

# Anna C. Gilbert

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## Research

- General interests: analysis, probability, signal processing, and algorithms.
- Specialization: randomized algorithms with applications to massive datasets and signal processing.

## Education

- Ph.D., Mathematics, Princeton University, June 1997, *Multiresolution homogenization schemes for differential equations and applications*, Professor Ingrid Daubechies, advisor.
- S.B., Mathematics (with honors), University of Chicago, June 1993.

## Positions Held

- Herman H. Goldstine Collegiate Professor. Department of Mathematics, University of Michigan, 2014–present.
- Full Professor (Courtesy appointment). Division of Electrical and Computer Engineering, University of Michigan, 2010–present.
- Full Professor. Department of Mathematics, University of Michigan, 2010–present.
- Associate Professor (Courtesy appointment). Division of Electrical and Computer Engineering, University of Michigan, 2008–2010.
- Associate Professor. Department of Mathematics, University of Michigan, 2007–2010.
- Assistant Professor. Department of Mathematics, University of Michigan, 2004–2007.
- Principal technical staff member. Internet and Network Systems Research Center, AT&T Labs-Research, 2002–2004.
- Senior technical staff member. Information Sciences Research Center, AT&T Labs-Research, 1998–2002.
- Visiting instructor. Department of Mathematics, Stanford University, Winter quarter 2000.
- Postdoctoral research associate. Yale University and AT&T Labs-Research, 1997–1998.
- Intern. Lucent Technologies Bell Laboratories, summer 1996.
- Research assistant. Princeton University, 1994–1995.
- Intern. AT&T Bell Laboratories, summers 1993–1995.

## Publications

### Refereed Journal Publications

- F. J. Chung, A. C. Gilbert, J. G. Hoskins, and J. C. Schotland, “Optical tomography on graphs”, *Inverse Problems*, Volume 33, Number 5, 2017.
- Anna C. Gilbert, Yi Li, Ely Porat, Martin J. Strauss, “For-All Sparse Recovery in Near-Optimal Time,” *ACM Transactions on Algorithms (TALG)*, Volume 13 Issue 3, pp. 1–32, March 2017.

- Anna C. Gilbert, Jeremy G. Hoskins, John C. Schotland, Diffuse Scattering on Graphs, *Linear Algebra and its Applications*, Volume 496, May 2016, pages 135.
- Anna C. Gilbert, Mark Iwen, Piotr Indyk, Ludwig Schmidt, Recent Developments in the Sparse Fourier Transform, *Signal Processing Magazine*, 31(5): 91-100, 2014.
- J. Y. Park, M. B. Wakin, and A. C. Gilbert, “Modal Analysis with Compressive Measurements”, *IEEE Transactions on Signal Processing*, 62(7): 1655-1670, 2014.
- Petros Boufounos, Volkan Cevher, Anna C. Gilbert, Yi Li, Martin J. Strauss, “What’s the Frequency, Kenneth: Sublinear Fourier Sampling Off the Grid”, *Algorithmica*, 2014.
- B. S. Kim, J. Y. Park, A. Mohan, A. Gilbert, and S. Savarese, “Hierarchical classification of images by sparse approximation”, *Image and Vision Computing*, 31(12): 982-991, 2013.
- Paul Shearer, Anna C. Gilbert, A generalization of variable elimination for separable inverse problems beyond least squares, *Inverse Problems*: 29(4), 2013.
- P. Yenduri, A. Rocca, A. Rao, S. Naraghi, M. Flynn, and A. Gilbert, A low power compressive sampling time-based analog to digital converter, *IEEE Journal on Emerging and Selected Topics in Circuits and Systems* 2(3): 502–515, 2012.
- D. Yoon, J. A. Fessler, A. C. Gilbert, and D. C. Noll, Fast joint design method for parallel excitation RF pulse and gradient waveforms considering off-resonance, *Magnetic Resonance in Medicine*, vol. 68, issue 1, 2012, pp. 278—285.
- Anna C. Gilbert, Yi Li, Ely Porat, Martin Strauss, Approximate Sparse Recovery: Optimizing Time and Measurements, *SIAM J. Comput.*, 41(2): 436-453, 2012.
- Paul Shearer, Richard A. Frazin, Alfred O. Hero, Anna C. Gilbert, The first stray light corrected EUV images of solar coronal holes, *The Astrophysical Journal Letters*, volume 749 (1), 2012.
- Vishal M. Patel, Ray Maleh, Anna C. Gilbert, and Rama Chellappa, Gradient-based image recovery methods from incomplete Fourier measurements, *IEEE Transactions on Image Processing*, vol. 21 (1), 2012, pp.94–105.
- Melina Demertzi, Pedro C Diniz, Mary W Hall, Anna C Gilbert, and Yi Wang, Domain-Specific Optimization of Signal Recognition Targeting FPGAs, *ACM Transactions on Reconfigurable Technology and Systems*, vol. 4 (2), 2011, p. 1–26.
- Raghunandan M. Kainkaryam, Angela Bruex, Anna C. Gilbert, John Schiefelbein, Peter J. Woolf, poolMC: Smart pooling of mRNA samples in microarray experiments, *BMC Bioinformatics* vol. 11, no. 299, 2010.
- A. C. Gilbert, P. Indyk, Sparse recovery using sparse matrices, *Proceedings of the IEEE*, vol. 98, issue 6, 2010, pp. 937–947.
- 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.
- A. C. Gilbert, M. J. Strauss, Analysis of Data Streams: Computational and Algorithmic Challenges, *Technometrics*, vol. 49, no. 3, August 2007, pp. 346–356.
- 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.
- Joel A. Tropp, Anna C. Gilbert, Signal recovery from random measurements via Orthogonal Matching Pursuit, *IEEE Trans. on Info. Theory*, vol. 53, no. 12, 2007, pp. 4655–4666.
- 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*, vol. 211, No. 2, 2006, pp. 572–595.

