

# Martin J. Strauss

September 28, 2011

## Work Address:

Dept. of Mathematics  
University of Michigan  
Ann Arbor, MI 48109-1043  
martinjs@umich.edu  
<http://www.eecs.umich.edu/~martinjs/>  
+1-734-717-9874 (cell)

---

## Research Interests

- Fundamental algorithms, especially randomized and approximation algorithms.
- Algorithms for massive data sets.
- Signal processing and computational harmonic analysis.
- Computer security and cryptography.
- Complexity theory.

## Education

- Ph.D., Mathematics, Rutgers University, October 1995. Thesis title: *Measure in Feasible Complexity Classes*. Advisor: Prof. E. Allender, Dept. of Computer Science.
- A.B. *summa cum laude*, Mathematics, Columbia University, May 1989. Minor in Computer Science.

## Employment History

- Professor, Dept. of Mathematics and Dept. of Electrical Engineering and Computer Science (jointly appointed), University of Michigan, 2011–present.
- Associate Professor, Dept. of Mathematics and Dept. of Electrical Engineering and Computer Science (jointly appointed), University of Michigan, 2008–2011.
- Assistant Professor, Dept. of Mathematics and Dept. of Electrical Engineering and Computer Science (jointly appointed), University of Michigan, 2004–2008.
- Visiting Associate Research Scholar, Program in Applied and Computational Mathematics, Princeton University, Sept. 2006–Feb. 2007.
- Principal investigator, AT&T Laboratories—Research, 1997–2004. Most recent position: Principal Technical Staff Member, Internet and Network Systems Research Center.
- Consultant, Network Services Research Center, AT&T Laboratories, 1996.
- Post-Doctoral Research Associate, Department of Computer Science, Iowa State University, September 1995–May 1996.
- Intern. Speech recognition group, IBM Watson Research Center, summers, 1989–1990.
- Intern. Physics, AT&T Bell Laboratories, summers, 1986–1987.

## Refereed Journal Publications

- Radu Berinde, Graham Cormode, Piotr Indyk, Martin J. Strauss. Space-optimal Heavy Hitters with Strong Error Bounds. *ACM Transactions on Database Systems*, vol. 35, issue 4, 2010, pages 26:1–26:28.
- Yuval Ishai, Tal Malkin, Martin J. Strauss, Rebecca N. Wright. Private multiparty sampling and approximation of vector combinations. *Theor. Comput. Sci.* 410(18): 1730–1745 (2009).
- M. A. Iwen, A. C. Gilbert, M. J. Strauss. Empirical evaluation of a sub-linear time sparse DFT algorithm, *Communications in Mathematical Sciences*, vol. 5, no. 4, 2007, pp. 981–998.
- A. C. Gilbert and M. J. Strauss, Group testing in statistical signal recovery. *Technometrics*, vol. 49, no. 3, August, 2007, pp. 346–356.
- X. Shi, L. A. Adamic, and M. J. Strauss. Networks of Strong Ties. *Physica A: Statistical Mechanics and its Applications*, Volume 378, Issue 1, pp. 33–47, 1 May 2007.
- J. Feigenbaum, Y. Ishai, T. Malkin, K. Nissim, M. Strauss, R. Wright. Secure Multiparty Computation of Approximations. *Transactions on Algorithms*, pp. 435–472, 2006.
- E. Cohen and M. Strauss. Maintaining Time-Decaying Stream Aggregates, *Journal of Algorithms*, 59(1) 19–36, 2006.
- J. Zou, A. Gilbert, M. Strauss, and I. Daubechies. Theoretical and Experimental Analysis of a Randomized Algorithm for Sparse Fourier Transform Analysis. *Journal of Computational Physics*, (211):2, 572–595, 2006.
- A. C. Gilbert, M. J. Strauss, and J. Tropp. Algorithms for simultaneous sparse approximation. Part I: Greedy pursuit. Special issue on sparse approximations in signal and image processing of *EURASIP J. Signal Processing*, Vol. 86, April, 2006, pp. 572–588.
- J. Fong, A. Gilbert, S. Kannan, and M. Strauss, Better alternatives to OSPF routing, Special issue of *Algorithmica* on network design, 43(1–2) 113–131, 2005.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Domain-driven data synopses for dynamic quantiles, *IEEE Transactions on Knowledge and Data Engineering*, 17(7): 927–938, 2005.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. J. Strauss, One-pass wavelet decompositions of data streams, *IEEE Transactions on Knowledge and Data Engineering*, vol. 15, no. 3, 2003, pp. 541–554.
- J. Feigenbaum, S. Kannan, M. Strauss, and M. Vishwanathan, Testing and spot-checking data streams. *Algorithmica*, 34(1): 67–80, 2002.
- J. Feigenbaum, S. Kannan, M. Strauss, and M. Vishwanathan. An Approximate L1-Difference Algorithm for Massive Data Streams. *SIAM J. Comput.*, 32(1): 131–151, 2002.
- J. Fong and M. Strauss. An Approximate Lp-Difference Algorithm for Massive Data Streams. *Discrete Mathematics and Theoretical Computer Science* (2): 301–322, 2001.
- H. Buhrman, D. van Melkebeek, K. Regan, D. Sivakumar and M. Strauss, A generalization of resource-bounded measure, with an application to the BPP vs. EXP problem. *SIAM J. Comput.* 30(2): 576–601, 2000.

