# Michael B. Wakin

Colorado School of Mines
Electrical Engineering Department
1500 Illinois St.
Golden, CO 80401, USA

Phone: (303) 273-3607
Fax: (303) 273-3602
Email: mwakin@mines.edu
Web: www.mines.edu/~mwakin

---

## RESEARCH INTERESTS

Signal processing and machine learning using sparse, low-rank, tensor, and manifold-based models
Sensing, compression, inference, and reconstruction
Inverse problems, compressive sensing, and quantum state tomography
Convex and non-convex optimization algorithms and theory
Approximation theory and computational harmonic analysis

## EDUCATION

| | | |
|---|---|---|
| 2007 | Ph.D., Electrical Engineering (Dr. Richard Baraniuk, advisor)<br>Thesis: "The Geometry of Low-Dimensional Signal Models" | Rice University |
| 2002 | M.S., Electrical Engineering (Dr. Richard Baraniuk, advisor)<br>Thesis: "Image Compression using Multiscale Geometric Edge Models" | Rice University |
| 2000 | B.S., Electrical Engineering (summa cum laude) | Rice University |
| 2000 | B.A., Mathematics (summa cum laude) | Rice University |

## POSITIONS

| | | |
|---|---|---|
| 2019–present | Colorado School of Mines<br>Dept. of Electrical Engineering | Professor |
| 2022 | UCLA<br>Institute for Pure and Applied Mathematics | Senior Fellow |
| 2013–2019 | Colorado School of Mines<br>Dept. of Electrical Engineering<br>(Ben L. Fryrear Associate Professor from 2015–2017)<br>(Electrical Engineering and Computer Science from 2013–2017) | Associate Professor |
| 2008–2013 | Colorado School of Mines<br>Dept. of Electrical Engineering and Computer Science<br>(Division of Engineering from 2008–2011) | Assistant Professor |
| 2007–2008 | University of Michigan<br>Dept. of Electrical Engineering and Computer Science | Assistant Professor |
| 2006–2007 | California Institute of Technology<br>Dept. of Applied and Computational Mathematics | NSF Postdoctoral Fellow |
| 2000–2006 | Rice University<br>Dept. of Electrical and Computer Engineering | Research Assistant |
| 2004 | UCLA<br>Institute for Pure and Applied Mathematics | Fellow |
| 2003 | Baylor College of Medicine | Research Intern |

| | | |
|---|---|---|
| | National Center for Macromolecular Imaging | |
| 2002 | Rice University<br>Dept. of Electrical and Computer Engineering | Teaching Fellow |
| 1998–2000 | Motorola, Inc. | Summer Intern |

## HONORS and AWARDS

| | | |
|---|---|---|
| 2025 | Elbert K. Fretwell Award for Outstanding Educators | Scouting Colorado |
| 2021 | IEEE Fellow | IEEE |
| 2021 | Outstanding Editorial Board Member Award | IEEE Transactions on Signal Processing |
| 2020 | IEEE Signal Processing Magazine Best Paper Award | IEEE Signal Processing Society |
| 2018 | Electrical Engineering Faculty Research Award | Colorado School of Mines |
| 2015 | Best Paper Award | IEEE Signal Processing Society |
| 2015 | Ben L. Fryrear Associate Professorship Award | Colorado School of Mines |
| 2014 | Excellence in Research Award (Junior Faculty) | Colorado School of Mines |
| 2012 | CAREER Award | National Science Foundation |
| 2008 | Young Faculty Award | Defense Advanced Research Projects Agency (DARPA) |
| 2007 | Hershel M. Rich Invention Award | Rice University |
| 2006 | Mathematical Sciences Postdoctoral Research Fellowship | National Science Foundation |
| 2004 | Edmund M. Dupree Fellowship in Electrical Engineering | Rice University |
| 2001 | Graduate Research Fellowship | National Science Foundation |
| 2000 | Distinguished Graduate Fellowship | Texas Instruments/Nokia |
| 2000 | Senior Merit Award in Electrical Engineering | Rice Engineering Alumni |
| 2000 | Vice President's Appreciation Award | Rice University |
| 2000 | Brotzen Award for Achievement and Service | Brown College, Rice University |
| 1998 | Louis J. Walsh Scholarship in Engineering | Rice University |
| 1997–1999 | Samuel T. Sikes, Jr. Scholarship in Engineering | Rice University |
| 1997–1999 | Donald R. Baker Award for G.P.A. | Brown College, Rice University |
| 1996–2000 | President's Honor Roll | Rice University |
| 1996 | National Merit Scholarship | Arlington Lamar High School |

## RESEARCH SUPPORT

| | |
|---|---|
| 2024–present | "Mid-InfraRed AdvanCed Life-detection Explorer (MIRACLE)," NASA PICASSO program (Collaborative with Y. Phal, J. Spear, and C. Dreyer) |
| 2021–present | "Collaborative Research: CIF: Medium: Structured Inference and Adaptive Measurement Design in Indirect Sensing Systems," NSF Division of Computing and Communication Foundations (Collaborative with G. Tang at CU and Z. Zhu at DU) |
| 2022–2023 | "Data Driven Qualification (DDQ) Framework for Metals Additive Manufacturing (AM) (Phase II)," US Army (Collaborative with Mines ADAPT) |
| 2017–2022 | "Convex Optimization for Blind Inverse Problems," NSF Division of Computing and Communication Foundations (Collaborative with G. Tang at CU-Boulder) |
| 2018–2021 | "Big, Deep, and Smart Data to Support VTR Experiment Design and Validation," Idaho National Laboratory (Collaborative with J. King and X. Zhang at Mines) |
| 2018–2021 | "Robotic Laser Wire Additive Manufacturing System with Comprehensive Quality Assurance Framework," ONR Quality Made Program (Subcontracted by Lockheed Martin) (Collaborative with C. Brice, A. Stebner, B. Kappes, and X. Zhang at Mines) |
| 2018–2020 | "Nonconvex Matrix Optimization: Geometry, Algorithms, and Distributed |