- A. C. Gilbert, M. J. Strauss, and J. .A. Tropp, Algorithms for Simultaneous Sparse Approximation, special issue on sparse approximations in signal and image processing of *EURASIP J. Signal Processing*, 2005.
- J. Fong, A. C. Gilbert, S. Kannan, and M. Strauss, Better alternatives to OSPF routing, special issue of *Algorithmica* on network design, vol. 43, Nos.1–2, 2005, pp.113–131.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Domain-driven data synopses for dynamic quantiles, *IEEE Transactions on Knowledge and Data Engineering*, vol. 17, no. 7, 2005, pp. 927–938.
- Don Caldwell, Anna Gilbert, Joel Gottlieb, Albert Greenberg, Gísli Hjálmtýsson, Jennifer Rexford, *The cutting EDGE of IP router configuration*, Computer Communication Review 34(1): 21–26 (2004).
- 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.
- S. Resnick, G. Samorodnitsky, A. Gilbert, and W. Willinger, Wavelet analysis of conservative cascades, *Bernoulli*, 9(1):97–135, 2003.
- A. C. Gilbert, Multiscale analysis and data networks, *Applied and Computational Harmonic Analysis*, vol. 10, no. 3, pp. 185–202, May 2001.
- Y. Joo, V. Ribeiro, A. Feldmann, A. C. Gilbert, and W. Willinger, TCP/IP traffic dynamics and network performance: A lesson in workload modeling, flow control, and trace-driven simulations, *ACM SIGCOMM Computer Communication Review*, 2001.
- A. C. Gilbert, W. Willinger, A. Feldmann, Scaling analysis of random cascades, with applications to network traffic, *IEEE Trans. on Information Theory*, Vol. 45, **3**, 1999, pp. 971–991.
- A. Feldmann, A. C. Gilbert, W. Willinger and T. G. Kurtz, The changing nature of network traffic: Scaling phenomena, *ACM SIGCOMM Computer Communication Review*, Vol. 28, **2**, April 1998, pp. 5–29.
- A. C. Gilbert, A comparison of multiresolution and classical one-dimensional homogenization schemes, *Applied and Computational Harmonic Analysis*, vol. 5, no. 1, January 1998, pp. 1–35.
- G. Beylkin, M. E. Brewster and A. C. Gilbert, A multiresolution strategy for numerical reduction and homogenization of nonlinear ODEs, *Applied and Computational Harmonic Analysis*, vol. 5, no. 4, October 1998, pp. 312–331.

#### Refereed Conference Publications

- Anna C. Gilbert, Lalit Jain, “If it ain’t broke, don’t fix it: Sparse metric repair,” in the proceedings of *Allerton Conf. on Communication, Control, and Computing 2017*, 2017.
- Anna C. Gilbert, Yi Zhang, Kibok Lee, Yuting Zhang, Honglak Lee, “Towards Understanding the Invertibility of Convolutional Neural Networks,” in the proceedings of *International Joint Conference on Artificial Intelligence 2017*, 2017.
- Anna Gilbert and Audra McMillan, “Recovery of sparse heat source signals from locally differentially private sensor data via constrained  $\ell_1$  minimisation,” in the proceedings of *SPARS 2017*, 2017.
- Wenling Shang, Kihyuk Sohn, Honglak Lee, Anna Gilbert, “Discriminative Training of Structured Dictionaries via Block Orthogonal Matching Pursuit,” *2016 SIAM International Conference on Data Mining*, 2016.
- Y. Liu, A. C. Yücel, A. C. Gilbert, H. Bağcı and E. Michielssen, “A wavelet-based PWTD algorithm-accelerated time domain surface integral equation solver,” *Radio Science Meeting (Joint with AP-S Symposium)*, 2015 USNC-URSI, Vancouver, BC, Canada, 2015.