- M. Blaze, J. Feigenbaum, P. Resnick, and M. Strauss. Managing trust in an information-labeling system. *European Transactions on Telecommunications*, 1997.
- Y.-H. Chu, J. Feigenbaum, B. LaMacchia, P. Resnick, M. Strauss, REFEREE: trust management for web applications, *World Wide Web Journal*, 2 1997, pages 127–139. (Reprinted from Proc. 6<sup>th</sup> International World Wide Web Conference, World Wide Web Consortium, Cambridge 1997, pages 227–238.)
- M. Strauss, Measure on P: strength of the Notion, *Information and Computation*, 136(1), 1997, pages 1–23.
- M. Strauss, Normal numbers and sources for BPP. *Theoretical Computer Science*, Vol. 178, Number 1-2, 1997 pages 155–169.
- J. Chelikowsky, J. Phillips, M. Kamal and M. Strauss, Surface and thermodynamic interatomic force fields for silicon clusters and bulk phases, *Physical Review Letters*, v. 62 **3** 1989, pages 292–295.

### Refereed Conference Publications<sup>1</sup>

- Brett Hemenway, Rafail Ostrovsky, Martin J. Strauss, Mary Wootters: Public Key Locally Decodable Codes with Short Keys. APPROX-RANDOM 2011: 605–615
- Ely Porat and Martin Strauss. Sublinear Time, Measurement-Optimal, Sparse Recovery For All. To appear in SODA 2012.
- Xiangming Kong, Peter Petre, Roy Matic, Anna Gilbert, Martin Strauss. An analog-to-information converter for wideband signals using a time encoding machine, in *Proceedings of Digital Signal Processing Workshop and IEEE Signal Processing Education Workshop (DSP/SPE)*, 2011, pages 414–419.
- Anna C. Gilbert, Y. Li, E. Porat, and M. Strauss. Approximate Sparse Recovery: Optimizing Time and Measurements. *Symposium on Theory of Computing (STOC)*, 2010, 475–484.
- Volkan Cevher, Petros Boufounos, Richard G. Baraniuk, Anna C. Gilbert, Martin J. Strauss: Near-optimal Bayesian localization via incoherence and sparsity. ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN) 2009: 205-216
- Radu Berinde, Graham Cormode, Piotr Indyk, Martin J. Strauss. Space-optimal heavy hitters with strong error bounds. *Transactions of Principles of Database Systems (PODS)* 2009: 157–166.
- Radu Berinde, Anna Gilbert, Piotr Indyk, Howard Karloff, and Martin Strauss. Combining Geometry and Combinatorics: A Unified Approach to Sparse Signal Recovery. Proceedings of Allerton Conference, 2008.
- Joe Kilian, André Madeira, Martin J. Strauss, Xuan Zheng. Fast Private Norm Estimation and Heavy Hitters. *Theoretical Cryptography Conference*, 2008, 176–193.
- Ray Maleh, Anna C. Gilbert, and Martin J. Strauss. Sparse gradient image reconstruction done faster. International Conference on Image Processing ICIP (2) 2007: 77-80.

---

<sup>1</sup>The recent average acceptance rates for a number of conferences where I have published papers are: VLDB 17%, PODS 22%, STOC 27% , SODA 30%, and ICASSP 50%.