| | |
|---|---|
| | Implementations," DARPA Lagrange Program, Defense Sciences Office<br>(Collaborative with G. Tang at Mines, W. Bajwa at Rutgers, S. Wright at Wisconsin) |
| 2014–2018 | "Collaborative Research: Tracking Low-dimensional Information in Data Streams and Dynamical Systems," NSF Division of Computing and Communication Foundations<br>(Collaborative with C. Rozell at Georgia Tech) |
| 2014–2018 | "Collaborative Research: Subspace Matching and Approximation on the Continuum," NSF Division of Computing and Communication Foundations<br>(Collaborative with M. Davenport and J. Romberg at Georgia Tech) |
| 2012–2018 | "CAREER: New Models, Representations, and Dimensionality Reduction Techniques for Structured Data Sets," NSF Division of Computing and Communication Foundations |
| 2016–2017 | "Compressive Sensing Data Analysis and Algorithm Development," United Launch Alliance |
| 2015–2016 | "Compressive Sensing Viability Study," United Launch Alliance |
| 2009–2013 | "New Theory and Algorithms for Scalable Data Fusion," AFOSR Directorate for Mathematics, Information and Life Sciences |
| 2008–2012 | "Collaborative Research: Leveraging Low-dimensional Structure for Time Series Analysis and Prediction," NSF Division of Computing and Communication Foundations<br>(Collaborative with C. Rozell at Georgia Tech) |
| 2008–2012 | "Analog-to-Information Receiver Development," DARPA Microsystems Technology Office<br>(Subcontracted by Northrop Grumman and Caltech) |
| 2008–2010 | "Geometric Methods for Compressive Multi-Signal Processing," DARPA Microsystems Technology Office (Young Faculty Award) |
| 2006–2007 | "The Geometry of Low-Dimensional Signal Models," NSF Division of Mathematical Sciences (Postdoctoral Research Fellowship) |

## PREPRINTS

1. Q. Zheng, J. Zhang, J. Gockel, M. B. Wakin, C. Brice, and X. Zhang, "QA-VLM: Providing human-interpretable quality assessment for wire-feed laser additive manufacturing parts with Vision Language Models," arXiv preprint arXiv:2508.16661.
2. Z. Qin, M. B. Wakin, and Z, Zhu, "A Scalable Factorization Approach for High-Order Structured Tensor Recovery," arXiv preprint arXiv:2506.16032.
3. Z. Qin, C. Jameson, Z. Gong, M. B. Wakin, and Z. Zhu, "Optimal Allocation of Pauli Measurements for Low-rank Quantum State Tomography," arXiv preprint arXiv:2411.04452.
4. Z. Qin, C. Jameson, A. Goldar, M. B. Wakin, Z. Gong, and Z. Zhu, "Sample-Efficient Quantum State Tomography for Structured Quantum States in One Dimension," arXiv preprint arXiv:2410.02583.
5. C. Jameson, Z. Qin, A. Goldar, M. B. Wakin, Z. Zhu, and Z. Gong, "Optimal quantum state tomography with local informationally complete measurements," arXiv preprint arXiv:2408.07115.
6. A. Lidiak, C. Jameson, Z. Qin, G. Tang, M. B. Wakin, Z. Zhu, and Z. Gong, "Quantum state tomography with tensor train cross approximation," preprint, 2022.
7. S. Li and M. B. Wakin, "Recovery Guarantees for Time-varying Pairwise Comparison Matrices with Non-transitivity," preprint, 2021.
8. S. Li, P. Nayeri, and M. B. Wakin, "Digital Beamforming Robust to Time-Varying Carrier Frequency Offset," preprint, 2021.

## BOOK CHAPTERS

1. M. B. Wakin, "Compressive Sensing Fundamentals," in M. Amin (Ed.), *Compressive Sensing for Urban Radar*, CRC Press, 2014.

## JOURNAL PUBLICATIONS

1. Q. Zheng, M. B. Wakin, J, Gockel, C. Brice, and X. Zhang, "Cross-platform laser powder bed fusion process-property modeling with active transfer learning," Journal of Manufacturing Processes, vol. 149, 15 September 2025, pp. 955-963.
2. P. Saengduean, R. Snieder, and M. B. Wakin, "Weighted compressive sensing applied to seismic interferometry: Wavefield reconstruction using prior information," *Seismological Research Letters*, vol. 95, no. 4, pp. 2221–2228, 2024.
3. Z. Qin and M. B. Wakin and Z. Zhu, "Guaranteed Nonconvex Factorization Approach for Tensor Train Recovery," *Journal of Machine Learning Research*, vol. 25, no. 383, pp. 1–48, 2024.
4. P. Saengduean, J. Yang, J. Shragge, R. Snieder, and M. B. Wakin, "Multi-source wavefield reconstruction of distributed acoustic sensing data using compressive sensing and seismic interferometry," *Journal of the Acoustical Society of America*, vol. 156, no. 2, pp. 1309–1318, 1 August 2024.
5. Z. Qin, C. Jameson, Z. Gong, M. B. Wakin, and Z. Zhu, "Quantum State Tomography for Matrix Product Density Operators," *IEEE Transactions on Information Theory*, vol. 70, no. 7, pp. 5030-5056, July 2024.
6. D. Rosen, D. Scarbrough, J. Squier, M. B. Wakin, "Phase retrieval from integrated intensity of auto-convolution," *Signal Processing*, vol. 220, 109464, July 2024.
7. M. A. Valdez, J. D. Rezac, M. B. Wakin, and J. A. Gordon, "Multi-Frequency Spherical Near-Field Antenna Measurements Using Compressive Sensing," *IEEE Journal of Selected Topics in Signal Processing*, vol. 18, no. 4, pp. 572–586, May 2024.
8. Y. Wu, M. B. Wakin, and P. Gerstoft, "Non-Uniform Array and Frequency Spacing for Regularization-Free Gridless DOA," *IEEE Transactions on Signal Processing*, vol. 72, pp. 2006 - 2020, 08 April 2024.
9. D. Rosen and M. B. Wakin, "Bivariate Retrieval from Intensity of Cross-Correlation," *Signal Processing*, vol. 215, 109267, February 2024.
10. A. Titova, M. B. Wakin, and A. C. Tura, "Achieving Robust Compressive Sensing Seismic Acquisition with a Two-Step Sampling Approach," *Sensors*, vol. 23, no. 23, 9519, 2023.
11. Y. Wu, M. B. Wakin, and P. Gerstoft, "Gridless DOA Estimation with Multiple Frequencies," *IEEE Transactions on Signal Processing*, vol. 71, pp. 417-432, 2023.
12. Z. Zhu and M. B. Wakin, "Time-Limited Toeplitz Operators on Abelian Groups: Applications in Information Theory and Subspace Approximation," *Pure and Applied Functional Analysis*, vol. 8, no. 2, pp. 775-808, 2023.
13. P. Saengduean, R. Snieder, and M. B. Wakin, "Multi-source wavefield reconstruction combining interferometry and compressive sensing: Application to a linear receiver array," *Geophysical Journal International*, vol. 235, no. 3, pp. 2007–2019, December 2023.
14. J. Jayne, M. B. Wakin, and R. Snieder, "Green's function estimation by seismic interferometry from limited frequency samples," *Signal Processing*, vol. 205, 108863, April 2023.
15. M. A. Valdez, A. J. Yuffa, and M. B. Wakin, "Compressive Sensing with Wigner $D$-functions on Subsets of the Sphere," *IEEE Transactions on Signal Processing*, vol. 70, pp. 5652-5667, 2022.
16. R. Snieder and M. B. Wakin, "When Randomness Helps in Undersampling," Education Article in *SIAM Review*, vol. 64, no. 4, pp. 1062-1080, November 2022.