- J. Y. Park, A. C. Gilbert, and M. B. Wakin, “Compressive Measurement Bounds for Wireless Sensor Networks in Structural Health Monitoring,” *World Conference on Structural Control and Monitoring (WCSCM)*, Barcelona, Spain, July 2014.
- J. Y. Park, M. B. Wakin, and A. C. Gilbert, “Sampling Considerations for Modal Analysis with Damping,” *Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems at SPIE Smart Structures/NDE*, San Diego, California, March 2015.
- Anna C. Gilbert, Yi Li, Ely Porat, Martin J. Strauss, “For-All Sparse Recovery in Near-Optimal Time”, *ICALP*, 538-550, 2014.
- Sean M O’Connor, Jerome P Lynch, Anna C Gilbert, Implementation of a compressive sampling scheme for wireless sensors to achieve energy efficiency in a structural health monitoring system, *Proc. SPIE 8694 Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security 2013*, 2013.
- A. C. Gilbert, J. Y. Park, and M. B. Wakin, Sketched SVD: Recovering Spectral Features from Compressive Measurements, *Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, 2013 (**Best Student Paper Award**).
- Paul Shearer, Anna C. Gilbert, Alfred O. Hero III, Correcting Camera Shake by Incremental Sparse Approximation, *International Conference on Image Processing (ICIP)*, 2013 (**Best Paper Award**).
- Denisa Duma, Mary Wootters, Anna C. Gilbert, Hung Q. Ngo, Atri Rudra, Matthew Alpert, Timothy J. Close, Gianfranco Ciardo, Stefano Lonardi, *Accurate Decoding of Pooled Sequenced Data Using Compressed Sensing*, WABI 2013: 70–84.
- Anna C. Gilbert, Hung Q. Ngo, Ely Porat, Atri Rudra, Martin J. Strauss,  $\ell_2/\ell_2$ -foreach sparse recovery with low risk, *ICALP*, 2013: 461–472.
- Chun Lo, Mingyan Liu, Jerome P. Lynch, Anna C. Gilbert, Efficient Sensor Fault Detection Using Combinatorial Group Testing, *IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2013)*, 2013: 199–206.
- Praveen Yenduri and Anna C. Gilbert, Compressive, Collaborative Spectrum Sensing for Wideband Cognitive Radios, *The Ninth International Symposium on Wireless Communication Systems*, 2012.
- Petros Boufounos, Volkan Cevher, Anna C. Gilbert, Yi Li, and Martin J. Strauss, What’s the frequency, Kenneth?: Sublinear Fourier Sampling Off the Grid, *Proceedings of RANDOM/APPROX 2012*, 2012.
- Praveen K. Yenduri, Anna C. Gilbert, and Jun Zhang, Integrate-and-Fire Neuron Modeled as a Low-Rate Sparse Time-Encoding Device, *Proceedings of Third International Conference on Intelligent Control and Information Processing*, 2012.
- Anna C. Gilbert, Brett Hemenway, Atri Rudra, Martin J. Strauss, and Mary Wootters, Recovering simple signals, *Proceedings of Information Theory and Applications*, 2012, pp. 382–391.
- B. S. Kim, J. Y. Park, A. Mohan, A. Gilbert, and S. Savarese, Hierarchical classification of images by sparse approximation, in J. Hoey, S. McKenna, and E. Trucco, editors, *Proceedings of the British Machine Vision Conference*, BMVC Press, September 2011.
- S. M. O’Connor, J. P. Lynch, and A. C. Gilbert, Compressive sensing approach for structural health monitoring of ship hulls, in F.-K. Chang, editor, *Proceedings of the Eighth International Workshop on Structural Health Monitoring*, pages 1675–1683. DESTech Publications, Inc., 2011.
- P. Yenduri, A. Gilbert, M. Flynn, and S. Naraghi, Rand PPM: A low-power compressive sampling analog to digital converter, *2011 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 5980–5983, 2011.
- Daehyun Yoon, Jeffrey A. Fessler, Jon-Frederik Nielsen, Anna C. Gilbert, and Douglas C. Noll, Non-convex greedy compressed sensing for phase contrast MRI, in *Proceedings of ISMRM*, Stockholm SWEDEN, 2010.

- Daehyun Yoon, Jeffrey A. Fessler, Anna C. Gilbert, and Douglas C. Noll A fast parallel excitation pulse design for efficient selection and ordering of PE locations with B0 field inhomogeneity, in *Proceedings of ISMRM*, Montreal, CANADA, 2011.
- Praveen K. Yenduri, Anna C. Gilbert, Michael P. Flynn, and Shahrzad Naraghi, Rand PPM: A low power compressive sampling analog to digital converter, to appear in *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2011.
- 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, Yi Li, Ely Porat, Martin J. Strauss, Approximate sparse recovery: optimizing time and measurements, in *Proc. of ACM Symposium on Theory of Computing 2010*, STOC 2010, pp. 475–484.
- Daehyun Yoon, Ray Maleh, Anna C. Gilbert, J. A. Fessler, Douglas C. Noll, Fast selection of phase encoding locations in parallel excitation, in *Proc. Intl. Soc. Mag. Res. Med.*, 2009, p. 2595.
- R. Maleh, D. Yoon, A. C. Gilbert, Fast Algorithm for Sparse Signal Approximation using Multiple Additive Dictionaries, in *Proc. of Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, 2009.
- Melina Demertzi, Pedro C. Diniz, Mary W. Hall, Anna C. Gilbert, Yi Wang, Computation reuse in domain-specific optimization of signal recognition, in *Proc. of FPGA*, 2009, p. 281.
- V. Cevher, P. Boufounos, R. G. Baraniuk, A. C. Gilbert, M. J. Strauss, Near-optimal Bayesian localization via incoherence and sparsity, in *Proc. of International Conference on Information Processing in Sensor Networks*, 2009, pp. 205–216.
- Daehyun Yoon, Ray Maleh, Anna C. Gilbert, J. A. Fessler, Douglas C. Noll, Sparsity in MRI parallel excitation, in *Proc. of Houston Society for Engineering in Medicine and Biology Conf.*, p. 55, 2009. Invited presentation for “Sparsity-driven medical imaging” symposium.
- M. Demertzi, P. C. Diniz, M. W. Hall, A. C. Gilbert, Yi Wang, The potential of computation reuse in high-level optimization of a signal recognition system, in *Proc. of IEEE International Symposium on Parallel and Distributed Processing (IPDPS)*, 2008, pp. 1–5.
- R. Berinde, A. C. Gilbert, P. Indyk, H. Karloff, M. J. Strauss, Combining geometry and combinatorics: A unified approach to sparse signal recovery, in *Proc. of 46th Annual Allerton Conference on Communication, Control, and Computing*, 2008, pp. 798–805.
- A. C. Gilbert, M. A. Iwen, M. J. Strauss, Group testing and sparse signal recovery, in *Proc. of the 42nd Asilomar Conference on Signals, Systems and Computers*, 2008, pp. 1059–1063.
- R. Maleh, A. C. Gilbert, Sublinear recovery of sparse wavelet signals, proceedings of *Data Compression Conference (DCC) 2008*, 2008.
- Y. Massound, 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, proceedings of *IEEE International Symposium on Circuits and Systems (ISCAS) 2008*, 2008.
- A. C. Gilbert, M. J. Strauss, Fundamental performance bounds for a compressive sampling system, proceedings of *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2008*, 2008.
- X. Shi, M. Bonner, L. Adamic, A. C. Gilbert, The very small world of the well-connected, proceedings of *ACM Conference on Hypertext and Hypermedia 2008*, 2008. (**Awarded ACM Douglas Engelbart Award**)
- Anna C. Gilbert, Martin J. Strauss, Joel A. Tropp, Roman Vershynin, One sketch for all: fast algorithms for compressed sensing, in *Proc. of ACM Symposium on Theory of Computing 2007*, STOC 2007, pp. 237–246.