- Yuval Ishai, Tal Malkin, Martin J. Strauss and Rebecca N. Wright. Private Multiparty Sampling and Approximation of Vector Combinations. In *International Colloquium on Automata, Languages and Programming (ICALP)*, 2007, 243–254.
- A. Gilbert, M. Strauss, J. Tropp, and R. Vershynin. One sketch for all: Fast algorithms for compressed sensing. In *Symposium on Theory of Computing (STOC)*, 2007, 237–246.
- M. Iwen, G. Mandair, M. Morris, and M. Strauss. Fast Line-based Imaging of Small Sample Features. International Conference on Acoustics, Speech, and Signal Processing (ICASSP), poster, 2007.
- A. C. Gilbert, M. J. Strauss, J. A. Tropp, and R. Vershynin. Algorithmic linear dimension reduction in the  $\ell_1$  norm for sparse vectors. Invited paper, special session on “Compressed Sensing” in Proceedings of the 44th Annual Allerton Conference on Communication, Control and Computing, Allerton, September 2006.
- S. Muthukrishnan, M. Strauss, and X. Zheng. Workload-Optimal Histograms on Streams. European Symposium on Algorithms (ESA) conference, 734–745, 2005.
- A. C. Gilbert, S. Muthukrishnan, and M. Strauss, Improved Time Bounds for Near-Optimal Sparse Fourier Representations. Wavelets XI conference, part of SPIE’s International Symposium on Optical Science and Technology, 2005.
- A. R. Calderbank, A. Gilbert, K. Levchenko, S. Muthukrishnan, and M. Strauss. Improved Range-Summable Random Variable Construction Algorithms. Symposium on Discrete Algorithms (SODA), 840–849, 2005.
- J. Tropp, A. C. Gilbert, and M. J. Strauss. Simultaneous sparse approximation via greedy pursuit. Invited paper for the special session “Sparse representation in signal processing,” *Proc. of the 2005 IEEE Intl Conf on Acoustics, Speech, and Signal Processing (ICASSP)*, March, 2005.
- S. Muthukrishnan and Martin Strauss. Maintenance of Multidimensional Histograms. Foundations of Software Technology and Theoretical Computer Science, 352–362, 2003.
- A. C. Gilbert, S. Muthukrishnan, and M. J. Strauss, and J. Tropp. Improved sparse approximation over quasi-coherent dictionaries. *Proc. of Intl conf on Image Processing (ICIP)*, 37–40, 2003.
- A. Gilbert, S. Muthukrishnan, and M. Strauss. Approximation of Functions over Redundant Dictionaries Using Coherence. Symposium on Discrete Algorithms (SODA), 243–252, 2003.
- S. Muthukrishnan and M. Strauss. Rangesum Histograms. Symposium on Discrete Algorithms (SODA), 233–242, 2003.
- E. Cohen and M. Strauss. Maintaining Stream Statistics with Decay. Principles of Database Systems (PODS) conference, 223–233, 2003. Expanded version, Maintaining Time-Decaying Stream Aggregates, in *Journal of Algorithms*.
- S. Guha, P. Indyk, S. Muthukrishnan, and M. Strauss. Histogramming Data Streams with Fast Per-Item Processing. International Colloquium on Automata, Languages and Programming (ICALP) conference, 681–692, 2002.
- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss. How to Summarize the Universe: Dynamic Maintenance of Quantiles. Conference on Very Large Data Bases (VLDB), 454–465, 2002.

