

O. Peter Buneman

Curriculum Vitæ – Jan 2008

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Academic record

- 2004-present** Research Director, Digital Curation Centre
- 2002-present** Adjunct Professor of Computer Science, Department of Computer and Information Science, University of Pennsylvania.
- 2002-present** Professor of Database Systems, Laboratory for the Foundations of Computer Science, School of Informatics, University of Edinburgh
- 1990-2001** Professor of Computer Science, Department of Computer and Information Science, University of Pennsylvania.
- 1981-1989** Associate Professor of Computer Science, Department of Computer and Information Science, University of Pennsylvania.
- 1981-1987** Graduate Chairman, Department of Computer and Information Science, University of Pennsylvania
- 1975-1981** Assistant Professor of Computer Science at the Moore School and Assistant Professor of Decision Sciences at the Wharton School, University of Pennsylvania.
- 1969-1974** Research Associate and subsequently Lecturer in the School of Artificial Intelligence, Edinburgh University.

Education

- 1970** PhD in Mathematics, University of Warwick (Supervisor E.C. Zeeman)
- 1966** MA in Mathematics, Cambridge.
- 1963-1966** Major Scholar in Mathematics at Gonville and Caius College, Cambridge.

Awards, Visting positions

- Distinguished Visitor, University of Auckland, 2006
- Trustee, VLDB Endowment, 2004
- Fellow of the Royal Society of Edinburgh, 2004
- Royal Society Wolfson Merit Award, 2002
- ACM Fellow, 1999.

Visiting Researcher, INRIA, Jan 1999

Visiting Research Fellowship sponsored by the Japan Society for the Promotion of Science, Research Institute for the Mathematical Sciences, Kyoto University, Spring 1997.

Visiting Research Fellowship sponsored by the British SERC, Spring 1991, Imperial College, London.

Visiting Researcher, INRIA, May 1991.

Visiting Research Fellowship sponsored by the British SERC, 1984-5, Glasgow University.

Research Interests

Databases: semistructured data, XML, data provenance, programming language interfaces, query languages, data models, knowledge bases, database semantics, user interfaces, distributed databases, database monitoring.

Programming Languages: database interfaces, applicative and functional languages, type systems, implementation techniques, semantics.

General: mathematical phylogeny, neural models, cognitive science, data structures, graph theory, combinatorics, applications of computers in the humanities.

Professional Activities

Program chair, VLDB 2008

Research Director, Digital Curation Centre

Program chair, ACM Principles of Database Systems 2001

Program co-chair, International Conference on Database Theory 1999

Program chair, ACM SIGMOD Conference 1993

Member ACM

Editorial Boards: ACM Journal on Data and Information Quality, ACM Transactions on Database Systems (former), J. Digital Libraries (former), VLDB Journal (former), International Journal of Digital Curation.

Referee for ACM Transactions on Programming Languages and Systems, ACM Transactions on Database Systems, Communications ACM, ACM Computing Surveys, IEEE Transactions on Computers, IEEE Transactions on Knowledge Engineering, IEEE Transactions on Software Engineering, J. Comb. Theory, Discrete Mathematics, Computer Journal, Software Practice and Experience, Journal of Parallel Programming.

Referee for EPSRC, NSF (Computer Science and Math), ARO, ONR proposals. Site visitor for NSF CER proposals. NSF Research Initiation Panels. EPSRC MRC and BBSRC Panels.

Program Committees etc.