- M. Demertzi, P. C. Diniz, M. W. Hall, A. C. Gilbert, Y. Wang, A Combined Hardware/Software Optimization Framework for Signal Representation and Recognition, proceedings of *International Conference on Computational Science*, vol. 1, 2007, pp. 1230–1237.
- R. Maleh, A. C. Gilbert, M. J. Strauss, Sparse Gradient Image Reconstruction Done Faster, proceedings of *IEEE International Conference on Image Processing (ICIP) 2007*, vol. 2, 2007, pp. 77–80.
- K. Herrity, A. C. Gilbert, and J. Tropp, Sparse Approximation via Iterative Thresholding, in *Proceedings of the 2006 IEEE International Conference on Acoustics, Speech, and Signal Processing ICASSP*, Toulouse, France, 2006.
- W. Aiello, A. C. Gilbert, B. Rexroad, and V. Sekar, Sparse Approximations for High Fidelity Compression of Network Traffic Data, in *Proceedings of ACM Internet Measurement Conference IMC 2005*, New Orleans, LA, October 2005.
- A. C. Gilbert and J. A. Tropp, Applications of Sparse Approximations in Communications, in *Proceedings of IEEE International Symposium on Information Theory ISIT 2005*, September 2005.
- A. C. Gilbert, S. Muthukrishnan, and M. J. Strauss, Improved time bounds for near-optimal sparse Fourier representation via sampling, in *Proceedings of SPIE Wavelets XI*, San Diego, CA, 2005.
- J. Tropp, A. C. Gilbert, and M. J. Strauss, Simultaneous sparse approximation via greedy pursuit, invited paper, special session on “Sparse representations in signal processing”, in *Proceedings of the 2005 IEEE International Conference on Acoustics, Speech, and Signal Processing ICASSP*, Philadelphia, PA, March 2005.
- A. R. Calderbank, A. C. Gilbert, K. Levchenko, S. Muthukrishnan, and M. Strauss, Improved range-summable random variable construction algorithms, in *Proceedings of the 2005 SIAM Symposium on Discrete Algorithms SODA*, Vancouver, BC, January 2005.
- J. A. Tropp, A. C. Gilbert, S. Muthukrishnan, and M. J. Strauss, Improved sparse approximation over quasi-incoherent dictionaries, *IEEE International conference on image processing ICIP*, pp. 37–40, 2003.
- A. C. Gilbert, S. Muthukrishnan, and M. J. Strauss, Approximation of Functions over Redundant Dictionaries Using Coherence, in *Proceedings of 2003 SIAM Symposium on Discrete Algorithms SODA*, pp. 243–252, 2003.
- A. C. Gilbert and H. Karloff, On the Fractal Behavior of TCP, *Proc. of the 2003 ACM Symposium on Theory of Computing STOC*, pp. 297–306, 2003.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, M. J. Strauss, How to summarize the universe: Dynamic maintenance of quantiles, in *Proc. of the 2002 Conference on Very Large Databases VLDB*, pp. 454–465, 2002.
- A. C. Gilbert, S. Guha, P. Indyk, Y. Kotidis, S. Muthukrishnan, M. J. Strauss, Fast, Small-Space Algorithms for Approximate Histogram Maintenance, in *Proc. of the 2002 ACM Symposium on Theory of Computing STOC*, pp. 389–398, 2002.
- A. C. Gilbert, S. Guha, P. Indyk, S. Muthukrishnan, M. J. Strauss, Near-Optimal Sparse Fourier Representations via Sampling, *Proc. of the 2002 ACM Symposium on Theory of Computing STOC*, pp. 152–161, 2002.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, M. Strauss, Surfing wavelets on streams: one-pass summaries for approximate aggregate queries, in *Proc. of the 2001 Conference on Very Large Databases VLDB*, pp. 79–88, 2001.
- A. C. Gilbert, Y. Kotidis, S. Muthukrishnan, M. Strauss, Optimal and Approximate Computation of Summary Statistics for Range Aggregates, in *Proc. of the 2001 ACM Principles of Database Systems PODS*, pp. 227–236, Santa Barbara, 2001.