- A. Gilbert, S. Guha, P. Indyk, S. Muthukrishnan, and M. Strauss. Near-Optimal Sparse Fourier Representations via Sampling. Symposium on Theory of Computing (STOC), 152–161, 2002.
- A. Gilbert, S. Guha, P. Indyk, Y. Kotidis, S. Muthukrishnan, and M. Strauss. Fast, Small-Space Algorithms for Approximate Histogram Maintenance. Symposium on Theory of Computing (STOC), 389–398, 2002.
- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss. Surfing Wavelets on Streams: One-Pass Summaries for Approximate Aggregate Queries. Very Large Data Bases (VLDB), 79–88, 2001.
- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss. Optimal and Approximate Computation of Summary Statistics for Range Aggregates. 227–236, Principles of Database Systems (PODS) conference, 2001.
- J. Feigenbaum, Y. Ishai, T. Malkin, K. Nissim, M. Strauss, R. Wright. Secure Multiparty Computation of Approximations. International Colloquium on Automata, Languages and Programming (ICALP), 927–938, 2001.
- J. Fong and M. Strauss. An Approximate L<sub>p</sub>-Difference Algorithm for Massive Data Streams. Symposium on Theoretical Aspects of Computer Science (STACS) conference, 193–204, 2000.
- J. Lutz and M. Strauss, Bias invariance of small upper spans. Symposium on Theoretical Aspects of Computer Science (STACS) conference, 74–86, 2000.
- J. Feigenbaum, S. Kannan, M. Strauss, and M. Vishwanathan, Testing and spot-checking data streams. Symposium on Discrete Algorithms (SODA), 165–174, 2000.
- J. Feigenbaum, S. Kannan, M. Strauss, and M. Vishwanathan. An Approximate L<sub>1</sub>-Difference Algorithm for Massive Data Streams. Foundations of Computer Science (FOCS) conference, 501–511, 1999.
- W. Aiello, A. Rubin, and M. Strauss. Using smartcards to secure a personalized gambling device. Computer and Communication Security (CCS) conference, 128–137, 1999.
- H. Kaplan, M. Strauss, M. Szegedy: Just the Fax–Differentiating Voice and Fax Phone Lines Using Call Billing Data. Symposium on Discrete Algorithms (SODA) 935–936, 1999.
- M. Blaze, G. Bleumer and M. Strauss. Protocol divertibility and atomic proxy cryptography. Eurocrypt conference, 127–144, 1998.
- M. Blaze, J. Feigenbaum and M. Strauss. Compliance checking in the PolicyMaker trust management system. 254–274, Financial Cryptography conference, 1998.
- H. Buhrman, D. van Melkebeek, K. Regan, D. Sivakumar and M. Strauss, A generalization of resource-bounded measure, with an application to the BPP vs. EXP problem. Symposium on Theoretical Aspects of Computer Science (STACS) conference, 129–138, 1998.
- J. Feigenbaum and M. Strauss, An information-theoretic treatment of random-self-reducibility, Symposium on Theoretical Aspects of Computer Science (STACS) conference, 523–534, 1997.
- J.-Y. Cai, D. Sivakumar, and M. Strauss. Constant-depth circuits and the Lutz hypothesis. FOCS, 595–604, 1997.

- M. Strauss, Normal numbers and sources for BPP. Symposium on Theoretical Aspects of Computer Science (STACS) conference, 515–526, 1995.
- E. Allender and M. Strauss. Measure on P: Robustness of the notion. Mathematical Foundations of Computer Science (MFCS) Conference, 129–138, 1995.
- E. Allender and M. Strauss. Measure on small complexity classes with applications for BPP. FOCS, 807–818, 1994.

### Refereed Workshop Publications

- Y. Massoud, S. Pfetsch, T. Ragheb, J. Laska, H. Nejati, A. Gilbert, M. Strauss, R. Baraniuk. On the feasibility of hardware implementation of sub-Nyquist random-sampling based analog-to-information conversion. In *Proceedings of IEEE International Symposium on Circuits and Systems (ISCAS)*, 2008.
- A. C. Gilbert, M. J. Strauss. Fundamental performance bounds for a compressive sampling system. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2008.
- Tamer Ragheb, Sami Kirolos, Jason Laska, Martin Strauss, Anna Gilbert, Richard Baraniuk, and Yehia Massoud. Implementation Models for Analog-to-Information Conversion via Random Sampling. IEEE International Midwest Symposium on Circuits & Systems, Montreal, Canada, 2007.
- J. Laska, S. Kirolos, Y. Massoud, R. Baraniuk, A. Gilbert, M. Iwen, and M. Strauss. Random Sampling for Analog-to-Information Conversion of Wideband Signals. Fifth IEEE Dallas Circuits and Systems Workshop, Oct., 2006.
- J. Fong, A. Gilbert, S. Kannan, M. Strauss, Better Alternatives to OSPF Routing. Approximation and Randomized Algorithms in Communication Networks (ARACNE) workshop, 2001.
- J. Lathrop and M. Strauss, A universal upper bound on the performance of the Lempel-Ziv algorithm on maliciously-constructed data, SEQUENCES'97 conference, Positano, Italy.

### Book Chapters and Expository Papers

- M. J. Strauss, Histograms on Streams. In *Encyclopedia of Database Systems*, Springer Verlag. 1315–1318, 2009.
- A. C. Gilbert, M. J. Strauss, J. A. Tropp, A Tutorial on Fast Fourier Sampling, *IEEE Signal Processing Magazine*, vol. 25, no. 2, 2008, pp. 57–66.
- S. Muthukrishnan and M. J. Strauss. Approximate Histogram and Wavelet Summaries of Streaming Data. In *Data Stream Management: Processing High-Speed Data Streams*, Springer-Verlag. Minos N. Garofalakis, contact editor. In progress.