Program Committee, BNCOD 2008

Co-organizer, Database Preservation Workshop

Co-organizer, Principles of Provenance Workshop

Program committee, SIGMOD 2007

Program committee, IPAW 2006

Program committee, ISMB 2005

Program committee, DILS 2005

Program committee, SIGMOD 2006

Program committee, VLDB 2006

External examiner, Glasgow University, 2005

Program committee, ICALP 2005
 Organizer, DIBD (database issues in biological databases), Edinburgh, 2005
 Organizer ICDT 2005
 External examiner, TU Wien, 2004
 Program Committee, SIGMOD 2004
 Program Committee, VLDB 2004
 Program Committee, VLDB 2003
 External examiner, University of Paris, 2004
 Co-organizer, Provenance Workshop, Edinburgh, 2003
 Program Committee, SSDBM 2003
 Program Committee, ICDT 2003
 Program Committee, BNCOD 2002
 Co-organizer, Provenance Workshop, Chicago, 2003
 Program Committee, SSDBM 2002
 Program Committee, WWW11 2002
 Co-organizer, Linguistic Database Workshop, Penn, 2001.
 Program Committee KRDB, 2001
 Program Committee SSDBM, 1999
 Program Committee SSDBM, 1998
 Program Committee, CIKM, 1999
 Program Committee, CIKM, 1998
 Program committee, VLDB, 1998.
 Program Committee, Multimedia Workshop, 1997
 Co-organizer, Workshop on semistructured data, 1997
 Program Committee, ACM Sigmod, 1997
 Co-organizer, POS'96 – Persistent Object Systems Workshop.
 Program Committee, 1995 NGITS
 Program Committee, 1994 Persistent Object Systems Workshop.
 Program Committee, 1994 Intl. Conf on Very Large Databases.
 Program Committee, 1994 Principles of Database Systems.
 Program Committee, 1992 Persistent Object Systems Workshop
 Organizer, Abingdon Workshop on Information Structures.
 Program Committee, ACM Sigmod, 1992 Organizer, Workshop on Heterogenous Databases, Penn, 1991
 Program Committee, Deductive Object-oriented databases, Munich, December 1991.
 Program Committee, ACM SIGPLAN Conference on Programming Language Design and Implementation, June 1990.
 External examiner, Oxford University, 1990.
 Organizer, US-France workshop on Types and Data models, Pennsylvania, May, 1990
 Rapporteur, Thèse d'état de M. Philippe Richard, Université de Paris.
 Program Committee, VLDB conference, Australia, September, 1990.
 Program Committee, IEEE International Conference on Computer Languages, Florida, 1990.
 Program Committee, 2nd Intl. Workshop on Database Programming Languages, Portland, Oregon, June, 1989.
 Program Committee, ACM Sigmod Conference, Portland, Oregon, June 1989.
 Program Committee, Foundations of Data Organization, Paris, France, June, 1989.
 Program Committee, Extending Database Technology, Venice, May, 1988.
 Program Committee, Entity-Relationship Conference, Venice, 1988.
 Organizer, (with Malcolm Atkinson and Ron Morrison) Workshop on Persistent Object Systems, Appin, Scotland, 1987.
 Organizer, First International Workshop on Database Programming Languages (with F. Bancilhon) Roscoff, France, 1987.

Program Committee, Expert Database Systems Conference, 1985.
Organizer, (with Malcolm Atkinson and Ron Morrison) Workshop on Data Types and Persistence, Appin, Scotland, 1985.
Program Committee, Expert Database Systems Conference, 1984.
Organizer, 1982 Database Interface Workshop. Philadelphia, 1982
Program Committee, International Conference on Very Large Databases, 1981.

Teaching

Edinburgh Undergraduate databases. Introductory Computer Science. Advanced Databases. **Penn** Graduate and undergraduate courses and graduate seminars on databases. Introductory courses in Computer Science. Introductory and advanced graduate courses on programming languages. Analysis of algorithms (graduate). Data and file Structures (graduate and undergraduate). Undergraduate graph theory.

PhD Students

Tom Myers (1981), now at William and Mary College
Amihai Motro (1982), now at George Mason Univ.
Hassan Ait-Kaci (1984), now at Simon Fraser Univ.
Rishyur Nikhil (1985), CTO, Bluespec Inc.
Atsushi Ohori (1989), now at Tohoku Univ.
Aaron Watters(1991), now at New Jersey Institute of Technology
Limsoon Wong (1995), now at National University of Singapore
Leonid Libkin(1995), now at University of Edinburgh
Anthony Kosky (1997), CTO Axiope
Wenfei Fan (2000), now at Univ. of Edinburgh
Wang-Chiew Tan (2002), now at Univ. of California, Santa Cruz
Byron Choi (2006), now at National Technical Univ. of Singapore
Robert Hutchison

