Jelani Nelson

Curriculum Vitae

John A. Paulson School of Engineering and Applied Sciences
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Current Position

Harvard University — Cambridge, MA

- Associate Professor of Computer Science, July 2017–present
- John L. Loeb Associate Professor of Engineering and Applied Sciences, July 2017–present

Previous Positions

Harvard University — Cambridge, MA

- Assistant Professor of Computer Science, July 2013–June 2017

Institute for Advanced Study — Princeton, NJ

- Member, September 2012–June 2013
- Mentor: Avi Wigderson

Princeton University — Princeton, NJ

- Postdoctoral fellow, Center for Computational Intractibility, January 2012–August 2012

Mathematical Sciences Research Institute — Berkeley, CA

- Postdoctoral fellow, Program in Quantitative Geometry, August 2011–December 2011
- Mentor: Adam Klivans

Education

Massachusetts Institute of Technology — Cambridge, MA

- Ph.D. in Computer Science, June 2011.
- Advisors: Professor Erik D. Demaine, Professor Piotr Indyk.
- Thesis: *Sketching and Streaming High-Dimensional Vectors.*

Massachusetts Institute of Technology — Cambridge, MA

- M.Eng. in Computer Science, June 2006.
- Advisors: Dr. Bradley C. Kuszmaul, Professor Charles E. Leiserson.
- Thesis: *External-Memory Search Trees with Fast Insertions.*

Massachusetts Institute of Technology — Cambridge, MA

- S.B. in Computer Science, June 2005.
- S.B. in Mathematics, June 2005.

Honors

- Presidential Early Career Award for Scientists and Engineers (PECASE), 2017.
- Alfred P. Sloan Research Fellow, 2017.
- ONR Director of Research Early Career Grant, 2017–2022.
- Harvard University Clark Fund Award, 2017.
- ONR Young Investigator Award, 2015–2018.
- NSF Early Career Development (CAREER) Award, 2014–2019.
- George M. Sprowls Award, given for best doctoral theses in computer science at MIT, 2011.
- IBM Research Pat Goldberg Memorial Best Paper Award. 2010.
- Best Paper Award, ACM Symposium on Principles of Database Systems (PODS). 2010.
- Xerox Fellow. 2010–2011.
- National Defense Science and Engineering Graduate (NDSEG) Fellow. 2007–2010.
- Akamai Presidential Fellow. 2006–2007.
- Member of Phi Beta Kappa, Tau Beta Pi, and Eta Kappa Nu.

Professional Activities

- Associate Editor, *Mathematical Statistics and Learning*, 2017–present.
- Program committee member, 2nd Annual Symposium on Symplicity in Algorithms (SOSA), San Diego, CA, January 2019.
- Program committee member, 21st Annual International Conference on Database Theory (ICDT), Vienna, Austria, March 2018.
- Program committee member, 49th Annual ACM Symposium on the Theory of Computing (STOC), Montreal, Quebec, Canada, June 2017.
- Program committee member, 28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), New Orleans, Louisiana, January 2017.
- Program committee member, 44th Annual International Colloquium on Automata, Languages and Programming (ICALP), Warsaw, Poland, July 2017.
- Co-organizer (with Assaf Naor), workshop on "Chaining Methods and their Applications to Computer Science", Harvard University, June 22–23, 2016.
- Program committee member, 13th Annual Conference on Theory and Applications of Models of Computation (TAMC), Xi'an, China, July 2016.

