

# Jelani Nelson

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## EDUCATION

- Massachusetts Institute of Technology** **Cambridge, MA**
- 09/06–present Candidate for PhD in Computer Science. GPA: 5.0/5.0.  
Research advisors: Prof. Erik D. Demaine and Prof. Piotr Indyk, Theory of Computation Group, CSAIL.  
Interests: external-memory algorithms, cache-obliviousness, streaming, metric embeddings, exact and approximation algorithms.
- 09/05–06/06 Master of Engineering in Electrical Engineering and Computer Science. GPA: 5.0/5.0.  
Thesis title: External-Memory Search Trees with Fast Insertions. Under supervision of Dr. Bradley C. Kuszmaul and Prof. Charles E. Leiserson.
- 09/01–06/05 Bachelor of Science degree in Computer Science and Engineering, and Bachelor of Science degree in Mathematics. GPA: 4.9/5.0.
- Relevant courses: Advanced Algorithms, Randomized Algorithms, Randomness and Computation, Machine Learning, Algebra and Computation, Advanced Data Structures, Metric Embeddings, Sketching and Streaming, Essential Coding Theory, Spectral Graph Theory and Convex Geometry, Pseudorandomness, Advanced Complexity Theory, Network Security, Theory of Computation, Cryptography and Cryptanalysis, Computer System Architecture.

## RESEARCH EXPERIENCE

- 06/08–08/08 **IBM Almaden Research Center, Theory Group** **San Jose, CA**  
05/09–07/09 Mentors: Dr. David P. Woodruff, Dr. T.S. Jayram. Upper and lower bounds for streaming problems, amongst other things.
- 06/06–07/06 **Technion - Israel Institute of Technology, ToC Lab** **Haifa, Israel**  
Mentor: Prof. Yuval Rabani. Research on approximation algorithms for graph labeling and other problems.
- 06/04–08/04 **Toshiba Research and Development Center** **Kawasaki, Japan**  
Mentor: Dr. Hideto Ogasawara. Developed the latest version of a tool used to estimate statistics related to software reliability based on data collected during software testing.
- 05/03–09/03 **MIT LCS Program Analysis Group** **Cambridge, MA**  
Mentor: Prof. Michael D. Ernst. Contributed several features to a tool for dynamically detecting invariants over program points.

## OTHER EXPERIENCE

- 06/05–08/05 **Google Inc.** **Mountain View, CA**  
Software engineering intern on team responsible for detecting fraudulent behavior related to Google ads.

## TEACHING

MIT, EECS Department

Cambridge, MA

- 8/06–9/09 One of three coaches of MIT's ACM International Collegiate Programming Contest team. Organized team selection contests and practices. Also co-organized BOSPRES 2006 with Harvard University and Fitchburg State College. BOSPRES is a preliminary ACM ICPC contest for universities in Northeast North America.
- 09/05–12/05 Teaching Assistant for 6.042, "Mathematics for Computer Science". Responsibilities included grading, holding office hours, creating problems, and maintaining and modifying grading software.

## JOURNAL PAPER

- Timothy Abbott, Michael A. Burr, Timothy M. Chan, Erik D. Demaine, Martin L. Demaine, John Hugg, Daniel M. Kane, Stefan Langerman, Jelani Nelson, Eynat Rafalin, Kathryn Seyboth, Vincent Yeung.  
**Dynamic Ham-Sandwich Cuts in the Plane.**  
*Computational Geometry: Theory and Applications*, 42(5): 419-428, 2009.

## CONFERENCE PAPERS

- Daniel M. Kane, Jelani Nelson, David P. Woodruff  
**On the Exact Space Complexity of Sketching and Streaming Small Norms.**  
*21st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, to appear, 2010.
- Miklós Ajtai, Vitaly Feldman, Avinatan Hassidim, Jelani Nelson  
**Sorting and Selection with Imprecise Comparisons.**  
*36th International Colloquium on Automata, Languages and Programming (ICALP)*, 2009.
- Nicholas J. A. Harvey, Jelani Nelson, Krzysztof Onak.  
**Sketching and Streaming Entropy via Approximation Theory.**  
*49th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2008.
- Michael A. Bender, Martin Farach-Colton, Jeremy T. Fineman, Yonatan Fogel, Bradley C. Kuszmaul, Jelani Nelson.  
**Cache-Oblivious Streaming B-trees.**  
*19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, 2007.
- Timothy Abbott, Erik D. Demaine, Martin L. Demaine, Daniel M. Kane, Stefan Langerman, Jelani Nelson, Vincent Yeung  
**Dynamic Ham-Sandwich Cuts of Convex Polygons in the Plane.**  
*17th Canadian Conference on Computational Geometry (CCCG)*, 2005.