### Preprints and Technical Reports

- A. C. Gilbert, M. J. Strauss, J. A. Tropp, and R. Vershynin, Algorithmic linear dimension reduction in the  $\ell_1$  norm for sparse vectors, 2006.
- A. R. Calderbank, A. C. Gilbert, and M. J. Strauss, List decoding of noisy Reed-Muller-like codes, 2006.

- M. J. Strauss and X. Zheng, Private Approximate Heavy Hitters, 2006.
- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss. QuickSAND: Quick Summary and Analysis of Network Data.

## Awards

- 2010 Signal Processing Best Paper Award from the European Association for Signal Processing (EURASIP), joint with Joel Tropp and Anna C. Gilbert.
- National Science Foundation Graduate Fellowship, 1990–1993.
- Phi Beta Kappa, May 1989.
- John Dash Van Buren, Jr., Prize Winner in Mathematics, Columbia College, 1988 and 1989.

## Grants

- NSF CDI-Type II: New Cyber Technologies to Enable Space Weather Forecasting. Co-I; Tamas Gombosi, Michigan AOSS, is PI. October 1, 2010, to September 30, 2013. \$1,700,000.
- CAREER: Next-Generation Algorithmics for Sparse Recovery, NSF CCF 0743372, August, 2008–July, 2013, \$400,000. Single PI.
- Analog-to-Information (A-to-I) Receiver Development, DARPA N66001-08-1-2065, July, 2008–Jan, 2010, \$1,948,566. Option period, Jan, 2010–July, 2011, \$2,009,706. (Subcontract of a grant of which Rich Baraniuk (Rice University) is PI; various additional co-PIs.
- How streaming can help pattern matching. United States-Israel Binational Science Foundation (BSF), 2007–2011, \$70,000. Co-PI: Ely Porat, Bar-Ilan University Computer Science.
- Theory and Practice of Analog-to-Information Conversion, DARPA/ONR N66001-06-1-2011, February 2006–January, 2007, \$150,000. Co-PIs include Richard Baraniuk (Rice ECE), Ronald DeVore (South Carolina Mathematics, emeritus), Anna Gilbert (Michigan Mathematics), Yehia Massoud (Rice ECE), and Joel Tropp (Michigan Mathematics).
- Theory, Implementation, and Applications of Sublinear-time Fourier Transform Algorithms, NSF DMS 0510203, August 2005–2008, \$125,010. Single PI.
- FRG: Collaborative Research in Algorithms for Sparse Data Representation, NSF DMS 0354600, September 2004–2007, \$317,808. Co-PIs: Ingrid Daubechies (Princeton Mathematics), Ronald DeVore (South Carolina Mathematics, emeritus), Anna Gilbert (Michigan Mathematics), and S. Muthukrishnan (Rutgers Computer Science). PI is Gilbert.

## Mentoring

- Mentor of Brett Hemenway, Math postdoc, starting Fall, 2010.
- Mentor of Carl Miller, first joint Math-CS postdoc, 2009–present.
- Informal mentor to Lada Adamic, junior faculty in School of Information, University of Michigan.
- Formal mentor to Joel Tropp, postdoc in the Department of Mathematics, University of Michigan. Tropp will take a tenure-track job at California Institute of Technology starting in the Fall of 2007.

- Formal mentor to Brian Jennings, graduate student in the Department of Mathematics, University of Michigan.
- Mentored two PhD students via email under the auspices of Mentornet.

## Students

- Mary Wootters, Mathematics Department, Michigan, pre-candidate.
- Yi Li, EECS/CSE Department, Michigan. PhD Candidate.
- Xiaolin Shi (secondary advisor; primary advisor is Lada Adamic, School of Information, Michigan), EECS/CSE Department, Michigan. PhD, 2009. Now at Stanford.
- Ray Maleh (informal secondary advisor; primary advisor is Anna Gilbert, Department of Mathematics, Michigan), Mathematics Department, Michigan. PhD, 2009. Now at L3.
- Mark Iwen, Mathematics Department, Michigan. PhD, 2008. Now at the Institute for Mathematics and its Applications.
- Xuan Zheng, EECS/CSE Department, Michigan. PhD, 2008.
- Joel Lepak, Mathematics Department, Michigan. MA, 2007. Now at LMI Government Consulting.

