PAUL W. BEAME
Curriculum Vitae
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Personal

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Education

Ph.D.   Computer Science, University of Toronto, 1987. Supervisor: S. A. Cook.

M.Sc.   Computer Science, University of Toronto, 1982. Supervisor: S. A. Cook.

B.Sc.   Mathematics Specialist with Computer Science Minor, University of Toronto, Summa Cum Laude 1981.

Academic Employment

1999–Present   Professor, Department of Computer Science and Engineering, University of Washington.

1993–1999   Associate Professor, Department of Computer Science and Engineering, University of Washington.

1993–1994   Visiting Associate Professor, Department of Computer Science, University of Toronto.

1987–1993   Assistant Professor, Department of Computer Science and Engineering, University of Washington.

1986–1987   Postdoctoral Associate, Theory of Computation Group in the Laboratory for Computer Science at Massachusetts Institute of Technology.

Summer 1985   Lecturer for a course entitled Discrete Mathematics for Computer Science while a graduate student at the University of Toronto.

1981–1985   Tutorial Assistant for courses entitled Computability and Logic, Automata Theory, Effective and Efficient Computing, Programming Methodology, Algebra I, Analysis I at the University of Toronto, 1981–1985.

Awards

Presidential Young Investigator, National Science Foundation, 1988.

University of Toronto Open Fellowship, 1985-1986.

Natural Sciences and Engineering Research Council Postgraduate Scholarship, 1981-1985.

R. K. Arnold Graduating Scholarship; University of Toronto 1981.

Graduation *summa cum laude*; University of Toronto, 1981.

Mary Beatty Undergraduate Scholarship; University of Toronto, 1977-1981.

Research Interests

Computational complexity. Lower bounds on resources necessary to solve computational problems. The complexity of proofs. Symbolic model checking and verification of software specifications.

Program Committees

1999 Symposium on Foundations of Computer Science (Chair)

1999 Computational Complexity Conference

1997 Symposium on Theory of Computing

1997 International Computing and Combinatorics Conference (COCOON)

1992 Symposium on Foundations of Computer Science

Recent Publications

- Paul W. Beame and Faith Fich. Optimal bounds for the predecessor problem. In *Proceedings of the Thirty-First Annual ACM Symposium on Theory of Computing*, pages 295–304, Atlanta, GA, May 1999.

- W. Chan, R. J. Anderson, P. Beame, D. J. Jones, D. Notkin, and W. E Warner. Decoupling synchronization from logic for efficient symbolic model checking of statecharts. In *Proceedings of the 21st International Conference on Software Engineering*, April 1999.

- Paul W. Beame, Allan Borodin, Prabhakar Raghavan, Walter L. Ruzzo, and Martin Tompa. A time-space tradeoff for undirected graph traversal by walking automata. *SIAM Journal on Computing*, 28(3):1051–1072, 1999.

- Paul W. Beame, Michael Saks, and Jayram S. Thathachar. Time-space tradeoffs for branching programs. In *Proceedings 39th Annual Symposium on Foundations of Computer Science*, pages 254–263, Palo Alto, CA, November 1998. IEEE.

- Paul Beame, Russell Impagliazzo, and Toniann Pitassi. Improved depth bounds for small distance connectivity. *Computational Complexity*, 7(4):325–345, 1998.

- W. Chan, R. J. Anderson, P. Beame, S. Burns, F. Modugno, D. Notkin, and J. D. Reese. Model checking large software specifications. *IEEE Transactions on Software Engineering*, 24(7):498–520, July 1998. Special section of invited papers from 4th Foundations in Software Engineering Conference.

- Paul W. Beame and Toniann Pitassi. Propositional Proof Complexity: Past, Present, and Future. *Bulletin of the European Association for Theoretical Computer Science*, 65:66–89, June 1998. The Computational Complexity Column (ed. E. Allender).