- Program committee member, 7th Workshop on Massive Data Algorithmics (MASSIVE), Patras, Greece, September 2015.
- Program committee member, 20th International Symposium on Fundamentals of Computation Theory (FCT), Gdańsk, Poland, August 2015.
- Program committee member, 16th International Workshop on Randomization and Computation (RANDOM), Berkeley, California, August 2013.
- Program committee member, 24th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), New Orleans, Louisiana, January 2013.
- Grant reviewing: National Science Foundation, U.S. Army Research Office, United States – Israel Binational Science Foundation.
- Conference reviewing: FOCS, STOC, SODA, ICML, NIPS, PODS, ICDT, CCC, RANDOM, ITCS, STACS, ISIT, SOCG, ESA, SPAA, ICASSP, MFCS, IPDPS
- Journal reviewing: SIAM J. Comput., J. Comp. Sys. Sci., Appl. Comp. Harm. Anal., Algorithmica, ACM Trans. Algor., ACM Trans. Database Syst., ACM Trans. Comput. Theor., Inf. Comput., IEEE Trans. Sig. Proc., J. Comb. Opt., IEEE Trans. Pattern Analysis and Machine Intelligence, IEEE Trans. Inf. Theory, Discrete and Computational Geometry, Statistics Surveys

Doctoral Advisees

Current Students

- Jarosław Błasiok
- Vasileios Nakos
- Zhengyu Wang

Postdoctoral Fellows

Rasmus Kyng — January '18–

- Supported by Office of Naval Research Director of Research Early Career Grant.

Kyle Luh — July '17–

- Supported by NSF Mathematical Sciences Postdoctoral Research Fellowship.

Huacheng Yu — August '17–

- Partially supported by Office of Naval Research Young Investigator Award.
- Co-hosted with Madhu Sudan.

Jakub Pachocki — July '16–January '17

- Supported partially by Office of Naval Research Young Investigator Award.
- Currently: Researcher at OpenAI.

Yi Li November '14–October '15

- Supported partially by grant from Office of Naval Research.
- Currently: Assistant Professor in the Division of Mathematical Sciences at Nanyang Technological University.

Undergraduate and High School Research Advising

Ce Jin Summer '18

- Tsinghua University, Class of 2020. Completed two research projects, one on approximation algorithms, and one on streaming algorithms. Former in preparation; latter to appear in ITCS 2019.

Shyam Narayanan Summer '18

- Harvard College, Class of 2019. PRISE and Herchel-Smith Fellow. Completed two research projects on pseudorandom walks and on dimensionality reduction. Manuscripts in submission: `https://arxiv.org/abs/1807.04910`; `https://arxiv.org/abs/1810.09250`.

Alexander Wei Summer '18

- Harvard College, Class of 2020. PRISE and Herchel-Smith Fellow. Completed research project on approximate nearest neighbor search. Work to appear in SODA 2019 (best student paper award): `https://arxiv.org/abs/1807.07527`.

Meena Jagadeesan Summer '17

- Harvard College, Class of 2020. PRISE and Herchel-Smith Fellow. Completed theoretical computer science research project on random projections. Manuscript in submission: `https://arxiv.org/abs/1708.02966`.

Jacob Teo Por Loong Summer '17

- NUS High School, Singapore, Class of 2018. Participated in the Research Science Institute (RSI) and conducted a theoretical project in succinct data structures. Manuscript in submission: `https://arxiv.org/abs/1709.09574`.

Matt Rauen September '15–May'16

- Harvard College, A.B. thesis *Streaming Approximation Algorithms using Amnesic Dynamic Programming*, cum laude in mathematics and computer science.

Martin Camacho September '13–May '14

- Harvard College, A.B. thesis *Spectral Sparsification: The Barrier Method and its Applications*, magna cum laude in mathematics and computer science.

Visitors Hosted

Zhao Song — August '17–May '18

- Visiting student from UT Austin.

Radosław Adamczak — June '16–July '16

- Visited from University of Warsaw.

Mikkel Thorup — March '16

- Visited from University of Copenhagen.

Sjoerd Dirksen — May '14–June '14, June '16–July '16

- Visited from University of Bonn.

Ameya Velingker — January '14–June '14

- Visiting student from Carnegie Mellon University.

Teaching

CS 224: Advanced Algorithms — Fall '14, Spring '17

- Graduate course, redesigned version of CS 226r: Efficient Algorithms.

CS 226: Sketching Algorithms for Big Data (formerly CS 229r) — Fall '13, '15, '17

- New graduate course.