- M. Gupta and A. Gilbert, Nonlinear vector multiresolution analysis, *Proc. of the 34th Asilomar Conference on Signals, Systems, and Computers*, 2000.
- A. Feldmann, A. C. Gilbert, P. Huang, and W. Willinger, Dynamics of IP Traffic: A Study of the Role of Variability and the Impact of Control, in *Proc. of the ACM SIGCOMM'99*, pp. 301–313, Boston, MA, 1999.
- Y. Joo, V. Ribeiro, A. Feldmann, A. C. Gilbert, and W. Willinger, On the impact of variability on the buffer dynamics in IP networks, in *Proc. of the 37th Annual Allerton Conference on Communication, Control, and Computing*, Allerton, IL, 1999.
- A. Feldmann, A. C. Gilbert, and W. Willinger, Data networks as cascades: Investigating the multifractal nature of Internet WAN traffic, in *Proc. of the ACM SIGCOMM'98*, pp. 42–55, Vancouver, B.C., 1998.
- A. C. Gilbert, A. Feldmann, W. Willinger, Visualizing multifractal scaling behavior: A simple scaling heuristic, in *Proc. of the 32nd Asilomar Conference on Signals, Systems, and Computers*, 1998.
- A. Feldmann, A. C. Gilbert, W. Willinger and T. G. Kurtz, Looking behind and beyond self-similarity: Scaling phenomena in measured WAN traffic, in *Proc. of the 35th Annual Allerton Conference on Communication, Control and Computing*, pp. 269–280, 1997.

#### Refereed Workshop Publications

- Sean M. O'Connor, Jerome P. Lynch, and Anna C. Gilbert, Implementation of a compressive sampling scheme for wireless sensors to achieve energy efficiency in a structural health monitoring system, in *Proc. SPIE 8694, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland Security*, April 2013
- A. C. Gilbert, B. Hemenway, M. J. Strauss, D. P. Woodruff, and M. Wootters, Reusable low-error compressive sampling schemes through privacy, *Proceedings of IEEE Statistical Signal Processing Workshop*, 2012.
- X. Kong, P. Petre, R. Matic, A. Gilbert, and M. Strauss, An analog-to-information converter for wideband signals using a time encoding machine, in *2011 IEEE Digital Signal Processing Workshop and IEEE Signal Processing Education Workshop (DSP/SPE)*, pages 414–419, Jan. 2011.
- Daehyun Yoon, J. A. Fessler, Anna C. Gilbert, Douglas C. Noll, Simultaneous signal loss correction from B1 and B0 field inhomogeneity in BOLD fMRI with parallel excitation, in *ISMRM Workshop on Parallel MRI*, 2009.
- Praveen K. Yenduri and Anna C. Gilbert, Continuous Fast Fourier Sampling, in *Proc. of Sampling Theory and Applications (SampTA)*, 2009.
- R. Maleh, A. C. Gilbert, Multichannel image estimation via simultaneous orthogonal matching pursuit, in *Proc. of Statistical Signal Processing Workshop 2007*, 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, in *Fifth IEEE Dallas Circuits and Systems Workshop*, October 2006.
- A. C. Gilbert, M. J. Strauss, J. A. Tropp, and R. Vershynin, Sublinear approximation of compressible signals, Invited paper, special session on “Compressive Sensing,” in *Proceedings of SPIE Intelligent Integrated Microsystems*, Orlando, April 2006.
- A. C. Gilbert and K. Levchenko, Compressing network graphs, in *Proceedings of the LinkKDD workshop at the 10th ACM Conference on KDD*, August 2004.
- J. Fong, A. Gilbert, S. Kannan, and M. Strauss, Better alternatives to OSPF routing, in *Proc. of Workshop on Approximation and Randomized Algorithms in Communication Networks (ARACNE)*, 2001.

- M. Gupta and A. Gilbert, Robust speech recognition using wavelet coefficient features, *Proc. of IEEE Automatic Speech Recognition and Understanding Workshop*, Italy, 2001.
- S. Seuret and A. Gilbert, Pointwise Hölder exponent estimation in data network traffic, *International Teletraffic Congress Workshop*, Monterey, CA, 2000.
- A. C. Gilbert, Y. Joo, and N. McKeown, Congestion control and periodic behavior, *Proc. of IEEE LANMAN Workshop*, Boulder, CO, 2001.

### Book Chapters

- Anna C. Gilbert, “Dynamics of congestion control,” in *Complex Dynamics in Communication Networks*, G. Vattay and L. Kocarev, eds., Springer-Verlag, 2005.
- A. C. Gilbert, “Multiresolution homogenization schemes for differential equations and applications,” in *Topics in analysis and its applications: Selected theses*, Ronald Coifman, ed., World Scientific, 2000.
- I. C. Daubechies and A. C. Gilbert, “Harmonic analysis, wavelets, and applications,” in *Hyperbolic Equations and Frequency Interactions*, Luis Cafarelli and Weinan E, eds., IAS/Park City Mathematics Series, Vol. 5, 1998.

### Grants

- MIDAS Challenge grant, co-PI and co-director of Michigan Institute for Single Cell Data Analysis, March 2017–February 2020, \$1.2 million.
- Simons Foundation Fellowship, 2017–2018.
- Samsung research funds, “Neural Network Inspired Compressive Sensing and Image Processing,” Prof. Michael Flynn (ECE) PI, \$60,000, 2013–2020.
- AF (Medium, Collaborative Research): Sparse Approximation: Theory and Extensions, PI, July 2012–June 2017, \$603,000
- ARO 61819-MA: Semi-inner-products in Banach Spaces with Applications to Regularized Learning, Sampling, and Sparse Approximation, co-PI, July 2012–June 2013, \$65,000.
- NSF SCREMS: Scientific Computing and Mathematics at the University of Michigan, co-PI, NSF DMS 1026317, September 2010–August 2013, \$175,000.
- Sensing Sensors: Compressed Sampling with Co-design of Hardware and Algorithms across Multiple Layers in Wireless Sensor Networks, co-PI, NSF CIF 0910765, September 2009–August 2014, \$2,900,000.
- DARPA: Theory and Practice of Analog-to-Information Conversion (Phase II), co-PI, ONR/DARPA N66001-06-1-2011, September 2008–August 2010, \$750,000.
- CAREER: Modeling and Analysis of Data from Massive Graphs, sole PI, NSF DMS 0547744, May 2006–April 2011, \$400,000.
- DARPA: Theory and Practice of Analog-to-Information Conversion, co-PI, ONR/DARPA N66001-06-1-2011, January 2006–December 2006, \$150,000.
- DDDAS-SMRP: Optimizing Signal and Image Processing in a Dynamic, Data-Driven Application System, co-PI, NSF CNS 0540154, January 2006–November 2008, \$90,000.
- Elizabeth C. Crosby Research Award, sole PI, University of Michigan, 2005–2006, \$20,000.
- FRG: Collaborative research in algorithms for sparse data representation, co-PI, NSF DMS 0354600, September 2004–August 2007, \$317,808.