17. M. A. Valdez, A. J. Yuffa, and M. B. Wakin, “On-Grid Compressive Sensing for Spherical Field Measurements in Acoustics,” *Journal of the Acoustical Society of America*, vol. 152, no. 4, October 2022.
18. S. Li, G. Tang, and M. B. Wakin, “Landscape Correspondence of Empirical and Population Risks in the Eigendecomposition Problem,” *IEEE Transactions on Signal Processing*, vol. 70, pp. 2985–2999, 2022.
19. S. Li, H. Mansour, and M. B. Wakin, “Recovery analysis of damped spectrally sparse signals and its relation to MUSIC,” *Information and Inference: A Journal of the IMA*, vol. 11, no. 1, pp. 355–383, March 2022.
20. I. Pawelec, M. Wakin, and P. Sava, “Missing trace reconstruction for 2D land seismic data with randomized sparse sampling,” *Geophysics*, vol. 86, no. 3, pp. 1MJ-WA152, May 2021.
21. Z. Zhu, Q. Li, G. Tang, and M. B. Wakin, “The Global Optimization Geometry of Low-Rank Matrix Optimization,” *IEEE Transactions on Information Theory*, vol. 67, no. 2, pp. 1308-1331, February 2021.
22. S. Li, D. Gaydos, P. Nayeri, and M. B. Wakin, “Adaptive Interference Cancellation Using Atomic Norm Minimization and Denoising,” *IEEE Antennas and Wireless Propagation Letters*, vol. 19, no. 12, pp. 2349-2353, December 2020.
23. S. Li, Q. Li, Z. Zhu, G. Tang, and M. B. Wakin, “The Global Geometry of Centralized and Distributed Low-rank Matrix Recovery without Regularization,” *IEEE Signal Processing Letters*, vol. 27, pp. 1400-1404, July 15, 2020.
24. S. Li, M. B. Wakin, and G. Tang, “Atomic Norm Denoising for Complex Exponentials with Unknown Waveform Modulations,” *IEEE Transactions on Information Theory*, vol. 66, no. 6, pp. 3893-3913, June 2020.
25. Y. Xie, M. B. Wakin, and G. Tang, “Support Recovery for Sparse Signals With Unknown Non-Stationary Modulation,” *IEEE Transactions on Signal Processing*, vol. 68, February 24, 2020.
26. Y. Xie, M. B. Wakin, and G. Tang, “Simultaneous Sparse Recovery and Blind Demodulation,” *IEEE Transactions on Signal Processing*, vol. 67, no. 19, pp. 5184-5199, October 1, 2019.
27. Z. Zhu, D. Soudry, Y. C. Eldar, and M. B. Wakin, “The Global Optimization Geometry of Shallow Linear Neural Networks,” *Journal of Mathematical Imaging and Vision*, May 31, 2019.
28. A. Eftekhari, G. Ongie, L. Balzano, and M. B. Wakin, “Streaming Principal Component Analysis From Incomplete Data,” *Journal of Machine Learning Research*, vol. 20, no. 86, pp. 1-62, 2019.
29. S. Karnik, Z. Zhu, M. B. Wakin, J. Romberg, and M. A. Davenport, “The Fast Slepian Transform,” *Applied and Computational Harmonic Analysis*, vol. 46, no. 3, pp. 624-652, May 2019.
30. A. Eftekhari, M. B. Wakin, P. Li, and P. G. Constantine, “Randomized Learning of the Second-moment Matrix of a Smooth Function,” *Foundations of Data Science*, vol. 1, no. 3, pp. 329-387, 2019.
31. Z. Zhu, S. Karnik, M. B. Wakin, M. A. Davenport, and J. Romberg, “ROAST: Rapid Orthogonal Approximate Slepian Transform,” *IEEE Transactions on Signal Processing*, vol. 66, no. 22, pp. 5887-5901, November 15, 2018.
32. A. Eftekhari, M. B. Wakin, and R. A. Ward, “MC$^2$: A Two-Phase Algorithm for Leveraged Matrix Completion,” *Information and Inference: A Journal of the IMA*, vol. 7, no. 3, pp. 581-604, 19 September 2018.
33. Z. Zhu, Q. Li, G. Tang, and M. B. Wakin, “Global Optimality in Low-rank Matrix Optimization,” *IEEE Transactions on Signal Processing*, vol. 66, no. 13, pp. 3614-3628, July 2018.
34. A. Eftekhari, D. Yang, and M. B. Wakin, “Weighted Matrix Completion and Recovery with Prior Subspace Information,” *IEEE Transactions on Information Theory*, vol. 64, no. 6, pp. 4044-4071, June 2018.

35. S. Li, D. Yang, G. Tang, and M. B. Wakin, "Atomic Norm Minimization for Modal Analysis from Random and Compressed Samples," *IEEE Transactions on Signal Processing*, vol. 66, no. 7, pp. 1817-1831, April 1, 2018.

36. A. Eftekhari, H. L. Yap, M. B. Wakin, and C. J. Rozell, "Stabilizing Embedology: Geometry-Preserving Delay-Coordinate Maps," *Physical Review E*, vol. 97, no. 2, pp. 022222, February 2018.

37. Z. Zhu, S. Karnik, M. A. Davenport, J. Romberg, and M. B. Wakin, "The Eigenvalue Distribution of Discrete Periodic Time-Frequency Limiting Operators," *IEEE Signal Processing Letters*, vol. 25, no. 1, pp. 95–99, January 2018.

38. Z. Pang, M. Yuan, M. B. Wakin, "A random demodulation architecture for sub-sampling acoustic emission signals in structural health monitoring," *Journal of Sound and Vibration*, vol. 431, pp. 390-404, 2018.

39. Z. Zhu and M. B. Wakin, "Approximating Sampled Sinusoids and Multiband Signals Using Multiband Modulated DPSS Dictionaries," *Journal of Fourier Analysis and Applications*, vol. 23, no. 6, pp. 1263–1310, December 2017.

40. A. Eftekhari, L. Balzano, and M. B. Wakin, "What to Expect When You Are Expecting on the Grassmannian," *IEEE Signal Processing Letters*, vol. 24, no. 6, pp. 872–876, June 2017.

41. Z. Zhu and M. B. Wakin, "On the Asymptotic Equivalence of Circulant and Toeplitz Matrices," *IEEE Transactions on Information Theory*, vol. 63, no. 5, pp. 2975–2992, May 2017.