CS 124: Data Structures and Algorithms — Spring '14, '15, '18

- Core undergraduate course for computer science concentrators.

CS 125: Algorithms & Complexity — Fall '16

- Core undergraduate course for computer science concentrators.

Additional Teaching

- Lecturer at summer school "Mathematical methods for high-dimensional data analysis", Technische Universität München, Germany, July 2016.
- Summer course on algorithms for high schoolers in Ethiopia (`http://www.addiscoder.com`), July 2011, 2016, and 2018.
- Lecturer at MathROOTS@MIT, June 23, 2016 and June 18, 2018.
- Lecturer at "MADALGO Summer School on Streaming Algorithms", August 2015.
- Week-long course on algorithms for high schoolers in St. Thomas, USVI (`http://www.usvicoder.com`), January 2015.
- Invited tutorial "Data Mining in Streams" given at KDD 2012 (joint with Edo Liberty).
- Co-coach, with Bob Walton, for Harvard ACM International Collegiate Programming Contest team, August 2015–present.
- Student coach for MIT ACM International Collegiate Programming Contest team, August 2006–September 2009.

External Funding

Research Funding

- Office of Naval Research Basic Research Challenge Program. "Dimensionality Reduction and Randomized Linear Algebra: Foundations and New Directions", co-PI with David Woodruff (Carnegie Mellon University). $1,199,987 (Harvard portion: $596,333), 6/18–5/22.
- Sloan Research Fellowship. $60,000.00, 9/17–9/19.
- Office of Naval Research Director of Research Early Career Grant. "Sketching Methods for High-Dimensional Data Analysis." $1,000,000.00, 7/17–6/22.
- Office of Naval Research Young Investigator Award. "Randomized Dimensionality Reduction Methods for Machine Learning." $510,000.00, 6/15–5/18.
- NSF BIGDATA program. "BIGDATA: F: DKA: Randomized methods for high-dimensional data analysis." $285,000.00 (+ $2,800 REU Supplement), 9/14–8/18.
- Office of Naval Research grant. "Dimensionality reduction methods for machine learning." $120,000.00, 7/14–7/15.
- NSF Early Career Development Award. "Sketching Algorithms for Massive Data." $512,818.00, 5/14–4/19.
- Google Faculty Research Award. $53,010. 2/14.

Other Funding

- Office of Naval Research grant. "Chaining methods and their applications to computer science", to support speaker travel expenses, $10,000.00, 6/16–5/17.
- NSF Algorithmic Foundations grant. "Chaining methods and their applications to computer science", to support conference attendance by postdocs and students, $10,000.00, 4/16–3/17.

Patents

- Jelani Nelson, David P. Woodruff. *Aggregate Contribution of Iceberg Queries*, US Patent #8,499,003 B2.
- Jelani Nelson, David P. Woodruff. *Summarizing Internet Traffic Patterns*, US Patent #8,310,922 B2.

Refereed Journal Articles

[1] Miklós Ajtai, Vitaly Feldman, Avinatan Hassidim, and Jelani Nelson. Sorting and selection with imprecise comparisons. *ACM Transactions on Algorithms*, 12(2), February 2016. Preliminary version in ICALP 2009.

[2] Jean Bourgain, Sjoerd Dirksen, and Jelani Nelson. Toward a unified theory of sparse dimensionality reduction in Euclidean space. *Geometric and Functional Analysis (GAFA)*, 25(4):1009–1088, July 2015. Preliminary version in STOC 2015.

[3] Daniel M. Kane and Jelani Nelson. Sparser Johnson-Lindenstrauss transforms. *J. ACM*, 61(1):4, January 2014. Preliminary version in SODA 2012.

[4] Jelani Nelson, Huy L. Nguyễn, and David P. Woodruff. On deterministic sketching and streaming for sparse recovery and norm estimation. *Lin. Alg. Appl.*, 441:152–167, January 2014. Preliminary version in RANDOM 2012.