University Service (1980 to present)

Edinburgh

Committee to revise introductory informatics courses
Informatics Lecture Series
Various advisory and appointment committees

Penn

Departmental

Admissions Chair, Acting Graduate Chair, etc. variously 1995-2001
WPE Committee Chair, too often
Graduate Chair, 1981-87
Chair search committee chair, 1989-90
Numerous ad-hoc committees to overhaul the graduate and undergraduate curricula

School

Pender Award (Chair), 2001
Personnel Committee 1997-2000
Personnel Committee (Chair) 1991-1992

Faculty Council, 1988-90
Personnel Committee, 1990-1991
Eniac Celebration Committee, 1987
ExMSE program (planner and lecturer), 1987-88
Graduate Affairs Committee, 1982-87
Personnel Committee, 1982
Pender Award (Chair), 1982
Academic Performance Committee, 1981

University

Institute for Research in Cognitive Science, Executive Committee, 1998-2001
Committee on Academic Strengths, 1994-1996
Various promotion committees, library committees etc.

Grants and Awards – since 1990

2008-2012 EPSRC Platform Grant. Approx £1.4m
2005-2008 Marie Curie Chair Award (PI, beneficiary Leonid Libkin). Approx £400k.
2005 EPSRC Visitor for Prof. Marc Scholl £5k
2004-2007 EPSRC (PI, with many others) Digital Curation Centre – Research Component. Approx £1.1m.
2004-2007 EU DELOS project. Approx £75k.
2004-2007 EPSRC (PI, with Malcolm Atkinson, David Berry and Wenfei Fan.) Approx £350k.
2003-2006 EPSRC (PI, with Douglas Armstrong) Approx £250k.
2002 (PI) IBM Sur Award. Multiprocessor. Street value approx £2m.
2002-2007 Royal Society Wolfson Merit Award. Approx £275k.
1999-2002 KDI (NSF) (Co-PI with Brian MacWhinney(PI, CMU), Mark Liberman (Penn), Steven Bird (Penn)) \$2,800,000
2000-2003 NSF (co-PI with Susan Davidson PI) \$600,000
1999-2002 NSF (PI) \$270,000
1999-2002 Digital Libraries (NSF, DARPA, NLM) (PI with Susan Davidson, Mark Liberman, Chris Overton, Val Tannen) \$500,000
1995-2000 NSF-ESPRIT (PI, with a large number of co-PIs from various institutions) \$180,000.
1998-2002 SmithKline Beecham (now Glaxo SmithKline) \$1,000,000 (co-PI with Susan Davidson an Val Tannen)
1995-1998 ARO (PI, with Susan Davidson, Chris Overton and Val Tannen) \$540,000.
1994-1997 ARPA (PI, with Susan Davidson and Val Tannen \$400,000.)
1994-1996 NSF (Co-PI, Susan Davidson PI) \$200,000
1994-1997 DOE (Co-PI, Chris Overton, PI) \$900,000
1994-1997 NSF (co-PI, Val Tannen, PI) \$210,000
1992-1995 ARO AASERT award (with Susan Davidson) \$350,000 for three years
1992-1994 ONR AASERTaward (with Val Breazu-Tannen) \$350,000 for three years
1991-1992 ARO (co-PI with Susan Davidson PI) “Merging Heterogeneous Databases” \$60,000 for one year.
1990-1992 NSF “Typed Programming Languages for Databases” \$140,000 for two years

- 1989-1994** Joint INRIA - NSF proposal “Languages for Knowledge Bases and Data Bases” \$70,000 over 2 years (Principal Investigator, with Richard Hull, USC; Paris Kanellakis, Brown; Victor Vianu, UCSD; Serge Abiteboul, INRIA; François Bancilhon, INRIA), Nicole Bidoit, INRIA)
- 1989-93** (co-PI, departmental) NSF CISE “Keeping up with the ’90s” \$1.7m
- 1988-92** Office of Naval Research. “Typed Programming Paradigms”, \$240,000 over 4 years. (with Val Breazu-Tannen) (Also co-ordinated related applications from the Penn Logic and Computation Group for a total of \$800,000 over four years.)
- 1987-90** National Science Foundation. “Combining Object-Oriented and Relational Databases”, \$350,000 over 3 years.