### Ph.D. Students

- Claire Lin, Department of Mathematics, University of Michigan, April 2021 (expected graduation). (jointly advised with Jeff Fessler, University of Michigan.)



- Umang Varma, Department of Mathematics, University of Michigan, April 2019 (expected graduation).
- Alexander Vargo, Department of Mathematics, University of Michigan, April 2019 (expected graduation).
- Audra McMillan, Department of Mathematics, University of Michigan, April 2018 (expected graduation).
- Yitong Sun, Department of Mathematics, University of Michigan, April 2019 (expected graduation). (jointly advised with Ambuj Tewari, University of Michigan.)
- Jeremy Hoskins, Department of Mathematics, University of Michigan, April 2017 (expected graduation). (jointly advised with John Schotland, University of Michigan.)
- Paul Shearer, Department of Mathematics, University of Michigan, May 2013.
- Jae Young Park, Department of Electrical Engineering and Computer Science, University of Michigan, May 2013. (now at Schlumberger Research, jointly advised with Michael Wakin, Colorado School of Mines.)
- Praveen Yenduri, Department of Electrical Engineering and Computer Science, University of Michigan, December 2012. (now at MathWorks.)
- Ray Maleh, Department of Mathematics, University of Michigan, August 2009. (now at L3 Communications.)
- Joel Tropp, *Topics in Sparse Approximation*, University of Texas at Austin (joint with Inderjit S. Dhillon, Dept. of Computer Science, UT-Austin), 2004. (now at California Institute of Technology.)

#### Thesis Committees<sup>1</sup>

- Served on the Ph.D. committee of Ran Duan, Division of Computer Science Engineering, University of Michigan, 2011.
- Served on the Ph.D. committee of Kim Khalsa, Division of Electrical Engineering, University of Michigan, 2011. Served on the Ph.D. committee of Awlok Josan, Division of Electrical Engineering, University of Michigan, 2011. Served on the Ph.D. committee of Amanda Funai, Division of Electrical Engineering, University of Michigan, 2010.
- Served on the Ph.D. committee of Sharzhad Naraghi, Division of Electrical Engineering, University of Michigan, 2009.
- Served on the Ph.D. committee of Xiaolin Shi, Division of Computer Science Engineering, University of Michigan, 2009.
- Served on the Ph.D. committee of Mark Iwen, Department of Mathematics, University of Michigan, 2008.
- Served on the Ph.D. committee of Xuan Zheng, Division of Computer Science Engineering, University of Michigan, 2008.
- Served on the Ph.D. committee of Thiradet Jiarasuksakun, Department of Mathematics, University of Michigan, 2006.
- Served on the Ph.D. committee of Earl Lawrence, Department of Statistics, University of Michigan, 2005.

#### REU/UROP/Summer Students Supervised

- Justin Shetty and James Wich (Univ. of Michigan, UROP), 2016–2017.
- Yi Wang (Univ. of Michigan, EECS), University of Michigan, 2006.

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<sup>1</sup>I quit keeping track of these. There are simply too many.

- Kyle Herrity (Univ. of Michigan, REU), University of Michigan, 2005.
- Daniel Sikora (Univ. of Michigan REU), University of Michigan, 2005.
- Kirill Levchenko (Univ. of California San Diego), AT&T Labs-Research, 2003.
- Joel Tropp (Univ. of Texas), AT&T Labs-Research, 2002.
- Jing Zou (Princeton University), AT&T Labs-Research, 2002.
- Maya Gupta (Stanford University), AT&T Labs-Research, 2000.
- Stephane Seuret (ENST), AT&T Labs-Research, 1999.
- Youngmi Joo (Stanford University), AT&T Labs-Research, 1999.
- Jennifer Steichen (Univ. Illinois), AT&T Labs-Research, 1998.

### Courses Taught

- Fall 2016, M571, Numerical Linear Algebra, Department of Mathematics, University of Michigan.
- Fall 2016, Math 556, Applied Functional Analysis, Department of Mathematics, University of Michigan.
- Fall 2015, Fall 2015, Math 556, Applied Functional Analysis, Department of Mathematics, University of Michigan.
- Winter 2015, Math 416, Randomized Algorithms, Department of Mathematics, University of Michigan.
- Fall 2014, Math 571, Numerical Linear Algebra, Department of Mathematics, University of Michigan.
- Winter 2014, Math 416, Randomized Algorithms, Department of Mathematics, University of Michigan.
- Fall 2013, Math 556, Applied Functional Analysis, Department of Mathematics, University of Michigan.
- Fall 2012, Math 471, Introduction to Numerical Methods, Department of Mathematics, University of Michigan.
- Fall 2012, Math 571, Numerical Methods for Scientific Computing I, Department of Mathematics, University of Michigan.
- Winter 2012, Math 651, Sparse Analysis, Department of Mathematics, University of Michigan.
- Fall 2011, Math 571, Numerical Methods for Scientific Computing I, Department of Mathematics, University of Michigan.
- Summer 2011, Short course on Sparse Approximation, Women in Mathematics Program, Institute for Advanced Study.
- Winter 2010, Math 471, Introduction to Numerical Methods, Department of Mathematics, University of Michigan.
- Summer 2010, Short course on Sparse Approximation, Park City Mathematics Institute.
- Fall 2009, Math 571, Numerical Methods for Scientific Computing I, Department of Mathematics, University of Michigan.
- Fall 2008, EECS 598, Compressive Sensing, Division of Electrical and Computer Engineering, University of Michigan.
- Winter 2008, Math 571, Numerical Methods for Scientific Computing I, Department of Mathematics, University of Michigan.
- Fall 2007, Math 471, Introduction to Numerical Methods, Department of Mathematics, University of Michigan.