[5] Timothy G. Abbott, Michael Burr, Timothy M. Chan, Erik D. Demaine, Martin L. Demaine, John Hugg, Daniel M. Kane, Stefan Langerman, Jelani Nelson, Eynat Rafalin, Kathryn Seyboth, and Vincent Yeung. Dynamic ham-sandwich cuts in the plane. *Comput. Geom.*, 42(5):419–428, July 2009. Preliminary version in CCCG 2005.

Refereed Conference Publications

Excludes conference publications for which a journal version appeared later.

[1] Jelani Nelson and Huacheng Yu. Optimal lower bounds for distributed and streaming spanning forest computation. In *Proceedings of the 30th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, January 2019.

[2] Mark Bun, Jelani Nelson, and Uri Stemmer. Heavy hitters and the structure of local privacy. In *Proceedings of the 37th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, June 2018.

[3] Tom Morgan and Jelani Nelson. A note on reductions between compressed sensing guarantees. In *Proceedings of the IEEE International Symposium on Information Theory (ISIT)*, June 2018.

[4] Michael B. Cohen, T.S. Jayram, and Jelani Nelson. Simple analyses of the Sparse Johnson-Lindenstrauss transform. In *Proceedings of the 1st Annual Symposium on Simplicity in Algorithms (SOSA)*, January 2018.

[5] Michael Kapralov, Jelani Nelson, Jakub Pachocki, Zhengyu Wang, David P. Woodruff, and Mobin Yahyazadeh. Optimal lower bounds for universal relation, samplers, and finding duplicates in streams. In *Proceedings of the 58th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, October 2017.

[6] Kasper Green Larsen and Jelani Nelson. Optimality of the Johnson-Lindenstrauss lemma. In *Proceedings of the 58th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, October 2017.

[7] Jarosław Błasiok, Jian Ding, and Jelani Nelson. Continuous monitoring of ℓ_p norms in data streams. In *Proceedings of the 21st International Workshop on Randomization and Computation (RANDOM)*, pages 545–558, August 2017.

[8] Vladimir Braverman, Stephen R. Chestnut, Nikita Ivkin, Jelani Nelson, Zhengyu Wang, and David P. Woodruff. BPTree: an ℓ_2 heavy hitters algorithm using constant memory. In *Proceedings of the 36th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, pages 361–376, May 2017.

[9] Kasper Green Larsen, Jelani Nelson, Huy L. Nguyễn, and Mikkel Thorup. Heavy hitters via cluster-preserving clustering. In *Proceedings of the 57th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 61–70, October 2016.

[10] Jarosław Błasiok and Jelani Nelson. An improved analysis of the ER-SpUD dictionary learning algorithm. In *Proceedings of the 41st International Colloquium on Automata, Languages and Programming (ICALP)*, pages 44:1–44:14, July 2016.

[11] Michael B. Cohen, Jelani Nelson, and David Woodruff. Optimal approximate matrix product in terms of stable rank. In *Proceedings of the 41st International Colloquium on Automata, Languages and Programming (ICALP)*, pages 11:1–11:14, July 2016.

[12] Kasper Green Larsen and Jelani Nelson. The Johnson-Lindenstrauss lemma is optimal for linear dimensionality reduction. In *Proceedings of the 41st International Colloquium on Automata, Languages and Programming (ICALP)*, pages 82:1–82:11, July 2016.

[13] Kasper Green Larsen, Jelani Nelson, and Huy L. Nguyễn. Time lower bounds for nonadaptive turnstile streaming algorithms. In *Proceedings of the 47th ACM Symposium on Theory of Computing (STOC)*, pages 803–812, June 2015.

[14] Jelani Nelson and Huy L. Nguyễn. Lower bounds for oblivious subspace embeddings. In *Proceedings of the 41st International Colloquium on Automata, Languages and Programming (ICALP)*, pages 883–894, July 2014.

[15] Jelani Nelson, Eric Price, and Mary Wootters. New constructions of RIP matrices with fast multiplication and fewer rows. In *Proceedings of the 25th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1515–1528, January 2014.