## OTHER PAPERS

- Ilias Diakonikolas, Daniel M. Kane, Jelani Nelson  
**Bounded Independent Fools Degree-2 Threshold Functions.**  
Manuscript, *CoRR abs/0911.3389*.
- Jelani Nelson, David P. Woodruff  
**A Near-Optimal Algorithm for L1-Difference.**  
Manuscript, *CoRR abs/0904.2027*.
- Daniel M. Kane, Jelani Nelson, David P. Woodruff  
**Revisiting Norm Estimation in Data Streams.**  
Manuscript, *CoRR abs/0811.3648* (contains [KNW10] plus other results).
- Jelani Nelson.  
**A Note on Set Cover Inapproximability Independent of Universe Size.**  
*Electronic Colloquium on Computational Complexity (ECCC)*, TR07-105, 2007.

## TALKS

- University of Michigan, Ann Arbor, MI. Title: *An Optimal Streaming Algorithm for Sketching Small Moments*. October 2009.
- Tsinghua University, Beijing, China. China Theory Week. Title: *An Optimal Streaming Algorithm for Sketching Small Moments*. September 2009.
- California Institute of Technology, Los Angeles, CA. Title: *An Optimal Streaming Algorithm for Sketching Small Moments*. August 2009.
- University of California, Los Angeles, CA. Title: *An Optimal Streaming Algorithm for Sketching Small Moments*. August 2009.
- IBM Almaden Research Center, San Jose, CA. Title: *Revisiting Norm Estimation in Data Streams*. June 2009.
- IT University of Copenhagen, Copenhagen, Denmark. Title: *Revisiting Norm Estimation in Data Streams*. April 2009.
- Center for Massive Data Algorithmics (MADALGO), Aarhus, Denmark. Title: *Revisiting Norm Estimation in Data Streams*. April 2009.
- MIT Algorithms and Complexity Seminar, Cambridge, MA. Title: *Revisiting Norm Estimation in Data Streams*. April 2009.
- DIMACS/DyDan Workshop on Streaming, Coding, and Compressive Sensing: Unifying Theory and Common Applications to Sparse Signal/Data Analysis and Processing, New Brunswick, NJ. Title: *Sketching and Streaming Entropy via Approximation Theory*. March 2009.
- MIT Algorithms and Complexity Seminar, Cambridge, MA. Title: *Sketching and Streaming Entropy via Approximation Theory*. September 2008.
- IBM Almaden Research Center, San Jose, CA. Title: *Sketching and Streaming Entropy via Approximation Theory*. June 2008.
- MIT 13<sup>th</sup> Annual LIDS Student Conference, Cambridge, MA. Title: *Streaming Algorithms for Estimating Information Statistics*. January 2008.
- MIT Theory Reading Group, Cambridge, MA. Title: *Algorithms for Random 3SAT*. May 2007.
- NSF Panel Visit, Stony Brook University, Stony Brook, NY. Title: *The Cache-Oblivious Lookahead Array: A Streaming B-tree with Fast Range Queries and Updates*. April 2007.
- MIT Theory of Computation Student Seminar, Cambridge, MA. Title: *Cache-Oblivious Algorithms and Data Structures*. December 2005.

## HONORS AND AWARDS

- National Defense Science and Engineering Graduate (NDSEG) Fellow. 2007–2010.
- Akamai Presidential Fellow. 2006–2007.
- NSF Graduate Research Fellowship Program, Honorable Mention. 2006, 2007.
- Member of the Phi Beta Kappa, Tau Beta Pi, and Eta Kappa Nu honor societies.
- Google Code Jam Latin America, 10th place (algorithmic individual programming contest with over 4,000 registered competitors), Belo Horizonte, Brazil. 2007.
- Google Code Jam, Semi-finalist. 2004, 2006, 2008.