Consulting (since 1995)

JISC (2003)
 Aleri Inc (2001-2003)
 SmithKline Beecham (1998-2000)
 OKI Electronics(1996/7)
 NASA/CESDIS (1995-97)
 Solutions NOW 1995

In addition, a number of the short courses listed below have been provided on a consulting basis and have covered topics such as databases, programming languages and distributed databases.

Distinguished Lectures, Invited Lectures at Conferences, Tutorials and Short Courses

2008 Keynote Speaker, ACM PODS
 2007 Keynote Speaker, DigCCurr
 2007 Distinguished Lecture, University of Auckland
 2005 Keynote Address, Ensuring Long-term Preservation and Adding Value to Scientific and Technical data.
 2005 Keynote Speaker, WAIM, Hang Zhou, China
 2005 Keynote Speaker, Workshop on Multimedia Systems, Sorrento, Italy
 2005 Invited Speaker, Data Integration in the Life Sciences, San Diego, USA
 2005 Keynote Speaker, DELOS Digital Libraries Workshop, Schloß Dagstuhl, Germany.
 2005 Distinguished Lecturer, Rutgers University
 2004 Invited Speaker, 16th Int. Conf. on Scientific and Statistical Database Management, Santorini, Greece.
 2003 Invited Speaker 4th International Conference on Web Information Systems Engineering, Rome.
 2003 Distinguished Lecture, University of California, Santa Cruz
 2003 Strachey Lecture, Oxford
 2001 Invited Tutorial, ECOOP, Budapest
 2000 Invited Speaker, Foundations of Software Technology and Theoretical Computer Science, Delhi.
 2000 Invited Speaker, British National Conference on Databases, Exeter
 2000 Invited Tutorial, ECOOP, Sophia Antipolis
 1998 Distinguished Lecturer, University of Maryland
 1998 Distinguished Lecturer, Princeton University
 1997 Invited Speaker, Principles of Database Systems. Tutorial on Semistructured data
 1997 Invited Speaker, British Society for Molecular Modelling
 1996 Invited Speaker, Int. Conf. on Category Theory, Cambridge
 1995 Invited Speaker, Glasgow University Research Festival

1994 Invited Speaker, Jumelage (Programming Language theory) Ottawa
1994 IBM Distinguished Lecturer, Johns Hopkins University.
1992 Invited Speaker, Conf. on Information and Knowledge Management, Baltimore MD.
1992 Invited Speaker, Glasgow Functional Programming Conference, Ayr, Scotland
1991 Invited Speaker, Mathematical Foundations of Programming Semantics, Carnegie Mellon, May 1991.
1990 Invited participant, Esprit/NSF/Darpa workshop on US - Europe collaboration
1987 Invited Speaker, University of Texas Year of Programming, Course on Declarative Programming.
1987 Invited Speaker, Summer School on Databases and Knowledge Bases, CRAI, Italy.
1987 Invited Speaker, French National Database Conference, Port Carmargue, France.
1987 Invited Speaker, CREAS Conference, MCC, Austin, Texas.
1986 Invited Speaker, ACM Sigmod conference.
1984 Institute for Labor Productivity, Tel Aviv, Israel, Database Course.
1984 United Nations Course on Databases, Tata Institute, India, Database Course.
1983 Shanghai Jiao-Tong University, Database Course.
1983 Invited Speaker, Digital Equipment Corporation Workshop on Database and Language Research
1983 Invited Speaker, British National Conference on Databases.
1982 Invited Speaker, ACM conference on Functional Programming and Computer Architecture.
1981 Invited Panelist, ACM Sigmod.
1979 Invited Panelist, VLDB.