42. A. Eftekhari and M. B. Wakin, "What Happens to a Manifold Under a Bi-Lipschitz Map?," *Discrete & Computational Geometry*, vol. 57, no. 3, pp. 641–673, April 2017.

43. L. Wiencke, V. Rizi, M. Will, C. Allen, A. Botts, M. Calhoun, B. Carande, J. Claus, M. Coco, L. Emmert, S. Esquibel, A. F. Grillo, L. Hamilton, T. J. Heid, M. Iarlori, H.-O. Klages, M. Kleifges, B. Knoll, J. Koop, H.-J. Mathes, A. Menshikov, S. Morgan, L. Patterson, S. Petrera, S. Robinson, C. Runyan, J. Sherman, D. Starbuck, M. Wakin, and O. Wolf, "Joint elastic side-scattering LIDAR and Raman LIDAR measurements of aerosol optical properties in south east Colorado," *Journal of Instrumentation*, vol. 12, March 2017.

44. R. G. Baraniuk, T. Goldstein, A. C. Sankaranarayanan, C. Studer, A. Veeraraghavan, and M. B. Wakin, "CS-Video: Algorithms, Architectures, and Applications for Compressive Video Sensing," *IEEE Signal Processing Magazine*, vol. 34, no. 1, pp. 52–66, January 2017.

45. D. Yang, G. Tang, and M. B. Wakin, "Super-Resolution of Complex Exponentials from Modulations with Unknown Waveforms," *IEEE Transactions on Information Theory*, vol. 62, no. 10, pp. 5809–5830, October 2016.

46. M. Babakmehr, M. G. Simoes, M. B. Wakin, A. Al Durra, and F. Harirchi, "Smart-Grid Topology Identification Using Sparse Recovery," *IEEE Transactions on Industry Applications*, vol. 52, no. 5, pp. 4375–4384, September–October 2016.

47. M. Babakmehr, M. G. Simoes, M. B. Wakin, and F. Harirchi, "Compressive Sensing-Based Topology Identification for Smart Grids," *IEEE Transactions on Industrial Informatics*, vol. 12, no. 2, pp. 532–543, April 2016.

48. M. J. Rubin, M. B. Wakin, and T. Camp, "Lossy Compression for Wireless Seismic Data Acquisition," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS)*, vol. 9, no. 1, pp. 236–252, January 2016.

49. A. Eftekhari and M. B. Wakin, "New Analysis of Manifold Embeddings and Signal Recovery from Compressive Measurements," *Applied and Computational Harmonic Analysis*, vol. 39, no. 1, pp. 67–109, July 2015.

50. C. W. Lim and M. B. Wakin, "Compressive Temporal Higher Order Cyclostationary Statistics," *IEEE Transactions on Signal Processing*, vol. 63, no. 11, pp. 2942–2956, June 2015.

51. A. Eftekhari, H. L. Yap, C. J. Rozell, and M. B. Wakin, "The Restricted Isometry Property for Random Block Diagonal Matrices," *Applied and Computational Harmonic Analysis*, vol. 38, no. 1, pp. 1–31, January 2015.
52. B. M. Sanandaji, M. B. Wakin, and T. L. Vincent, "Observability with Random Observations," *IEEE Transactions on Automatic Control*, vol. 59, no. 11, pp. 3002–3007, October 2014.
53. J. Y. Park, M. B. Wakin, and A. C. Gilbert, "Modal Analysis with Compressive Measurements," *IEEE Transactions on Signal Processing*, vol. 62, no. 7, pp. 1655–1670, April 2014.
54. M. A. Davenport, D. Needell, and M. B. Wakin, "Signal Space CoSaMP for Sparse Recovery with Redundant Dictionaries," *IEEE Transactions on Information Theory*, vol. 59, no. 10, pp. 6820–6829, October 2013.
55. H. L. Yap, M. B. Wakin, and C. J. Rozell, "Stable Manifold Embeddings with Structured Random Matrices," *IEEE Journal of Selected Topics in Signal Processing*, vol. 7, no. 4, pp. 720–730, August 2013.
56. M. F. Duarte, M. B. Wakin, D. Baron, S. Sarvotham, and R. G. Baraniuk, "Measurement Bounds for Sparse Signal Ensembles via Graphical Models," *IEEE Transactions on Information Theory*, vol. 59, no. 7, pp. 4280–4289, July 2013.
57. A. Eftekhari, J. Romberg, and M. B. Wakin, "Matched Filtering from Limited Frequency Samples," *IEEE Transactions on Information Theory*, vol. 59, no. 6, pp. 3475–3496, June 2013.
58. J. Y. Park and M. B. Wakin, "A Multiscale Algorithm for Reconstructing Videos from Streaming Compressive Measurements," *Journal of Electronic Imaging*, vol. 22, no. 2, 2013.
59. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, "Concentration of Measure Inequalities for Toeplitz Matrices with Applications," *IEEE Transactions on Signal Processing*, vol. 61, no. 1, pp. 109–117, January 2013.
60. A. J. Weinstein and M. B. Wakin, "Recovering a Clipped Signal in Sparseland," *Sampling Theory in Signal and Image Processing*, vol. 12, no. 1, pp. 55–69, 2013.
61. M. A. Davenport and M. B. Wakin, "Compressive Sensing of Analog Signals Using Discrete Prolate Spheroidal Sequences," *Applied and Computational Harmonic Analysis*, vol. 33, no. 3, pp. 438–472, November 2012.
62. M. Wakin, S. Becker, E. Nakamura, M. Grant, E. Sovero, D. Ching, J. Yoo, J. Romberg, A. Emami-Neyestanak, and E. Candès, "A Non-Uniform Sampler for Wideband Spectrally-Sparse Environments," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 2, no. 3, pp. 516–529, September 2012.
63. J. Yoo, C. Turnes, E. Nakamura, C. Le, S. Becker, E. Sovero, M. Wakin, M. Grant, J. Romberg, A. Emami-Neyestanak, and E. Candès, "A Compressed Sensing Parameter Extraction Platform for Radar Pulse Signal Acquisition," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 2, no. 3, pp. 626–638, September 2012.
64. J. Y. Park and M. B. Wakin, "A Geometric Approach to Multi-view Compressive Imaging," *EURASIP Journal on Advances in Signal Processing*, vol. 2012, article 37, 2012.
65. J. Y. Park, H. L. Yap, C. J. Rozell, and M. B. Wakin, "Concentration of Measure for Block Diagonal Matrices with Applications to Compressive Signal Processing," *IEEE Transactions on Signal Processing*, vol. 59, no. 12, pp. 5859–5875, December 2011.
66. L. Carin, R. G. Baraniuk, V. Cevher, D. Dunson, M. I. Jordan, G. Sapiro, and M. B. Wakin, "Learning Low-Dimensional Signal Models: A Bayesian Approach Based on Incomplete Measurements," *IEEE Signal Processing Magazine*, vol. 28, no. 2, pp. 39–51, March 2011.
67. M. A. Davenport and M. B. Wakin, "Analysis of Orthogonal Matching Pursuit using the Restricted Isometry Property," *IEEE Transactions on Information Theory*, vol. 56, no. 9, pp. 4395–4401, September 2010.