## PhD and Similar Committees

- Thesis Committee of Kuang-Hung Liu, EECS/ECE department, Michigan, 2011.
- Thesis Committee of Ran Duan EECS/CSE department, Michigan, 2010.
- Cognate member of Thesis Committee of Brian Jurgelewicz, Math Department, Michigan, 2010.
- Thesis Committee of Denny VandenBerg, EECS/CSE department, Michigan, 2010.
- Cognate member of Thesis Committee of Felipe Ramirez, Math department, Michigan, 2010.
- Preliminary examination committee of Xiaodi Wu, EECS/CSE department, Michigan, 2010.
- Cognate member of Thesis committee of Florian Block, Math department, Michigan, 2010.
- Cognate member of Thesis committee of Marie Snipes, Math department, Michigan, 2009.
- Cognate member of Thesis committee of Ellen Eischen, Math department, Michigan, 2009.
- Thesis Proposal and Defense committee of Smita Krishnaswamy. EECS/CSE department, Michigan, 2006–08.
- Thesis Proposal and Defense committee of You Jung Kim, EECS/CSE department, Michigan, 2007–08.
- Thesis Proposal and Defense committee of Nuwee Wiwatwattana, EECS/CSE department, Michigan, 2006–07.
- Cognate member of Thesis Proposal and Defense committee of Sandeep Tata. EECS/CSE department, Michigan, 2006–07.
- Preliminary examination committee of Erin Rhode, EECS/CSE department, Michigan, 2007.

- Preliminary examination committee of David Wingate, EECS/CSE department, Michigan, 2006.
- Preliminary examination committee of Jonathan Brown, EECS/CSE department, Michigan, 2005.
- Ph.D. committee of James Lathrop, Computer Science Department, Iowa State University, 1997.

## Summer and other Students

- Danielle Woerdeman (undergraduate REU student), 2009–present, Michigan. Helped with museum outreach project.
- Ethan Jewett, PhD student in biomedical sciences, 2009–present, Michigan. Helped with museum outreach project.
- Jeff Madsen (undergraduate REU student), summer of 2007, Math Department, Michigan.
- Mike Nowak (high school student at Dearborn Center for Math, Science and Technology), fall of 2006. I helped him with his science fair project, which won second place in the category of Computer Science.
- Joel Tropp (Institute for Computational Engineering and Sciences, University of Texas), AT&T Labs-Research (2002).
- Jing Zou (Program in Applied and Computational Mathematics, Princeton University), AT&T Labs-Research (2002).
- Jessica Fong (Department of Computer Science, Princeton University), AT&T Labs-Research (1999 and 2000).
- Aris Gionis (Department of Computer Science, Stanford University), AT&T Labs-Research (2000).
- Nina Fefferman (graduate student) and Barry Walker (undergraduate), Department of Mathematics, Rutgers University REU program, AT&T Labs-Research (2000).
- Mahesh Vishwanathan (Department of Computer and Information Science, University of Pennsylvania), AT&T Labs-Research (1998).

## Courses Taught

- Department of Mathematics, University of Michigan. Math 583, Probabilistic and Interactive Proofs (newly developed course), Winter, 2010.
- Department of Mathematics, University of Michigan. Math 371, Numerical Methods for Engineers and Scientists, Fall, 2009, and Winter, 2008.
- Department of EECS/CSE, University of Michigan. EECS 376, Foundations of Computer Science, Winter, 2009, and Fall, 2007.
- Department of EECS/CSE, University of Michigan. EECS 477, Introduction to Algorithms, Winter, 2008.
- Department of Mathematics, University of Michigan. Math 115, reform calculus I, Winter, 2007.

- Department of EECS/CSE, University of Michigan. EECS 586, Algorithms. Winter, 2006.
- Department of Mathematics, University of Michigan. Math 115, reform calculus I, Fall, 2005.
- Department of EECS/CSE, University of Michigan. EECS 684, Advanced graduate course in topics in databases, Winter, 2005.
- Department of Mathematics, University of Michigan. Math 416, Advanced undergraduate algorithms, Fall, 2004.
- Department of Computer Science, Rutgers University, Fall, 2002. Graduate level complexity course.
- Department of Computer Science, Iowa State University, Spring, 1996. Introductory C/C++.
- Department of Mathematics, Rutgers University, Summer, 1995. Senior-level undergraduate combinatorics.
- Department of Mathematics, Rutgers University, Summer, 1993. Calculus II.
- Department of Mathematics, Rutgers University, Summer, 1991. Pre-college algebra.
- Rutgers and Columbia math departments: served as teaching assistant for various courses.