Other Invited Colloquia, etc. (Partial list, 1981 to present)

- 2008** Rice University (Library and Computer Science)
- 2007** University of Pennsylvania, University of Edinburgh (Future of Libraries).
- 2006** Belief workshop, Linz. TU Vienna.
- 2005** Cambridge University, Humboldt University, University of Washington, Fudan University
- 2004** TU Wien
- 2003** Numerous e-Science meetings, University of Washington, Digital Preservation Coalition, IBM Almaden
- 2002** University of Edinburgh Jamboree, Cambridge University, Generic Programming Summer School (Oxford)
- 2001** University of Waterloo, University of Toronto, University of Washington, University of Edinburgh.
- 2000** Universität Hamburg.
- 2000** Université de Marseilles.
- 1999** Glasgow University, MRC (Edinburgh), University of Toronto
- 1997** Kyoto University, University of Cottbus, Birbeck College, London
- 1995** INRIA, AT&T
- 1993** University of Toronto
- 1992** AT&T, McGill, Matsushita Information Technology Laboratory, INRIA.
- 1991** Imperial College, Universität Hamburg, University of Kent.
- 1990** Stanford University, Turin University, INRIA
- 1989** AT&T Bell Laboratories, University of Massachusetts, Amherst; Massachusetts Institute of Technology (Boston Sigmod Chapter); HP Laboratories; Imperial College, London; Technische Hochschule Darmstadt; Universität Frankfurt.
- 1988** University of Southern California; Oregon Graduate Center; University of California at San Diego; INRIA; Unisys Corporation; Boeing Corporation; University of Massachussets (Boston Sigmod chapter); Courant Institute.
- 1987** INRIA, Universität Frankfurt; Glasgow University (3); Massachussets Institute of Technology;
- 1986** IASI, Rome, Italy; Brown University; Massachussets Institute of Technology; Cornell.
- 1985** University of Linköping; University of St. Andrews; University of Warwick; Aberdeen University; University of Glasgow (5);
- 1984** University of Edinburgh (2); International Computers, Ltd (3); Imperial College, London; DCM Delhi, India.
- 1983** Institut National de Recherche en Informatique et en Automatique (INRIA); SDC corporation; Digital Equipment Corporation.
- 1982** Rutgers University; Digital Equipment Corporation; Burroughs Corporation (2); Bell Telephone Laboratories; Jiao-Tong University, Shanghai; Digital Equipment Corporation.
- 1981** University of Southern California; University of Toronto; University of Linköping; Harvard University; Stanford Research Institute.

Patents

1. U.S. Patent Application S.N.: 08/864,538; Filed: May 28, 1997; Title: “Method and Apparatus for Restructuring Data”
2. U.S. Patent Application S.N.: 08/864,539; Filed: May 28, 1997; Title: “Database Access System with Optimizable Expressions”