[16] Jelani Nelson and Huy L. Nguyễn. OSNAP: Faster numerical linear algebra algorithms via sparser subspace embeddings. In *Proceedings of the 54th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 117–126, October 2013.

[17] Jelani Nelson and Huy L. Nguyễn. Sparsity lower bounds for dimensionality-reducing maps. In *Proceedings of the 45th ACM Symposium on Theory of Computing (STOC)*, pages 101–10, June 2013.

[18] Daniel M. Kane, Raghu Meka, and Jelani Nelson. Almost optimal explicit Johnson-Lindenstrauss families. In *Proceedings of the 15th International Workshop on Randomization and Computation (RANDOM)*, pages 628–639, August 2011.

[19] Daniel M. Kane, Jelani Nelson, Ely Porat, and David P. Woodruff. Fast moment estimation in data streams in optimal space. In *Proceedings of the 43rd ACM Symposium on Theory of Computing (STOC)*, pages 745–754, June 2011.

[20] Ilias Diakonikolas, Daniel M. Kane, and Jelani Nelson. Bounded independence fools degree-2 threshold functions. In *Proceedings of the 51st Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 11–20, October 2010.

[21] Daniel M. Kane, Jelani Nelson, and David P. Woodruff. An optimal algorithm for the distinct elements problem. In *Proceedings of the 29th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, pages 41–52, June 2010.

[22] Jelani Nelson and David P. Woodruff. Fast manhattan sketches in data streams. In *Proceedings of the 29th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)*, pages 99–110, June 2010.

[23] Daniel M. Kane, Jelani Nelson, and David P. Woodruff. On the exact space complexity of sketching and streaming small norms. In *Proceedings of the 21st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1161–1178, January 2010.

[24] Nicholas J. A. Harvey, Jelani Nelson, and Krzysztof Onak. Sketching and streaming entropy via approximation theory. In *Proceedings of the 49th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 489–498, October 2008.

[25] Michael A. Bender, Martin Farach-Colton, Jeremy T. Fineman, Yonatan R. Fogel, Bradley C. Kuszmaul, and Jelani Nelson. Cache-oblivious streaming B-trees. In *Proceedings of the 19th Annual ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 81–92, June 2007.

Other Manuscripts

[1] Shyam Narayanan and Jelani Nelson. Optimal terminal dimensionality reduction in Euclidean space. *CoRR*, abs/1810.09250, October 2018.

[2] Jacob Teo Por Loong, Jelani Nelson, and Huacheng Yu. Fillable arrays with constant time operations and a single bit of redundancy. *CoRR*, abs/1709.09574, September 2017.

[3] Daniel M. Kane and Jelani Nelson. A derandomized sparse Johnson-Lindenstrauss transform. *CoRR*, abs/1006.3585, June 2010.

[4] Jelani Nelson and David P. Woodruff. A near-optimal algorithm for L1-difference. *CoRR*, abs/0904.2027, April 2009.

[5] Jelani Nelson. A note on set cover inapproximability independent of universe size. *Electronic Colloquium on Computational Complexity (ECCC)*, 14(105), October 2007.

Theses, Surveys, and Books

[1] Jelani Nelson. Chaining introduction with some computer science applications. In *Bulletin of EATCS, The Algorithmics Column*, number 120. October 2016.

[2] Jelani Nelson. Oblivious subspace embeddings. In *Encyclopedia of Algorithms*. Springer, 2015.

[3] Jelani Nelson. Sketching and streaming algorithms for processing massive data. *ACM Crossroads*, 19(1):14–19, September 2012.

[4] Jelani Nelson. *Sketching and Streaming High-Dimensional Vectors*. PhD thesis, Massachusetts Institute of Technology, June 2011.

Invited Talks at Workshops and Conferences

[T1] The BPTree: improved insertion-only ℓ_2 heavy hitters. *25 years of Conferences for African-American Researchers in the Mathematical Sciences, Joint Mathematics Meetings, Baltimore, MD*, January 2019.