### Invited Talks and Meetings

- Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD), 2011.
- University of Pennsylvania seminar, November, 2009.
- DIMACS workshop, March, 2009.
- ITA workshop, UCSD, February, 2009.
- Bar Ilan University, Seminar, December, 2008.
- Tel Aviv University, Seminar, December, 2008.
- Dagstuhl program, November, 2008.
- SIAM Conference on Imaging Science, (organized mini-symposium and gave talk), July, 2008.
- Massachusetts Institute of Technology, Computer Science and Artificial Intelligence Laboratory, Theory of Computation Colloquium, Piotr Indyk, host, April, 2008.
- Pennsylvania State University, Department of Computer Science, Colloquium, Sofya Raskhodnikova and Adam Smith, hosts, November, 2007.
- MADALGO Summer School on Data Stream Algorithms, Piotr Indyk, host. Aarhus, Denmark, August, 2007.
- ACM von Neumann Symposium, J. Tanner, host. Snowbird, Utah, July, 2007.
- University of Michigan, Department of EECS/CSE, Toyota AI seminar, March, 2007.
- University of Michigan, Department of Mathematics, Combinatorics Seminar, February, 2007.
- Rennselaer Polytechnic Institute, Department of Computer Science, Petros Drineas, host. January, 2007.
- Workshop on Algorithms for Data Streams, S. Ganguly, host. IIT Kanpur, December, 2006.

- University of Maryland, Department of Computer Science, Aravind Srinivasan, host. November, 2006.
- Princeton University, Program in Applied and Computational Mathematics, Sparse Approximation Workshop, November, 2006.
- AT&T Labs—Research, Henry Landau, host. November, 2006.
- University of Pennsylvania, Department of Computer and Information Science, Sudipto Guha, host. Seminar, November, 2006.
- UCLA, Department of Mathematics, Stan Osher, host. Seminar, October, 2006.
- Princeton Theoretical Computer Science Lunch, M. Charikar, host. September, 2006.
- Rutgers Theory Seminar, E. Allender, host. September, 2006.
- Workshop on Algorithms for Modern Massive Data Sets, P. Drineas, host. Palo Alto, CA, June, 2006.
- Workshop on Space-Conscious Algorithms, S. Muthukrishnan, host. Bertinoro, Italy, June, 2006.
- SIAM Conference on Imaging Science, E. Candès, host. Session speaker, May, 2006.
- UC Davis, Department of Mathematics, Assistant Professor Roman Vershynin, host. Seminar, March, 2006.
- UCLA, Department of Mathematics, Professor Terence Tao, host. Seminar, February, 2006.
- Rice University, ECE department, Victor E. Cameron Professor Richard Baraniuk, host. Seminar, January 27, 2006.
- Dagstuhl seminar on Sublinear Algorithms, 2005.
- Institute for Pure and Applied Mathematics workshop on multiscale geometric algorithms, 2004.
- University of Arkansas Mathematics Department Spring Lecture Series, J. Hogan, host. 2004.
- Workshop: Privacy-Preserving Data Mining, 2004.
- International Congress on Applied and Industrial Mathematics, 2003.
- DIMACS Workshop on Streaming Data Analysis and Mining, 2001.
- DIMACS mixer, 2000.
- International Symposium on Artificial Intelligence and Mathematics, 2000.
- Dagstuhl seminar on Structure and Complexity, 1996.
- Seminars (through 2005): Air Force Institute of Technology, Arkansas, Berkeley, DIMACS, Iowa State, Jussieu (Paris, France) IMA, Michigan, MIT, Rutgers, Paris-Sud (Orsay, France), Pennsylvania, Princeton, Stanford; AT&T Labs, Bell Labs, IBM Almaden Research Center, Telcordia, United Technologies Research Center, Xerox PARC.

## Patents

- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Method and Apparatus for Using Wavelets to Produce Data Summaries. 7,296,014.

- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Method and Apparatus for Using Wavelets to Produce Data Summaries. 7,272,599.
- S. Muthukrishnan and M. Strauss. Space- and Time-Efficient Management and Summarization of Data Using Intermediate Summary Structure and Hierarchical Multidimensional Histogram. 7,249,136.
- A. Gilbert, S. Guha, P. Indyk, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Method and Apparatus for Using Histograms to Produce Data Summaries. 7,177,282.
- W. Aiello, A. Rubin, and M. Strauss, Using Smartcards to Enable Probabilistic Transactions on an Untrusted Device. 6,496,808.
- M. Blaze, J. Feigenbaum, and M. Strauss, Compliance Checking in the PolicyMaker Trust Management System. 6,256,734.
- P. D. McDaniel and M. Strauss. End-to-End Secure Wireless Communication. (Filed.)
- A. Gilbert, S. Muthukrishnan, and M. Strauss, Apparatus and method for providing near-optimal representations over redundant dictionaries. (Filed.)
- J. Fong, A. Gilbert, S. Kannan, and M. Strauss, Method For Routing Data Using a Fractional Open Shortest Path First Protocol. (Filed.)
- A. Rubin and M. Strauss, System and Method For Storage and Retrieval of Personal Communications in a Broadband Network. (Filed.)
- J. Feigenbaum, S. Kannan, M. Strauss, and M. Vishwanathan, Streaming Algorithms for Distributed, Massive Data Sets. (Filed.)

