, Finland

1991

Battelle Pacific Northwest Laboratories, Molecular Sciences Research Center  
Saturday Academy, Beaverton, Oregon  
University of Colorado, Colorado Springs, DEC Distinguished Lecture Series  
University of Aberdeen, Scotland, Department of Computing Science  
University of Glasgow, Scotland, Department of Computing Science, Distinguished Lecture Series  
Structured Development Forum, Portland, Oregon  
University of Texas, Austin, Distinguished Lecture Series in Systems Research

1992

Boeing Computer Services, Advanced Technology Center, Seattle, Washington  
University of Denver, Colorado Advanced Software Institute  
The Evergreen State College, Olympia, Washington  
Oregon State University, Department of Oceanography, Corvallis, Oregon

1994

University of Toronto, Canada, Department of Computer Science, Distinguished Lecture Series  
University of Wisconsin - Madison, Department of Computer Science  
Massachusetts Institute of Technology, Department of Computer Science  
IEEE Computer Society, Portland, Oregon  
University of Hamburg, Germany, Department of Informatics

1995

Brown University, Department of Computer Science  
Pittsburgh Supercomputing Center  
The Evergreen State College, Olympia, Washington  
NASA Center of Excellence in Space Data and Information Sciences (CESDIS)  
University of Utah, Department of Computer Science  
XEROX, Palo Alto Research Center (PARC)

1996

Southern Methodist University, School of Engineering and Applied Science  
Hong Kong University of Science and Technology, Department of Computer Science  
Informix, Portland, Oregon  
The Evergreen State College, Olympia, Washington

1997

National Science Foundation, Division of Information, Robotics and Intelligent Systems  
University of Wisconsin, Database Affiliates  
University of Wisconsin, Computer Sciences Department

1998

University of Pennsylvania, Department of Computer and Information Science  
Oregon Graduate Institute, ADC Kentrox Perspectives on Technology Series  
Case Western Reserve University, Department of Computer and Information Science.

1999

INRIA, VERSO group, Rocquencourt, France.

2000

University of Washington, Department of Computer Science  
GemStone Systems, Beaverton, Oregon.  
Intel Architecture Labs, Hillsboro, Oregon

NASA Ames Research Center, Moffett Field, California

2001

NASA Johnson Space Center, Houston, Texas

2002

University of Edinburgh, School of Informatics, Centre for Cognitive Science

University of Edinburgh, School of Informatics, Laboratory for the Foundations of Computer Science

University of British Columbia, Department of Computer Science

2003

New England Database Seminar, Brandeis University, Waltham, Massachusetts

Microsoft Research, Redmond, Washington

2005

Lawrence Livermore National Laboratory, Center for Applied Scientific Computing

University of California, Riverside, Department of Computer Science & Engineering

2007

University of California, Davis, Department of Computer Science

Northwest Database Society, Seattle, Washington

2008

Microsoft Research, Redmond, Washington

New England Database Seminar, Brandeis University, Waltham, Massachusetts

University of Pittsburgh, Department of Computer Science

2009

Microsoft Research, Redmond, Washington

Southern Methodist University, Department of Computer Science and Engineering, Dallas, Texas

University of California, Berkeley, Computer Science Division

2010

Georgia Tech Lorraine, Metz, France

University of Washington, Department of Computer Science

2011

Microsoft Research, Redmond, Washington

2012

National University of Singapore, School of Computing

Advanced Digital Science Center, Singapore

2013

National University of Singapore, School of Computing

2015

National University of Singapore, School of Computing

2016

Microsoft Research, Redmond, Washington

2019

Oregon State University, School of Electrical Engineering and Computer Science

2020

Oregon Health & Science University, Knight Data Governance Committee, Portland.

2023

Microsoft Research, Redmond, Washington