[T2] Sketching big data. *Simons Institute Open Lecture Series, Berkeley, CA*, November 2018.

[T3] Panel discussion on youth employment in ICT: the skills gap. *ICT Expo, Addis Ababa, Ethiopia*, July 2018.

[T4] Recent advances in dimensionality reduction with provable guarantees. *SIAM Annual Meeting, Portland, OR*, July 2018.

[T5] The BPTree: improved insertion-only ℓ_2 heavy hitters. *Sublinear Algorithms Bootcamp and Workshop, MIT, Cambridge, MA*, June 2018.

[T6] Recent advances concerning the Johnson-Lindenstrauss lemma. *Highlights of Algorithms Invited Survey Talk, Vrije Universiteit Amsterdam, Netherlands*, June 2018.

[T7] Optimality of the Johnson-Lindenstrauss lemma. *Symposium on Data Science & Statistics, Reston, VA*, May 2018.

[T8] The BPTree: improved insertion-only ℓ_2 heavy hitters. *Workshop on Data Summarization, Warwick University, United Kingdom*, March 2018.

[T9] Optimality of the Johnson-Lindenstrauss lemma. *Workshop on Geometric Functional Analysis and Applications, MSRI, Berkeley, CA*, November 2017.

[T10] Optimality of the Johnson-Lindenstrauss lemma. *Workshop on Random Matrices, Foundations of Computational Mathematics, Barcelona, Spain*, July 2017.

[T11] Optimality of the Johnson-Lindenstrauss lemma. *NII Shonan Village Center Workshop on Processing Big Data Streams, Kanagawa, Japan*, June 2017.

[T12] Heavy hitters via cluster-preserving clustering. *Workshop on Theory and Applications of Hashing, Schloss Dagstuhl, Wadern, Germany*, May 2017.

[T13] Optimality of the Johnson-Lindenstrauss lemma. *Banach Space Theory and Metric Embeddings Session, AMS Eastern Sectional Meeting, Hunter College, CUNY, New York, NY*, May 2017.

[T14] Optimal lower bounds for universal relation, samplers, and finding duplicates. *Workshop on Communication Complexity and Applications II, Banff, Alberta, Canada*, March 2017.

[T15] Heavy hitters via cluster-preserving clustering. *Theory at UBC Mini-Symposium, University of British Columbia, Vancouver, Canada*, February 2017.

[T16] Heavy hitters via cluster-preserving clustering. *26th Annual PCMI Summer Session on the Mathematics of Data, Midway, Utah*, July 2016.

[T17] Optimal approximate matrix product in terms of stable rank. *NII Shonan Village Center Workshop on Recent Advances in Numerical Linear Algebra, Kanagawa, Japan*, July 2016.

[T18] Sketching and streaming algorithms (three lectures). *Technical University of Munich Summer School on Mathematical Methods for High-Dimensional Data Analysis, Munich, Germany*, July 2016.

[T19] Heavy hitters via cluster-preserving clustering. *Nexus of Information and Computation Theories, Institut Henri Poincaré, Paris, France*, March 2016.

[T20] Heavy hitters via cluster-preserving clustering. *Low Complexity Models in Signal Processing Workshop, Hausdorff Institute, Bonn, Germany*, February 2016.

[T21] Heavy hitters via cluster-preserving clustering. *Information Theory and Applications (ITA) Workshop, UCSD, San Diego, CA*, February 2016.

[T22] Dimensionality reduction methods (three lectures). *MADALGO Summer School on Streaming Algorithms, Aarhus, Denmark*, August 2015.

[T23] Dimensionality reduction via sparse matrices. *Conference on Big Data, Harvard University, Cambridge, MA*, August 2015.

[T24] An introduction to chaining, and applications to sublinear algorithms. *DIMACS Workshop on Big Data through the Lens of Sublinear Algorithms, Piscataway, NJ*, August 2015.