Publications

A. Book, Journal Articles, Refereed Proceedings and Invited Papers

- [1] Peter Buneman, James Cheney, and Stijn VanSummeren. On the expressiveness of implicit provenance in query and update languages. In *Proceedings of the 2007 International Conference on Database Theory*. Springer, Jan 2007.
- [2] Peter Buneman, Gao Cong, Wenfei Fan, and Anastasios Kementsietsidis. Using Partial Evaluation in Distributed Query Evaluation. In *Proceedings of the 32nd International Conference on Very Large Data Bases*, pages 211–222, 2006.
- [3] Peter Buneman. How to cite curated databases and how to make them citable. In *Proceedings of the 18th Conference on Scientific and Statistical Database Management*, pages 195–203, July 2006.
- [4] Peter Buneman, Adriane Chapman, and James Cheney. Provenance management in curated databases. In *Proceedings of ACM SIGMOD International Conference on Management of Data*, pages 539–550, 2006.
- [5] Peter Buneman. What the Web Has Done for Scientific Data, and What it Hasn't. In *Proceedings of the Conference on Web Age Information Management*, pages 1–7, Hangzhou, China, October 2005.
- [6] Yannis E. Ioannidis, David Maier, Serge Abiteboul, Peter Buneman, Susan B. Davidson, Edward A. Fox, Alon Y. Halevy, Craig A. Knoblock, Fausto Rabitti, Hans-Jörg Schek, and Gerhard Weikum. Digital library information-technology infrastructures. *Int. J. on Digital Libraries*, 5(4):266–274, 2005.
- [7] Peter Buneman, Byron Choi, Wenfei Fan, Robert Hutchison, Robert Mann, and Stratis Viglas. Vectorizing and Querying Large XML Repositories. In *Proceedings of the International Conference on Data Engineering*, pages 261–272, Hong Kong, March 2005.
- [8] Peter Buneman, Sanjeev Khanna, Keishi Tajima, and Wang-Chiew Tan. Archiving Scientific Data. *ACM Transactions on Database Systems*, 27(1):2–42, 2004. Full version of [15].
- [9] Peter Buneman, Susan Davidson, Wenfei Fan, Carmem Hara, and Wang-Chiew Tan. Reasoning about Keys for XML. *Information Systems*, 28(8):1037–1063, 2003.
- [10] Peter Buneman, Martin Grohe, and Christoph Koch. Path Queries on Compressed XML. In *Proceedings of the 29th Conference on Very Large Data Bases*, pages 141–152, 2003.
- [11] Peter Buneman, Jonathan Riecke, Eric Sandler, and Vladimir Seroff. Data integration in vector (vertically partitioned) databases. *IEEE Data Eng. Bull.*, 25(3):19–25, 2002.
- [12] Peter Buneman, Wenfei Fan, and Scott Weinstein. Interaction between path and type constraints in semistructured data. *ACM Transactions on Computational Logic*, 4(4):530–577, October 2003.
- [13] Peter Buneman, Susan Davidson, Wenfei Fan, Carmem Hara, and Wang-Chiew Tan. Keys for XML. *Computer Networks*, 39(5):473–487, August 2002. Invited full version of [16].
- [14] Peter Buneman, Sanjeev Khanna, and Wang-Chiew Tan. On the Propagation of Deletions and Annotations through Views. In *Proceedings of 21st ACM Symposium on Principles of Database Systems*, pages 150–158, Madison, Wisconsin, 2002.
- [15] Peter Buneman, Sanjeev Khanna, Keishi Tajima, and Wang-Chiew Tan. Archiving scientific data. In *Proceedings of ACM SIGMOD International Conference on Management of Data*, pages 1–12, Madison, Wisconsin, 2002.
- [16] Peter Buneman and Susan Davidson and Wenfei Fan and Carmem Hara and Wang-Chiew Tan. Keys for XML. In *WWW10*, pages 201–210, May 2001.
- [17] Peter Buneman, Wenfei Fan, Jérôme Siméon, and Scott Weinstein. Constraints for Semistructured Data and XML. *SIGMOD Record*, 30(1):45–47, March 2001.
- [18] Peter Buneman, Sanjeev Khanna, and Wang Chiew Tan. Why and Where: A Characterization of Data Provenance. In Jan Van den Bussche and Victor Vianu, editors, *International Conference on Database Theory*, pages 316–330. Springer, LNCS 1973, 2001.
- [19] Peter Buneman, Sanjeev Khanna, and Wang-Chiew Tan. Data Provenance: Some Basic Issues. In Sanjiv Kapoor and Sanjiva Prasad, editors, *Proceedings of FST TCS 2000: Foundations of Software Technology and Theoretical Computer Science*, pages 87 – 93. Springer, LNCS 1974, Dec 2000. Invited Paper.
- [20] Peter Buneman, Wenfei Fan, and Scott Weinstein. Path constraints in semistructured databases. *J. Comput. Syst. Sci.*, 61(2):146–193, 2000. Invited full version of [26].