- Winter 2007, Math 650, Fourier Analysis, Department of Mathematics, University of Michigan.
- Winter 2006, Math 650, Fourier Analysis, Department of Mathematics, University of Michigan.
- Fall 2005, Math 425, Introduction to Probability, Department of Mathematics, University of Michigan.
- Fall 2005, Math 454, Boundary value problems for partial differential equations, Department of Mathematics, University of Michigan.
- Fall 2004, Math 454, Boundary value problems for partial differential equations, Department of Mathematics, University of Michigan.
- Fall 2004, Math 450, Advanced mathematics for engineers, Department of Mathematics, University of Michigan.
- Winter 2000, Time/Frequency analysis, Department of Mathematics, Stanford University.

### Patents

- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Method and apparatus for using wavelets to produce data summaries, 7,296,014, November 13, 2007. Assignee: AT&T Corp.
- A. Gilbert, Y. Kotidis, S. Muthukrishnan, and M. Strauss, Method and apparatus for using wavelets to produce data summaries, 7,272,599, September 18, 2007. Assignee: AT&T Corp.
- 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, February 13, 2007. Assignee: AT&T Corp.
- J. Fong, A. Gilbert, S. Kannan, and M. Strauss, Method for Routing Data Using a Fractional Open Shortest Path First Protocol. (Filed.)

### Awards

- Awarded SIAM Ralph E. Kleinman Prize, 2013.
- Awarded EURASIP Signal Processing Best Paper award for *Algorithms for simultaneous sparse approximation. Part I: Greedy pursuit*, joint with Joel Tropp and Martin J. Strauss, 2010.
- Awarded Association of Computing Machinery (ACM) Douglas Engelbart Award, 2008.
- Awarded National Academy of Sciences Award for Initiatives in Research, 2008.
- Awarded Alfred P. Sloan Fellowship, 2006–2008.
- Awarded NSF University-Industry Postdoctoral Research Fellowship, 1997-1999.
- Awarded AT&T Foundation Ph.D. Fellowship, 1995-1997.
- Awarded AT&T Foundation Graduate Research Program for Women grant, 1993–1997.
- Awarded National Physical Science Consortium Graduate Fellowship (1993)—declined to attend Princeton University.
- Phi Beta Kappa, May, 1993.

### Invited Talks

- CBMS Conference on Sparse Approximation and Signal Recovery Algorithms May 22-26, 2017
- IMA Public Lecture, *Group Testing*, March, 2017.
- University of Minnesota Applied Math Colloquium, March, 2017.

- IMA Workshop on Statistical Learning Theory, May, 2016.
- Algebraic and Spectral Graph Theory, BIRS, August, 2016.
- Plenary speaker, Mathematics and Image Analysis, Paris, January, 2016.
- Plenary speaker, Canadian Mathematical Society, Montreal, December, 2015.
- Lectures at summer school on Computational Harmonic Analysis, Univ. of Maryland, July, 2015.
- Plenary speaker, International Biomedical and Astronomical Signal processing (BASP) Frontiers Workshop, Switzerland, December, 2015.
- Speaker, AIM Workshop on implications of the Kadison-Singer proof, California, 2014.
- Invited speaker, Strata+Hadoop industry conference on massive data, New York, 2014.
- Invited speaker, International Congress of Mathematicians, Seoul, Korea, 2014.
- University of Texas at Austin, Distinguished Speaker, Winter 2014.
- Program in Applied and Computational Mathematics Colloquium, Princeton University, 2013.
- Symposium Speaker, National Academies of Science Kavli Frontiers of Science Symposium, Irvine, CA, 2013.
- Boeing Applied Mathematics Seminar, University of Washington, 2013.
- Applied Mathematics Colloquium, University of Colorado-Boulder, 2012.
- AAAS Symposium speaker, Applications of Compressed Sensing, 2013.
- Statistics and Computation Colloquium, University of Chicago, 2012.
- Invited speaker, ICALP 2012 Workshop on Group Testing, 2012.
- Invited speaker, Sensing and Analysis of High Dimensional Data (SAHD), Duke University, 2011.
- Plenary Speaker, Neural Information Processing Systems (NIPS), Granada Spain, December 2011.
- Plenary Speaker, Signal Processing with Adaptive Sparse Structured Representations (SPARS), St. Malo, FRANCE, 2009.
- Applied Mathematics Seminar speaker, Department of Mathematics, Stanford University, October 2008.
- Speaker, Workshop on Sublinear Algorithms, Dagstuhl Germany, August 2008.
- Tutorial Presentation, SIAM Imaging Conference, San Diego, July 2008.
- Speaker, Mining Massive Data Sets, Stanford University, June 2008.
- Michigan Section of the MAA, Plenary talk, May 2008.
- Applied Mathematics Colloquium, Brown University, May 2008.
- Applied Mathematics Seminar, Vanderbilt University, April 2008.
- Applied Mathematics Colloquium, University of Pennsylvania, February 2008.
- Invited Speaker, Information Theory and its Applications (ITA), UC-San Diego, January 2008.
- Applied Mathematics Colloquium, Cornell University, September 2007.
- Speaker, Workshop on Multiscale Methods, Oberwolfach Germany, July 2007.
- Invited speaker, von Neumann Symposium, Park City, Utah, 2007.