- P. Beame, R. Karp, T. Pitassi, and M. Saks. On the complexity of unsatisfiability of random k-CNF formulas. In *Proceedings of the 30th Annual ACM Symposium on Theory of Computing*, pages 561–571, Dallas, TX, May 1998.

- W. Chan, R. J. Anderson, P. Beame, and D. Notkin. Improving efficiency of symbolic model checking for state-based system requirements. In M. Young, editor, *ISSTA 98: Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis*, pages 102–112, Clearwater Beach, FL, March 1998. Published as *Software Engineering Notes*, 23(2), March 1998.

- Paul W. Beame, Stephen A. Cook, Jeff Edmonds, Russell Impagliazzo, and Toniann Pitassi. The relative complexity of NP search problems. *Journal of Computer and System Sciences*, 57:3–19, 1998. Special issue of invited papers from 1995 STOC conference.

- Paul W. Beame and Samuel R. Buss, editors. *Proof Complexity and Feasible Arithmetics*, volume 39 of *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*. American Mathematical Society, 1998.

- Paul Beame and Søren Riis. More on the relative strength of counting principles. In Paul W. Beame and Samuel R. Buss, editors, *Proof Complexity and Feasible Arithmetics*, volume 39 of *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, pages 13–35. American Mathematical Society, 1998.

- Paul W. Beame, Faith E. Fich, and Rakesh Sinha. Separating the power of EREW and CREW PRAMs with small communication width. *Information and Computation*, 138(1):89–99, October 1997.

- W. Chan, R. J. Anderson, P. Beame, and D. Notkin. Combining constraint solving and symbolic model checking for a class of systems with non-linear constraints. In O. Grumberg, editor, *Computer Aided Verification, 9th International Conference, CAV'97 Proceedings*, volume 1254 of *Lecture Notes in Computer Science*, pages 316–327, Haifa, Israel, June 1997. Springer-Verlag.

- Paul W. Beame, Russell Impagliazzo, Jan Krajíček, Toniann Pitassi, and Pavel Pudlák. Lower bounds on Hilbert's Nullstellensatz and propositional proofs. *Proc. London Math. Soc.*, 73(3):1–26, 1996.

- Paul W. Beame and Toniann Pitassi. An exponential separation between the parity principle and the pigeonhole principle. *Annals of Pure and Applied Logic*, 80:197–222, 1996.

- Paul W. Beame, Allan Borodin, Prabhakar Raghavan, Walter L. Ruzzo, and Martin Tompa. Time-space tradeoffs for undirected graph traversal by graph automata. *Information and Computation*, 130(2):101–129, November 1996.

- Paul W. Beame and Toniann Pitassi. Simplified and improved resolution lower bounds. In *Proceedings 37th Annual Symposium on Foundations of Computer Science*, pages 274–282, Burlington, VT, October 1996. IEEE.

Graduate Student Supervision

Simon Kahan Ph.D. 1991 (co-advised with Richard Anderson).

Joan Lawry, Ph.D. 1993.

Rakesh Sinha, Ph.D. 1995.

Jayram Thathachar, Ph.D. 1998.

William Chan, Ph.D. 1999 (co-advised with Richard Anderson and David Notkin).

Ellen Ratajak M.S. 1989.

Yotam Aviv M.S. 1993.

Steven Firebaugh M.S. 1991.

Ananda Ganguly M.S. 1995.

Erik Vee M.S. 1999 (co-advised with Chris Diorio).

Other Professional Service

Associate Editor, *computational complexity*, Jan 1997-present.

Co-chair DIMACS Workshop on Inherent Complexity of Problems, April 2000.

NSF CCR-TOC CAREER Awards Panel, October 1998.

Program Advisory Committee of Fields Institute special half-year on Computational Complexity 1998.

Co-chair DIMACS Workshop on Feasible Arithmetic and Proof Complexity, April 1996.

Steering committee of DIMACS Special Year on Logic and Algorithms 1995-96.

NSF CCR-TOC Research Initiation Award Panel, January 1994.