68. R. G. Baraniuk, V. Cevher, and M. B. Wakin, "Low-Dimensional Models for Dimensionality Reduction and Signal Recovery: A Geometric Perspective," *Proceedings of the IEEE, Special Issue on Sparse Representation and Compressive Sensing*, vol. 98, no. 6, pp. 959–971, June 2010.
69. M. A. Davenport, P. T. Boufounos, M. B. Wakin, and R. G. Baraniuk, "Signal Processing with Compressive Measurements," *IEEE Journal of Selected Topics in Signal Processing, Special Issue on Compressive Sensing*, vol. 4, no. 2, pp. 445–460, April 2010. **(Selected in 2015 for IEEE Signal Processing Society Best Paper Award.)**
70. R. A. Frazin, M. Jacob, W. B. Manchester, H. Morgan, and M. B. Wakin, "Toward Reconstruction of Coronal Mass Ejection Density from Only Three Points of View," *Astrophysical Journal*, vol. 695, no. 1, pp. 636–641, April 2009.
71. R. G. Baraniuk and M. B. Wakin, "Random Projections of Smooth Manifolds," *Foundations of Computational Mathematics*, vol. 9, no. 1, pp. 51–77, February 2009.
72. V. Chandrasekaran, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Representation and Compression of Multi-Dimensional Piecewise Functions Using *Surflets*," *IEEE Transactions on Information Theory*, vol. 55, no. 1, pp. 374–400, January 2009.
73. R. Baraniuk, M. Davenport, R. DeVore, and M. Wakin, "A Simple Proof of the Restricted Isometry Property for Random Matrices," *Constructive Approximation*, vol. 28, no. 3, pp. 253–263, December 2008.
74. E. J. Candès, M. B. Wakin, and S. P. Boyd, "Enhancing Sparsity by Reweighted $L_1$ Minimization," *Journal of Fourier Analysis and Applications*, vol. 14, no. 5, pp. 877–905, December 2008.
75. E. J. Candès and M. B. Wakin, "An Introduction to Compressive Sampling," *IEEE Signal Processing Magazine*, vol. 25, no. 2, pp. 21–30, March 2008. **(Selected in 2020 for IEEE Signal Processing Magazine Best Paper Award.)**
76. M. B. Wakin, J. K. Romberg, H. Choi, and R. G. Baraniuk, "Wavelet-domain Approximation and Compression of Piecewise Smooth Images," *IEEE Transactions on Image Processing*, vol. 15, no. 5, pp. 1071–1087, May 2006.

## CONFERENCE PUBLICATIONS

1. Y. Park, P. Gerstoft, Y. Wu, and M. B. Wakin, "Atomic Norm Denoising for Multi-Frequency-Snapshot DOA Estimation," *IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM)*, 2024.
2. Y. Wu, M. B. Wakin, P. Gerstoft, and Y. Park, "Non-uniform frequency spacing for regularization-free gridless DOA," *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
3. Z. Qin, A. Lidiak, Z. Gong, G. Tang, M. B. Wakin, and Z. Zhu, "Error Analysis of Tensor-Train Cross Approximation," *Conference on Neural Information Processing Systems (NeurIPS)*, 2022.
4. I. Pawelec, M. Wakin, and P. Sava, "Multichannel compressive sensing for seismic data reconstruction using joint sparsity," *Second International Meeting for Applied Geoscience & Energy*, 2022.
5. Y. Wu, M. B. Wakin, and P. Gerstoft, "Gridless DOA Estimation Under the Multi-Frequency Model," *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, May 2022.
6. Y. Xie, M. B. Wakin, and G. Tang, "Data-driven Support Recovery for Sparse Signals with Nonstationary Modulation," *IEEE 2021 International Conference on Machine Learning and Applications (ICMLA)*, Pasadena, California (virtual), December 2021.
7. Y. Xie, M. B. Wakin, and G. Tang, "Data-driven Parameter Estimation Of Contaminated Damped Exponentials," *55th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California (virtual), October 2021.

8. A. Titova, M. B. Wakin, and A. Tura, "Two-stage sampling—A novel approach for compressive sensing seismic acquisition," *First International Meeting for Applied Geoscience & Energy Expanded Abstracts*, Denver, Colorado, September 2021, pp. 110-114.
9. A. Titova, M. B. Wakin, and A. Tura, "Empirical analysis of compressive sensing reconstruction using the curvelet transform: SEAM Barrett model," *First International Meeting for Applied Geoscience & Energy Expanded Abstracts*, Denver, Colorado, September 2021, pp. 115-119.
10. Y. Xie, M. B. Wakin, and G. Tang, "Contaminated Multiband Signal Identification Via Deep Learning," *IEEE Statistical Signal Processing Workshop (SSP)*, Rio de Janeiro, Brazil (virtual), July 2021.
11. S. Li, S. Becker, and M. B. Wakin, "Nuclear Norm Based Spectrum Estimation for Molecular Dynamic Simulations," in *54th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California (virtual), November 2020.
12. S. Li, D. Gaydos, P. Nayeri, and M. Wakin, "Adaptive Interference Cancellation Using Atomic Norm Minimization," in *2020 International Applied Computational Electromagnetics Society (ACES) Symposium*, Monterey, California, March 2020.
13. Z. Zhu, Q. Li, X. Yang, G. Tang, and M. B. Wakin, "Distributed Low-rank Matrix Factorization with Exact Consensus," in *Thirty-third Conference on Neural Information Processing Systems (NeurIPS)*, Vancouver, Canada, December 2019.
14. S. Li, G. Tang, and M. B. Wakin, "The Landscape of Non-convex Empirical Risk with Degenerate Population Risk," in *Thirty-third Conference on Neural Information Processing Systems (NeurIPS)*, Vancouver, Canada, December 2019.
15. S. Li, Q. Li, G. Tang, and M. B. Wakin, "Geometry Correspondence between Empirical and Population Games," in *Bridging Game Theory and Deep Learning Workshop at NeurIPS*, Vancouver, Canada, December 2019.
16. Q. Li, X. Yang, Z. Zhu, G. Tang, and M. Wakin, "The Geometric Effects of Distributing Constrained Nonconvex Optimization Problems," in *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Guadeloupe, December 2019.
17. J. Helland, M. Wakin, and G. Tang, "A Super-Resolution Algorithm for Extended Target Localization," in *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Guadeloupe, December 2019.
18. Q. Li, Z. Zhu, M. Wakin, and G. Tang, "The Geometry of Orthogonal Dictionary Learning using L1 Minimization," in *53nd Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, November 2019.
19. Y. Xie, M. Wakin, and G. Tang, "Support Recovery for Sparse Recovery and Non-stationary Blind Demodulation," in *53nd Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, November 2019.
20. A. Titova, M. B. Wakin, and A. Tura, "Mutual coherence in compressive sensing seismic acquisition," in *SEG Technical Program Expanded Abstracts*, San Antonio, Texas, September 2019.
21. I. Pawelec, P. Sava, and M. Wakin, "Wavefield reconstruction using wavelet transform," in *SEG Technical Program Expanded Abstracts*, San Antonio, Texas, September 2019.
22. Q. Li, Z. Zhu, G. Tang, and M. B. Wakin, "The Geometry of Equality-Constrained Global Consensus Problems," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, UK, May 2019.
23. S. Li, G. Tang, and M. B. Wakin, "Simultaneous Blind Deconvolution and Phase Retrieval with Tensor Iterative Hard Thresholding," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, UK, May 2019.