- Colloquium speaker, Program in Applied and Computational Mathematics, Princeton University, Princeton, NJ, 2006.
- Invited speaker, Sequences and Codes, IRMACS Centre, Simon Fraser University, Vancouver, BC, 2006.
- Invited speaker, Abel Symposium, Ålesund, Norway, 2006.
- Colloquium speaker, Department of Applied Mathematics, Columbia University, New York, NY, 2006.
- Colloquium speaker, Department of Mathematics, Wayne State University, Detroit, MI, 2006.
- Colloquium speaker, Department of Computer Science, Harvard University, Boston, MA, 2005.
- Colloquium speaker, Departments of Mathematics and Statistics, Boston University, Boston, MA, 2005.
- Invited speaker, Sparse Representation in Redundant Systems Conference, Univ. of Maryland, College Park, MD 2005.
- Invited address, AMS Sectional Meeting, Newark, DE 2005.
- Invited speaker, Multiscale Geometry and Analysis in High Dimensions Conference, IPAM, Los Angeles, CA 2004.
- Plenary speaker, SIAM Annual Conference, San Diego, CA 2001.
- Invited speaker, Session on Internet Research As an Experimental Science, AAAS Annual Meeting, Anaheim, CA, January 1999.
- Invited speaker, SIAM Regional Meeting on Mathematics in Industry, Worcester, MA, May 1998.

### **Professional Service**

- Program Committee Member, Random/Approx Conference, 2017.
- Member of Alfred P. Sloan Fellowship Selection Committee 2016—2019.
- Co-organizer of Park City Mathematics Institute Summer 2016 program on the Mathematics of Information.
- Chair of Personnel Committee, Department of Mathematics, University of Michigan, 2015–2017.
- Core Member of Michigan Institute for Data Science and Chair of Faculty Recruiting Committee, 2015–2017.
- Co-organizer of workshop at Foundations of Computer Science (FOCS) 2014 on Sparse Fourier Transform.
- IMA Prize Committee member, 2014–2019.
- AWM Sadosky Prize Committee member, 2015–2017.
- Co-organized Midwest Theory Day (held at University of Michigan), 2014.
- Member of the Scientific Advisory Board of ICERM at Brown University 2014–2017, Chair (2015–2017).
- NSF DMS Panel Member, 2013.
- Organizing Committee on Training Students to Extract Value from Big Data, National Research Council, 2013–2014.
- Personnel Committee, Department of Mathematics, University of Michigan, 2012–2014.
- Natural Sciences Divisional Evaluation Committee, 2012–2015.

- ACM Symposium on Theory of Computing (STOC) 2013 technical program committee member, 2012.
- Member of external review committee for MSRI, March 2013
- Vienna Science and Technology Fund Reviewer for “Mathematics and...” Young Investigator Award, 2012.
- NSF CCF Panel Member, 2011.
- Committee on the Analysis of Massive Data, National Research Council, 2010-2011.
- Program Committee, Symposium on Discrete Algorithms (SODA) 2011.
- Program Committee, Foundations of Computer Science (FOCS) 2009.
- Fellow in the (Center for Research in Learning and Teaching) CRLT Colloquium on the Science of Learning for 2009-2010.
- Personnel Committee, Department of Mathematics, University of Michigan, 2008–2010.
- Graduate Admissions, Department of Mathematics, University of Michigan, 2007–2009, 2011–2012.
- Board of Governors, Institute of Mathematics and its Applications (IMA), University of Minnesota, 2006-2011, chair 2011.
- Steering Committee, Informatics Undergraduate Degree Program, University of Michigan, 2006–2009.
- Executive Committee, Department of Mathematics, University of Michigan, 2005–2006.
- Computing Committee, Department of Mathematics, University of Michigan, 2004–2005.
- Applied and Interdisciplinary Mathematics (AIM) Graduate Committee University of Michigan, 2004–2005.
- Served on AT&T Labs Fellowship Program committee, 2002–2004.
- Initiated AT&T Shannon Postdoctoral Fellowship and chaired search committee, 2000-2001.

### Editorial Service

- Associate editor for *Theory of Computing Systems*, 2010–present.
- Associate editor for *Applied and Computational Harmonic Analysis*, 2010–2013.
- Associate editor for *SIAM Multiscale Modeling*, 2008–2011.
- Associate editor for *Communications in Mathematical Sciences*, 2006–2009.
- Program committee for mini-symposia at ICIAM, Sydney, Australia, 2003.
- Referee for *IEEE Trans. on Information Theory*, *IEEE Trans. on Networking*, *IEEE Trans. on Signal Processing*, *SIAM Journal on Applied Mathematics*, *EURASIP Journal of Signal Processing*.

### Popular press

- Barry Cipra, Oh, What a Tangled Web We’ve Woven..., *SIAM News*, vol. 33, no. 2, 2000.
- Barry Cipra, Sublinear Computing: When Ignorance is Bliss, *SIAM News*, vol. 37, no. 3, 2004.