- [21] Steven Bird, Peter Buneman, and Wang-Chiew Tan. Towards a query language for annotation graphs. In *Proceedings of the Second International Conference on Language Resources and Evaluation*, pages 807–814, 2000.
- [22] Peter Buneman, Mary Fernandez, and Dan Suciu. UnQL: A Query Language and Algebra for Semistructured Data Based on Structural Recursion. *VLDB Journal*, 9(1):75–110, 2000.
- [23] Serge Abiteboul, Peter Buneman, and Dan Suciu. *Data on the Web: From Relations to Semistructured Data and XML*. Morgan Kaufmann, 1999.
- [24] Peter Buneman, Wenfei Fan, and Scott Weinstein. Query Optimization for Semistructured Data using Path Constraints in a Deterministic Data Model. In *Proceedings of DBPL'99*, pages 208–223. Springer, LNCS 1949, 1999.
- [25] Peter Buneman and Benjamin Pierce. Union Types for Semistructured Data. In *Proceedings of the International Database Programming Languages Workshop*, pages 184–207, September 1999.
- [26] Peter Buneman, Wenfei Fan, and Scott Weinstein. Interaction between Path and Type Constraints. In *Proceedings of the 18th ACM Symposium on Principles of Database Systems*, pages 56–67, May 1999.
- [27] Susan Davidson, Peter Buneman, Jonathan Crabtree, Val Tannen, and L. Wong. BioKleisli. In S. Letovsky, editor, *Bioinformatics*. Kluwer Academic Publishers, 1998.
- [28] Peter Buneman, Wenfei Fan, and Scott Weinstein. Path Constraints on Semistructured and Structured Data. In *Proceedings of the 27th ACM Symposium on Principles of Database Systems*, pages 129–138, May 1998.
- [29] Susan Davidson and Anthony Kosky and Peter Buneman. Semantics of Database Transformations. In L. Libkin and B. Thalheim, editor, *Semantics of Databases*. Springer LNCS 1358, Feb 1998.
- [30] Peter Buneman, Susan Davidson, Mary Fernandez, and Dan Suciu. Adding Structure to Unstructured Data. In *Proceedings of the International Conference on Database Theory*, 1997.
- [31] Peter Buneman. Semistructured data. In *Proc. ACM Symposium on Principles of Database Systems*, pages 117–121, Tucson, AZ., 1997. Abstract of invited tutorial.
- [32] Peter Buneman, Louiqa Raschid, and Jeffrey D. Ullman. Mediator Languages - a Proposal for a Standard. *SIGMOD Record*, 26(1):39–44, 1997.
- [33] Peter Buneman and Atsushi Ohori. Polymorphism and Type Inference in Database Programming. *ACM Transactions on Database Systems*, 21(1):30–76, March 1996.
- [34] Peter Buneman, Susan Davidson, Gerd Hillebrand, and Dan Suciu. A query language and optimization techniques for unstructured data . In *Proceedings of ACM-SIGMOD International Conference on Management of Data*, 1996.
- [35] Peter Buneman, Susan Davidson, and Dan Suciu. Programming Constructs for Unstructured Data . In *Proceedings of the Workshop on Database Programming Language*, 1995.
- [36] Peter Buneman and Susan Davidson and Kyle Hart and Chris Overton and L. Wong. A Data Transformation System for Biological Data Sources. In *Proceedings of VLDB*, Sep 1995.
- [37] Val Breazu-Tannen, Peter Buneman, Shamim Naqvi, and Limsoon Wong. Principles of Programming with Collection Types. *Theoretical Computer Science*, 149:3–48, 1995.
- [38] Susan Davidson and Chris Overton and Peter Buneman. Challenges in Integrating Biological Data Sources. *Journal of Computational Biology*, 2(4):557–572, Winter 1995.
- [39] P. Buneman, L. Libkin, D. Suciu, V. Tannen, and L. Wong. Comprehension Syntax. *SIGMOD Record*, 23(1):87–96, March 1994.
- [40] Atsushi Ohori and Peter Buneman. Static Type Inference for Parametric Classes. In C.A. Gunter and J.C. Mitchell, editors, *In Theoretical Aspects of Object-Oriented Programming*, pages 121–148. MIT Press, 1994.
- [41] Peter Buneman and Susan Davidson and A. Kosky. Theoretical Aspects of Schema Merging. In *Advances in Database Technology - EDBT '92*, pages 152–167. Springer, LNCS 580, 1992.
- [42] P. Buneman, S. Davidson, A. Kosky, and M. VanInwegen. A Basis for Interactive Schema Merging. In *Proceedings of the 25th Hawaii International Conference on System Sciences*, pages 311–322, Jan 1992.
- [43] Peter Buneman, Susan Davidson, and Aaron Watters. A Semantics for Complex Objects and Approximate Answers. *Journal of Computer and System Sciences*, 43(1):170–218, Aug 1991. Invited full version of [54].