## Professional Service, Activities, and Committees

- Computer committee, Dept. of Math, Univ. of Michigan, 2007-2009 and 2011–present.
- Started and led the Mathematics Olympiad for Elementary and Middle Schools team at Hebrew Day School, Ann Arbor. 2009–present. (Disclaimer: My children are on the team.)
- Co-organized Coding, Complexity and Sparsity Workshop, Michigan, 2011.
- Provided bi-weekly math enrichment activities for first graders at Hebrew Day School, Ann Arbor. 2009–2010. (Disclaimer: My son was in that class.)
- AIM Preliminary Exam committee (formally and informally), Dept. of Math, Univ. of Michigan, 2004–present.
- Doctoral committee, Dept. of Math, Univ. of Michigan, 2007–2010.
- Developed cryptography and communication outreach activities with the Ann Arbor Hands-on Museum, 2008–2010. Presented February 13–14, 2010.
- Established and oversee joint Math-Computer Science postdoctoral position, 2009.
- Advisor, CS/LSA program, Dept. of EECS, Univ. of Michigan, 2007–2009.
- Curriculum committee, Dept. of EECS/CSE, Univ. of Michigan, 2007
- Sparse approximation weekly reading group, Univ. of Michigan, 2005–2006.
- Applied and Interdisciplinary Mathematics (AIM) graduate committee, Department of Mathematics, University of Michigan, 2005–2007.

- Graduate committee, Dept. of EECS/CSE, Univ. of Michigan, 2004–2005.
- Organized (or co-organized, most semesters) Theoretical computer Science seminar, Univ. of Michigan, 2004–present.
- Organized DIMACS workshop on Sublinear Algorithms, September, 2000.
- Member of DIMACS graduate student committee (that awards grants to students for summer salary, travel support, etc.)
- Member of the AT&T Research Advisory Council for Research, that addresses quality-of-life issues in research, 1999–2001. Chair, 2001.
- Member of AT&T Shannon postdoctoral fellowship search committee, 2000.

### Editorial Service

- Serve on editorial committee of *Contemporary Mathematics*, 2008–2012.
- Serve on editorial board of *Theory of Computing Systems*, 2001–present.
- Referee for submissions to journals *Software—Practice & Experience*, *Computational Complexity*, *Foundations of Computational Mathematics*, *Information and Computation*, *Parallel Processing Letters*, *Theoretical Computer Science*, *Theory of Computing Systems*, *Journal of Computer Security*, *IEEE Journal of Selected Topics in Signal Processing*, *IEEE Transactions on Computers*, *ACM Transactions on Computer Systems*, and *IEEE Transactions on Knowledge and Data Engineering*; reviewer for submissions to conferences Computational Complexity Conference, Crypto, EUROCRYPT, ESA, FOCS, STOC, STACS, Usenix security.

### Program Committees and Session Organization

- LATIN 2012.
- FSTTCS 2011.
- ICALP2011GT. (Group Testing workshop, part of ICALP, 2011.)
- DEXA 2009–2010.
- COCOON 2010.
- SWAT 2010.
- DBKDA 2009–2010.
- DB 2009, The First International Conference on Advances in Databases, Gosier, Guadeloupe/France, 2009.
- RANDOM, Cambridge, MA, 2008.
- SIAM Conference on Imaging Science, (organized mini-symposium and gave talk), July, 2008.
- VLDB, Vienna, 2007.
- Allerton conference on communication, control, and computing, Urbana-Champaign, session, 2006.
- CISS, Princeton, session, 2006.

- ICDE, Tokyo, 2005.
- Information Technology Workshop, San Antonio, session, 2004.
- International Congress on Applied and Industrial Mathematics, session, 2003.
- SODA'99.

### **Programming Experience**

- Experience with C, UNIX, MATLAB, and various special-purpose scripting languages.