24. Y. Xie, M. B. Wakin, and G. Tang, "Sparse Recovery and Non-Stationary Blind Demodulation," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2019)*, Brighton, UK, May 2019.
25. F. Pourkamali-Anaraki, S. Becker, and M. B. Wakin, "Randomized Clustered Nystrom for Large-Scale Kernel Machines," *AAAI Conference on Artificial Intelligence (AAAI-18)*, New Orleans, Louisiana, February 2018.
26. Z. Zhu, M. Lopez-Santillana, and M. Wakin, "Super-Resolution of Complex Exponentials from Modulations with Known Waveforms," *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Curaçao, December 2017.
27. Z. Zhu, Q. Li, G. Tang, M. Wakin, "Global Optimality in Low-rank Matrix Optimization," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Montreal, Canada, November 2017.
28. Z. Zhu, D. Yang, M. B. Wakin, and G. Tang, "A Super-Resolution Algorithm for Multiband Signal Identification," *51st Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, October 2017.
29. A. Eftekhari, M. B. Wakin, P. Li, P. G. Constantine, and R. A. Ward, "Learning the Second-Moment Matrix of a Smooth Function From Point Samples," *51st Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, October 2017.
30. Y. Xie, S. Li, G. Tang, and M. B. Wakin, "Radar signal demixing via convex optimization," *International Conference on Digital Signal Processing (DSP)*, London, August 2017.
31. S. Li, D. Yang, and M. Wakin, "Atomic Norm Minimization for Modal Analysis With Random Spatial Compression," *IEEE 2017 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2017*, New Orleans, Louisiana, March 2017.
32. Z. Zhu, S. Karnik, M. Wakin, M. Davenport, and J. Romberg, "Fast Orthogonal Approximations of Sampled Sinusoids and Bandlimited Signals," *IEEE 2017 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2017*, New Orleans, Louisiana, March 2017.
33. Q. Li, S. Li, H. Mansour, M. Wakin, D. Yang, and Z. Zhu, "JAZZ: A Companion to MUSIC for Frequency Estimation With Missing Data," *IEEE 2017 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2017*, New Orleans, Louisiana, March 2017.
34. S. Karnik, Z. Zhu, M. B. Wakin, J. K. Romberg, and M. A. Davenport, "Fast Computations for Approximation and Compression in Slepian Spaces," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Greater Washington, D.C., December 2016.
35. L. Andrade De Almeida, M. Wakin, and P. Sava, "Data Denoising and Interpolation Using Synthesis and Analysis Sparse Regularization," *SEG Technical Program Expanded Abstracts*, Dallas, Texas, October 2016.
36. Z. Zhu and M. B. Wakin, "On the Dimensionality of Wall and Target Return Subspaces in Through-the-Wall Radar Imaging," *4th International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing (CoSeRa)*, Aachen, Germany, September 2016.
37. Z. Zhu, G. Tang, P. Setlur, S. Gogineni, M. Wakin, and M. Rangaswamy, "Super-Resolution in SAR Imaging: Analysis With the Atomic Norm," *IEEE Sensor Array and Multichannel Signal Processing (SAM) Workshop*, Rio de Janeiro, Brazil, July 2016.
38. S. Li, D. Yang, and M. B. Wakin, "Atomic Norm Minimization for Modal Analysis," *2016 IEEE International Conference on Multimedia & Expo Workshops (ICMEW)*, Seattle, Washington, July 2016.
39. D. Yang, G. Tang, and M. B. Wakin, "Non-Stationary Blind Super-Resolution," *IEEE 2016 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2016*, Shanghai, China, March 2016.

40. P. G. Constantine, A. Eftekhari, and M. B. Wakin, "Computing Active Subspaces Efficiently with Gradient Sketching," *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Cancun, Mexico, December 2015.
41. M. Babakmehr, M. G. Simoes, M. B. Wakin, A. Al Durra and F. Harirchi, "Smart grid topology identification using sparse recovery," *IEEE Industry Applications Society (IAS) Annual Meeting*, Addison, TX, October 2015.
42. Z. Zhu and M. B. Wakin, "Wall Clutter Mitigation and Target Detection Using Discrete Prolate Spheroidal Sequences," *3rd International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing (CoSeRa)*, Pisa, Italy, June 2015.
43. D. Yang and M. B. Wakin, "Modeling and Recovering Non-Transitive Pairwise Comparison Matrices," *11th International Conference on Sampling Theory and Applications (SampTA)*, Washington, DC, May 2015.
44. Z. Zhu and M. B. Wakin, "Detection of Stationary Targets Using Discrete Prolate Spheroidal Sequences," *International Review of Progress in Applied Computational Electromagnetics (ACES)*, Williamsburg, Virginia, March 2015.
45. 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.
46. C. W. Lim and M. B. Wakin "Recovery of Periodic Clustered Sparse Signals From Compressive Measurements," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Atlanta, Georgia, December 2014.
47. H. L. Yap, A. Eftekhari, M. B. Wakin, and C. J. Rozell, "A First Analysis of the Stability of Takens' Embedding," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Atlanta, Georgia, December 2014.
48. 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.
49. M. J. Rubin, M. B. Wakin, and T. Camp, "A Comparison of On-Mote Lossy Compression Algorithms for Wireless Seismic Data Acquisition," *IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS)*, Marina Del Rey, California, May 2014.
50. A. Eftekhari and M. B. Wakin "Greed is Super: A New Iterative Method for Super-Resolution," *IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Austin, Texas, December 2013.
51. M. Rubin, M. Wakin, and T. Camp, "Sensor Node Compressive Sampling in Wireless Seismic Sensor Networks," *1st IEEE/ACM Workshop on Signal Processing Advances in Sensor Networks (SPASN)*, Philadelphia, Pennsylvania, April 2013.
52. B. M. Sanandaji, T. L. Vincent, K. Poolla, and M. Wakin, "A Tutorial on Recovery Conditions for Compressive System Identification of Sparse Channels," *IEEE 2012 Conference on Decision and Control – CDC 2012*, Maui, Hawaii, December 2012.
53. M. Davenport, D. Needell, and M. Wakin, "CoSaMP with Redundant Dictionaries," *46th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, November 2012.
54. A. J. Weinstein and M. B. Wakin, "Online Search Orthogonal Matching Pursuit," *IEEE Statistical Signal Processing Workshop – SSP'12*, Ann Arbor, Michigan, August 2012.
55. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, "A Review of Sufficient Conditions for Structure Identification in Interconnected Systems," invited to *16th IFAC Symposium on System Identification – SYSID 2012*, Brussels, Belgium, July 2012.