[T25] Dimensionality reduction via sparse matrices. *Conference for African American Researchers in the Mathematical Sciences (CAARMS), Providence, RI*, June 2015.

[T26] Time lower bounds for nonadaptive turnstile streaming algorithms. *MIT Sublinear Day, Cambridge, MA*, April 2015.

[T27] The Johnson-Lindenstrauss lemma is optimal for linear dimensionality reduction. *NII Shonan Village Center Workshop on Algorithms for Large Scale Graphs, Kanagawa, Japan*, October 2014.

[T28] Time lower bounds for nonadaptive turnstile streaming algorithms. *Workshop on Communication Complexity and Applications, Banff, Alberta, Canada*, August 2014.

[T29] Dimensionality reduction via sparse matrices. *Workshop on Algorithms for Modern Massive Data Sets (MMDS), Berkeley, CA*, June 2014.

[T30] Dimensionality reduction via sparse matrices. *Workshop on Sublinear Algorithms, Bertinoro, Italy*, May 2014.

[T31] Dimensionality reduction via sparse matrices. *Breakthroughs in Theoretical Computer Science, IIT Guwahati, India*, December 2013.

[T32] OSNAP: Faster numerical linear algebra algorithms via sparser subspace embeddings. *Real Analysis Day, Simons Institute for the Theory of Computing, Berkeley, CA*, October 2013.

[T33] Dimensionality reduction via sparse matrices. *Workshop on Succinct Data Representations and Applications, Simons Institute for the Theory of Computing, Berkeley, CA*, September 2013.

[T34] OSNAP: Faster numerical linear algebra algorithms via sparser subspace embeddings. *Workshop on Coding, Complexity, and Sparsity (SPARC), University of Michigan, Ann Arbor*, August 2013.

[T35] Random matrices, dimensionality reduction, and faster numerical linear algebra algorithms. *Banach Spaces: Geometry and Analysis, Hebrew University, Jerusalem, Israel (in honor of Joram Lindenstrauss)*, May 2013.

[T36] Data mining in streams. *Tutorial at KDD, Beijing, China (*with Edo Liberty*)*, August 2012.

[T37] On deterministic sketching and streaming for sparse recovery and norm estimation. *Workshop on Streaming Algorithms, Dortmund, Germany*, July 2012.

[T38] Applications of FT-mollification. *Simons Symposium on the Analysis of Boolean Functions, St. John, US Virgin Islands*, February 2012.

[T39] Sparser Johnson-Lindenstrauss transforms. *IMA Workshop on Group Testing Designs, Algorithms, and Applications to Biology, Minneapolis, MN*, February 2012.

[T40] Streaming algorithms. *TEDxAddis, Addis Ababa, Ethiopia*, July 2011.

[T41] Sparser Johnson-Lindenstrauss transforms. *Workshop on Sublinear Algorithms, Bertinoro, Italy*, May 2011.

[T42] A space-optimal streaming algorithm for sketching small moments. *Stringology Workshop, Tel Aviv, Israel*, May 2010.

[T43] A space-optimal streaming algorithm for sketching small moments. *Workshop on Algorithms for Processing Massive Data Sets, IIT Kanpur, India*, December 2009.

[T44] A space-optimal streaming algorithm for sketching small moments. *Tsinghua University, Beijing, China. China Theory Week*, September 2009.

[T45] Sketching and streaming entropy via approximation theory. *DIMACS/DyDan Workshop on Streaming, Coding, and Compressive Sensing: Unifying Theory and Common Applications to Sparse Signal/Data Analysis and Processing, New Brunswick, NJ*, March 2009.

Departmental Seminars and Colloquia

[D1] The BPTree: improved insertion-only ℓ_2 heavy hitters. *Boston University, Boston, MA*, October 2018.

[D2] Optimality of the Johnson-Lindenstrauss lemma. *MIT Combinatorics Seminar, Cambridge, MA*, March 2018.

