

Joshua Buresh-Oppenheim

140 Upland Road
Cambridge, MA 02140
Citizenship: USA

Mobile: 617-875-0142
Email: jburesho@cs.sfu.ca
Webpage: www.cs.sfu.ca/~jburesho/personal/

Research Interests

Analysis of algorithms, computational complexity, propositional proof complexity, derandomization.

Education

- **Ph.D.:** Computer Science, University of Toronto, 2005. Advisor: Professor Toniann Pitassi.
- **M.Sc.:** Computer Science, University of Arizona, 2000. Advisor: Professor Toniann Pitassi.
- **A.B. cum laude:** Mathematics, Harvard University, Cambridge, MA, 1997. Honors Supervisor: Professor Noam Elkies.

Work Experience

- **Senior Performance Engineer :** Akamai Technologies, Cambridge, MA, October 2007 - Present.
- **Post-Doctoral Fellow :** University of Toronto, Department of Computer Science, September 2007 - October 2007. Host: Toniann Pitassi.
- **Post-Doctoral Fellow :** Simon Fraser University, School of Computing Science, September 2005 - August 2007. Host: David Mitchell. Supported, in part, by a PDF grant from the Pacific Institute for the Mathematical Sciences (PIMS).
- **Post-Doctoral Fellow :** University of California, San Diego, Computer Science and Engineering Department, September 2004 - August 2005. Host: Russell Impagliazzo.

Publications

- *Minimum 2CNF Resolution Refutations in Polynomial Time.* In Proceedings of the 10th Annual Conference on Theory and Applications of Satisfiability Testing (SAT), 2007. Co-author: David Mitchell.
- *Uniform Hardness Amplification in NP via Monotone Codes.* ECCC Technical Report TR06-154, 2006. Co-authors: Valentine Kabanets, Rahul Santhanam.
- *Minimum Witnesses for Unsatisfiable 2CNFs.* In Proceedings of the 9th Annual Conference on Theory and Applications of Satisfiability Testing (SAT), 2006. Co-author: David Mitchell.
- *Making Hard Problems Harder.* In Proceedings of the 21st Annual IEEE Conference on Computational Complexity (CCC), 2006. Co-author: Rahul Santhanam.
- *Towards a Model for Backtracking and Dynamic Programming.* In Proceedings of the 20th IEEE Conference on Computational Complexity (CCC), 2005. Co-authors: Michael Alekhnovich, Allan Borodin, Russell Impagliazzo, Avner Magen, Toniann Pitassi.

- *Relativized NP Search Problems and Propositional Proof Systems*. In Proceedings of the 19th IEEE Conference on Computational Complexity (CCC), 2004. Co-author: Tsuyoshi Morioka.
- *Rank Bounds and Integrality Gaps for Cutting Planes Procedures*. In Proceedings of the 44th IEEE Annual Symposium on the Foundations of Computer Science (FOCS), 2003. Also in *Theory of Computing*: 2 (2006), pp. 65-90. Co-authors: Nicola Galesi, Shlomo Hoory, Avner Magen, Toniann Pitassi.
- *The Complexity of Resolution Refinements*. In Proceedings of the 18th Annual IEEE Symposium on Logic in Computer Science (LICS), 2003. Also in *Journal of Symbolic Logic*: 72 (4), 2007. Co-author: Toniann Pitassi.
- *Lower Bounds for Weaker Pigeonhole Principles*. In Proceedings of the 43rd IEEE Annual Symposium on the Foundations of Computer Science (FOCS), 2002. Also in *SIAM Journal on Computing*: volume 34, issue 2, 2005. Co-authors: Paul Beame, Toniann Pitassi, Ran Raz, Ashish Sabharwal.
- *Homogenization and the Polynomial Calculus*. In Proceedings of the 27th International Colloquium for Automata, Languages and Programming (ICALP), 2000. Also in *Computational Complexity*: 11 (2002), pp. 91-108. Co-authors: Matthew Clegg, Russell Impagliazzo, Toniann Pitassi.
- *Solving the Discrete Logarithm Problem over Elliptic Curves*. Honors thesis, Harvard University, 1997. Supervisor: Noam Elkies.

In Progress

- *Stronger Models for Dynamic Programming*.
- *Hardness of Vertex Expansion in LP Hierarchies*.

Talks and Presentations

- Bell Labs Math Center Seminar, July 2007.
- SAT 2007
- Harvard University, Theory Seminar, October 2006.
- Dartmouth College, Theory Seminar, October 2006.
- SUNY Stony Brook, Algorithms Seminar, September 2006.
- DIMACS, Theory Seminar, September 2006.
- Columbia University, Theory Seminar, September 2006.
- SAT 2006
- Banff International Research Station workshop on computational complexity, August 2006.
- Simon Fraser University, Theory Seminar, December 2005.

- CCC 2005.
- UCSD, Theory Seminar, November 2004.
- McGill University, Algorithms Seminar, March 2004.
- Institute for Advanced Study, Computer Science Seminar, January 2004.
- York University, Computer Science Seminar, November 2003.
- FOCS 2003.
- LICS 2003.
- FOCS 2002.
- Institute for Advanced Study, workshop on proof complexity, December 2000.
- ICALP 2000.
- University of Toronto, Theory Seminar, November 1999.

Teaching Experience

- **Instructor:** Simon Fraser University, Summer Term, 2006 and Spring Term 2007. Taught 3rd-year-undergraduate computer networks course.
- **Instructor:** University of California, San Diego, Fall Quarter, 2004. Taught 4th-year-undergraduate algorithms course.
- **Instructor:** University of Toronto, Department of Computer Science, Summers of 2001-2004. Taught 3rd-year-undergraduate data structures course and 2nd-year-undergraduate discrete math course.
- **Teaching Assistant:** University of Toronto, Department of Computer Science, Fall 2000-Fall 2002. Courses: 3rd-year-undergraduate complexity and algorithms, graduate logic and computability, graduate complexity.
- **Teaching Assistant:** University of Arizona, Department of Computer Science, Fall 1998-Spring 1999. Courses: 4th-year-undergraduate automata, grammars and languages, 4th-year-undergraduate algorithms.

References

- Professor Toniann Pitassi
Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4
CANADA
Phone: (416) 978-3695
Fax: (416) 978-1931
Email: toni@cs.toronto.edu
- Professor Stephen Cook
University Professor
Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4
CANADA
Phone: (416) 978-5183
Fax: (416) 978-1931
Email: sacook@cs.toronto.edu
- Professor Allan Borodin
Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4
CANADA
Phone: (416) 978-6416
Fax: (416) 978-1931
Email: bor@cs.toronto.edu
- Professor Russell Impagliazzo
Department of Computer Science and Engineering
University of California, San Diego
La Jolla, CA 92093-0114
USA
Phone: (858) 534-1332
Fax: (858) 534-7029
Email: russell@cs.ucsd.edu
- Professor Valentine Kabanets
School of Computing Science
Simon Fraser University
Burnaby, BC
Canada V5A 1S6
Phone: (604)-268-6912
Fax: (604)-291-3045
Email: kabanets@cs.sfu.ca

- Professor Avner Magen
Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4
CANADA
Phone: (416) 946-8672
Email: avner@cs.toronto.edu
- Professor David Mitchell
School of Computing Science
Simon Fraser University
Burnaby, BC
Canada V5A 1S6
Phone: (604)-268-6673 Fax: (604)-291-3045
Email: mitchell@cs.sfu.ca

More available on request.