56. V. Rizi, Pierre Auger Collaboration, A. Botts, C. Allen, M. Calhoun, B. Carande, M. Coco, J. Claus, L. Emmert, L. Hamilton, T.J. Heid, F. Honecker, M. Iarlori, S. Morgan, S. Robinson, D. Starbuck, J. Sherman, M. Wakin, and O. Wolf, "UV Raman Lidar and Side Scattering Detector for the Monitoring of Aerosol Optical Transmission at the Pierre Auger Observatory," *26th International Laser Radar Conference – ILRC 26*, Porto Heli, Greece, June 2012.
57. C. W. Lim and M. B. Wakin, "Automatic Modulation Recognition for Spectrum Sensing using Nonuniform Compressive Samples," *IEEE International Conference on Communications – ICC'12*, Ottawa, Canada, June 2012.
58. C. W. Lim and M. B. Wakin, "CHOCS: A Framework for Estimating Compressive, Higher-order Cyclostationary Statistics," *SPIE Defense, Security, and Sensing Symposium – DSS'12*, Baltimore, Maryland, April 2012.
59. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, "Compressive Topology Identification of Interconnected Dynamic Systems via Clustered Orthogonal Matching Pursuit," *IEEE 2011 Conference on Decision and Control and European Control Conference – CDC-ECC 2011*, Orlando, Florida, December 2011.
60. B. M. Sanandaji, T. L. Vincent, M. B. Wakin, R. Toth, and K. Poolla, "Compressive System Identification of LTI and LTV ARX Models," *IEEE 2011 Conference on Decision and Control and European Control Conference – CDC-ECC 2011*, Orlando, Florida, December 2011.
61. L. Wiencke, for the Pierre Auger Collaboration, A. Botts, C. Allan, M. Calhoun, B. Carande, M. Coco, J. Claus, L. Emmert, L. Hamilton, T. J. Heid, F. Honecker, M. Iarlori, S. Morgan, S. Robinson, D. Starbuck, J. Sherman, M. Wakin, and O. Wolf, "Atmospheric 'Super Test Beam' for the Pierre Auger Observatory," *32nd International Cosmic Ray Conference*, Beijing, August 2011.
62. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, "Exact Topology Identification of Large-Scale Interconnected Dynamical Systems from Compressive Observations," *2011 American Control Conference – ACC 2011*, San Francisco, CA, June 2011.
63. A. Eftekhari, J. Romberg, and M. B. Wakin, "A Probabilistic Analysis of the Compressive Matched Filter," *9th International Conference on Sampling Theory and Applications (SampTA 2011)*, *Special Session on High-Dimensional Geometry*, Singapore, May 2011.
64. H. L. Yap, M. B. Wakin, and C. J. Rozell, "Stable Manifold Embeddings with Operators Satisfying the Restricted Isometry Property," *45th Annual Conference on Information Sciences and Systems – CISS 2011*, Baltimore, Maryland, March 2011.
65. H. L. Yap, A. Eftekhari, M. B. Wakin, and C. J. Rozell, "The Restricted Isometry Property for Block Diagonal Matrices," *45th Annual Conference on Information Sciences and Systems – CISS 2011*, Baltimore, Maryland, March 2011.
66. M. B. Wakin, B. M. Sanandaji, and T. L. Vincent, "On the Observability of Linear Systems from Random, Compressive Measurements," *IEEE 2010 Conference on Decision and Control – CDC 2010*, Atlanta, Georgia, December 2010.
67. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, "Concentration of Measure Inequalities for Compressive Toeplitz Matrices with Applications to Detection and System Identification," *IEEE 2010 Conference on Decision and Control – CDC 2010*, Atlanta, Georgia, December 2010.
68. M. A. Davenport, S. R. Schnelle, J. P. Slavinsky, R. G. Baraniuk, M. B. Wakin, and P. T. Boufounos, "A Wideband Compressive Radio Receiver," *Military Communications Conference (MILCOM)*, San Jose, California, October 2010.
69. M. B. Wakin, J. Y. Park, H. L. Yap, and C. J. Rozell, "Concentration of Measure for Block Diagonal Measurement Matrices," *IEEE 2010 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2010*, Dallas, Texas, March 2010.

70. C. J. Rozell, H. L. Yap, J. Y. Park, and M. B. Wakin, "Concentration of Measure for Block Diagonal Matrices with Repeated Blocks," invited to special session on Compressed Sensing, Sparse Approximation, and Frame Theory, *44th Annual Conference on Information Sciences and Systems – CISS 2010*, Princeton, New Jersey, March 2010.

71. M. B. Wakin, "A Manifold Lifting Algorithm for Multi-View Compressive Imaging," in *Picture Coding Symposium – PCS 2009*, Chicago, Illinois, May 2009.

72. J. Y. Park and M. B. Wakin, "A Multiscale Framework for Compressive Sensing of Video," in *Picture Coding Symposium – PCS 2009*, Chicago, Illinois, May 2009.

73. M. F. Duarte, S. Sarvotham, D. Baron, M. B. Wakin, and R. G. Baraniuk, "Performance Limits for Jointly Sparse Signals via Graphical Models," invited to *Sensor, Signal and Information Processing Workshop – SenSIP*, Sedona, AZ, May 2008.

74. M. F. Duarte, M. B. Wakin, and R. G. Baraniuk, "Wavelet-domain Compressive Signal Reconstruction using a Hidden Markov Tree Model," *IEEE 2008 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2008*, Las Vegas, Nevada, March 2008.

75. C. Hegde, M. Wakin, and R. Baraniuk, "Random Projections for Manifold Learning," in *Neural Information Processing Systems – NIPS*, Vancouver, Canada, December 2007.