[D3] Recent advances concerning the random projection method. *UPenn Wharton Statistics Seminar, Philadelphia, PA*, March 2018.

[D4] Optimality of the Johnson-Lindenstrauss lemma. *Chinese University, Hong Kong*, January 2018.

[D5] Optimality of the Johnson-Lindenstrauss lemma. *Stanford University, CA*, December 2017.

[D6] Some new approaches to the heavy hitters problem. *Mathematical Sciences Research Institute, Program on Geometric Functional Analysis and Applications, Berkeley, CA*, December 2017.

[D7] Continuous queries over append-only databases: randomized synopses beating the union bound. *UC Berkeley, California*, November 2017.

[D8] Optimality of the Johnson-Lindenstrauss lemma. *UCLA, CA*, November 2017.

[D9] Sketching big data. *Harvard University, Science Research Public Lecture Series, Cambridge, MA*, October 2017.

[D10] Optimal lower bounds for universal relation, samplers, and finding duplicates in streams. *MIT Stochastics and Statistics Seminar, Cambridge, MA*, September 2017.

[D11] Optimality of the Johnson-Lindenstrauss lemma. *The University of Texas at Austin*, September 2017.

[D12] Optimal lower bounds for universal relation, samplers, and finding duplicates in streams. *Center for Massive Data Algorithmics (MADALGO), Aarhus, Denmark*, July 2017.

[D13] Heavy hitters via cluster-preserving clustering. *University of Wisconsin, Madison, WI*, April 2017.

[D14] Optimality of the Johnson-Lindenstrauss lemma. *Princeton University Optimization Seminar, Princeton, NJ*, April 2017.

[D15] Heavy hitters via cluster-preserving clustering. *Georgetown University, Washington D.C.*, March 2017.

[D16] Heavy hitters via cluster-preserving clustering. *Williams College, Williamstown, MA*, February 2017.

[D17] Optimality of the Johnson-Lindenstrauss lemma. *TCS+ Online Seminars*, February 2017.

[D18] Sketching and streaming algorithms. *Harvard University, Cambridge, MA*, January 2017.

[D19] Heavy hitters via cluster-preserving clustering. *Massachusetts Institute of Technology, Cambridge, MA*, November 2016.

[D20] Sketching and streaming algorithms. *Brown University "Seeing Myself in Science" Lecture Series, Providence, RI*, November 2016.

[D21] Heavy hitters via cluster-preserving clustering. *Duke University, Durham, NC*, October 2016.

[D22] Heavy hitters via cluster-preserving clustering. *University of Illinois Industrial & Enterprise Systems Engineering Seminar, Urbana-Champaign, IL*, October 2016.

[D23] Heavy hitters via cluster-preserving clustering. *Yale Combinatorics and Probability Seminar, New Haven, CT*, October 2016.

[D24] Heavy hitters via cluster-preserving clustering. *Worcester Polytechnic Institute, Worcester, MA*, September 2016.

[D25] Heavy hitters via cluster-preserving clustering. *Cornell University, Ithaca, NY*, August 2016.

[D26] Heavy hitters via cluster-preserving clustering. *Ecole Polytechnique Fédérale de Lausanne, Switzerland*, July 2016.

[D27] Heavy hitters via cluster-preserving clustering. *Center for Massive Data Algorithmics (MADALGO), Aarhus, Denmark*, April 2016.

[D28] Heavy hitters via cluster-preserving clustering. *Imperial College, London, United Kingdom*, March 2016.

[D29] Heavy hitters via cluster-preserving clustering. *Rice University, Houston, TX*, February 2016.

[D30] Randomized sketch methods with statistical applications: a survey. *Harvard Statistics Colloquium, Cambridge, MA*, February 2016.

[D31] Sketching algorithms: a brief survey. *Harvard-Smithsonian Center for Astrophysics, Cambridge, MA*, February 2016.

[D32] Dimensionality reduction via sparse matrices. *Addis Ababa Science and Technology University, Addis Ababa, Ethiopia*, January 2016.

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