- [44] Peter Buneman and Atsushi Ohori. A Type System that Reconciles Classes and Extents. In *Proceedings of 3rd International Workshop on Database Programming Languages*, Naphlion, Greece, August 1991.
- [45] Peter Buneman, Val Tannen, and S. Naqvi. Structural Recursion as a Query Language. In *Proceedings of 3rd International Workshop on Database Programming Languages*, Naphlion, Greece, August 1991.
- [46] Peter Buneman, Achim Jung, and Atsushi Ohori. Using Powerdomains to Generalize Relational Databases. *Theoretical Computer Science*, 91(1):23–56, 1991.
- [47] Val Breazu-Tannen, Peter Buneman, and Atsushi Ohori. Data Structures and Data Types in Object-Oriented Databases. *IEEE Data Engineering Bulletin, Special Issue on Theoretical Foundation of Object-Oriented Databases*, 14(2):23–27, 1991.
- [48] Atsushi Ohori, Peter Buneman, and Val Tannen. Database Programming in Machiavelli, a Polymorphic Language with Static Type Inference. In *Proceedings of ACM SIGMOD International Conference on Management of Data*, Portland, Oregon, June 1989.
- [49] Val Breazu-Tannen, Peter Buneman, and Atsushi Ohori. Can Object-Oriented Databases be Statically Typed? In *Proc. 2nd International Workshop on Database Programming Languages*, pages 226–237. Morgan Kaufmann, 1989.
- [50] Peter Buneman, Susan Davidson, and Aaron Watters. Querying Independent Databases. *Information Sciences*, 49(3), Nov 1989.
- [51] Val Breazu-Tannen, Peter Buneman, and Atsushi Ohori. Static type-checking in object-oriented databases. *IEEE Data Engineering, Special Issue on Database Programming Languages*, pages 5–12, 1989.
- [52] Atsushi Ohori, Peter Buneman, and Val Breazu-Tannen. Database Programming in Machiavelli -a Polymorphic Language with Static Type Inference. *Proc. ACM SIGMOD Conference*, pages 46–57, 1989.
- [53] Atsushi Ohori and Peter Buneman. Static Type Inference for Parametric Classes. In *Proc. ACM OOPSLA Conference*, pages 445–456, 1989.
- [54] Peter Buneman, Susan Davidson, and Aaron Watters. A Semantics of Complex Objects and Approximate Queries. In *Proceedings of the 7th ACM Symposium on Principles of Database System*, March 1988. Full version published in JCSS.
- [55] Atsushi Ohori and Peter Buneman. Type Inference in a Database Programming Language. In *ACM Conference on LISP and Functional Programming*, pages 174–183, 1988.
- [56] M.P. Atkinson, P. Buneman, and R. Morrison. Binding and Type Checking in Database Programming Languages. *Computer Journal*, 31(2):99–109, 1988.
- [57] Malcolm P. Atkinson and Peter Buneman. Types and Persistence in Database Programming Languages. *Computing Surveys*, 19(2):105–190, 1987.
- [58] Peter Buneman and Malcolm Atkinson. Inheritance and Persistence in Database Programming Languages. In *Proceedings of 1986 ACM Sigmod conference*, May 1986. Invited Paper.
- [59] Peter Buneman and Atsushi Ohori. A Domain Theoretic Approach to Higher-order Relations. In *International Conference on Database Theory*, pages 91–104. Springer, LNCS 243, 1986.
- [60] Peter Buneman, Robert E. Frankel, and Rishiyur S. Nikhil. An Implementation Technique for Database Query Languages. *ACM Transactions on Database Systems*, 7(2):164–186, 1982.
- [61] Peter Buneman, Julia Hirschberg, and David Root. A Codasyl Interface for Pascal and Ada. In *British National Conference on Databases*, 1982. Invited Paper.
- [62] Amihai Motro and Peter Buneman. Constructing Superviews. In Y. Edmund Lien, editor, *Proceedings of the 1981 ACM SIGMOD International Conference on Management of Data, Ann Arbor, Michigan, April 29 - May 1, 1981*. ACM Press, 1981.
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