76. M. F. Duarte, M. A. Davenport, M. B. Wakin, J. N. Laska, D. Takhar, K. F. Kelly and R. G. Baraniuk, "Multiscale Random Projections for Compressive Classification," *IEEE 2007 International Conference on Image Processing – ICIP-2007*, San Antonio, Texas, September 2007.

77. E. Candès, N. Braun, and M. Wakin, "Sparse Signal and Image Recovery from Compressive Samples," invited to special session on Model-Based Imaging, *IEEE International Symposium on Biomedical Imaging*, Washington, D.C., April 2007.

78. M. Davenport, M. Duarte, M. B. Wakin, J. Laska, D. Takhar, K. Kelly, and R. Baraniuk, "The Smashed Filter for Compressive Classification and Target Recognition," invited to *Computational Imaging V at IS&T/SPIE Electronic Imaging*, San Jose, California, January 2007.

79. M. B. Wakin, J. N. Laska, M. F. Duarte, D. Baron, S. Sarvotham, D. Takhar, K. F. Kelly, and R. G. Baraniuk, "An Architecture for Compressive Imaging," invited to *IEEE 2006 International Conference on Image Processing – ICIP-2006*, Atlanta, Georgia, October 2006.

80. S. Kirolos, J. N. Laska, M. B. Wakin, M. F. Duarte, D. Baron, T. Ragheb, Y. Massoud, and R. G. Baraniuk, "Analog-to-Information Conversion via Random Demodulation," in *IEEE Dallas Circuits and Systems Workshop (DCAS)*, Dallas, Texas, October 2006.

81. M. B. Wakin and R. G. Baraniuk, "Random Projections of Signal Manifolds," invited to special session on Statistical Inference on Nonlinear Manifolds, *IEEE 2006 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2006*, Toulouse, France, May 2006.

82. J. A. Tropp, M. B. Wakin, M. F. Duarte, D. Baron, and R. G. Baraniuk, "Random Filters for Compressive Sampling and Reconstruction," in *IEEE 2006 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2006*, Toulouse, France, May 2006.

83. M. F. Duarte, M. A. Davenport, M. B. Wakin, and R. G. Baraniuk, "Sparse Signal Detection from Incoherent Projections," in *IEEE 2006 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2006*, Toulouse, France, May 2006.

84. M. F. Duarte, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Universal Distributed Sensing via Random Projections," in *International Conference on Information Processing in Sensor Networks – IPSN 2006*, Nashville, TN, April 2006.

85. M. B. Wakin, J. N. Laska, M. F. Duarte, D. Baron, S. Sarvotham, D. Takhar, K. F. Kelly, and R. G. Baraniuk, "Compressive Imaging for Video Representation and Coding", in *Picture Coding Symposium – PCS 2006*, Beijing, China, April 2006.

86. D. Takhar, J. N. Laska, M. B. Wakin, M. F. Duarte, D. Baron, S. Sarvotham, K. F. Kelly, and R. G. Baraniuk, "A New Compressive Imaging Camera Architecture using Optical-Domain Compression," invited to *Computational Imaging IV at IS&T/SPIE Electronic Imaging*, San Jose, California, January 2006.

87. M. B. Wakin, M. F. Duarte, S. Sarvotham, D. Baron, and R. G. Baraniuk, "Recovery of Jointly Sparse Signals from Few Random Projections," in *Neural Information Processing Systems – NIPS*, Vancouver, Canada, December 2005.

88. M. F. Duarte, S. Sarvotham, D. Baron, M. B. Wakin, and R. G. Baraniuk, "Distributed Compressed Sensing of Jointly Sparse Signals," invited to *39th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, November 2005.

89. M. F. Duarte, M. B. Wakin, and R. G. Baraniuk, "Fast Reconstruction of Piecewise Smooth Signals from Random Projections," in online proceedings of *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'05*, Rennes, France, November 2005.

90. M. F. Duarte, S. Sarvotham, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Joint Sparsity Models for Distributed Compressed Sensing," in online proceedings of *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'05*, Rennes, France, November 2005.

91. D. Baron, M. F. Duarte, S. Sarvotham, M. B. Wakin, and R. G. Baraniuk, "An Information-Theoretic Approach to Distributed Compressed Sensing," invited to *43rd Allerton Conference on Communication, Control, and Computing*, Monticello, Illinois, September 2005.

92. M. B. Wakin, D. L. Donoho, H. Choi, and R. G. Baraniuk, "The Multiscale Structure of Non-Differentiable Image Manifolds," invited to *Wavelets XI at SPIE Optics & Photonics*, San Diego, California, July 2005.

93. M. B. Wakin, D. L. Donoho, H. Choi, and R. G. Baraniuk, "High-Resolution Navigation on Non-Differentiable Image Manifolds," invited to special session on Higher-Dimensional Geometry in Signal Processing, *IEEE 2005 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2005*, Philadelphia, Pennsylvania, March 2005.

94. V. Chandrasekaran, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Surflets: A Sparse Representation for Multidimensional Functions Containing Smooth Discontinuities," in *IEEE 2004 International Symposium on Information Theory – ISIT 2004*, Chicago, Illinois, June 2004.

95. F. C. A. Fernandes, M. B. Wakin, and R. G. Baraniuk, "Non-Redundant, Linear-Phase, Semi-Orthogonal, Directional Complex Wavelets," in *IEEE 2004 International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2004*, Montreal, Quebec, Canada, May 2004.

96. V. Chandrasekaran, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Compression of Higher Dimensional Functions Containing Smooth Discontinuities," in *38th Annual Conference on Information Sciences and Systems – CISS 2004*, Princeton, New Jersey, March 2004.

97. M. B. Wakin, M. T. Orchard, R. G. Baraniuk, and V. Chandrasekaran, "Phase and Magnitude Perceptual Sensitivities in Nonredundant Complex Wavelet Representations," invited to *37th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, November 2003.

98. J. K. Romberg, M. B. Wakin, and R. G. Baraniuk, "Approximation and Compression of Piecewise Smooth Images Using a Wavelet/Wedgelet Geometric Model," invited to *IEEE 2003 International Conference on Image Processing – ICIP-2003*, Barcelona, Spain, September 2003.

99. M. B. Wakin, J. K. Romberg, H. Choi, and R. G. Baraniuk, "Geometric Methods for Wavelet-Based Image Compression," in *Wavelets X at SPIE International Symposium on Optical Science and Technology*, San Diego, California, August 2003.

100. J. K. Romberg, M. B. Wakin, H. Choi, and R. G. Baraniuk, "A Geometric Hidden Markov Tree Wavelet Model," invited to *Wavelets X at SPIE International Symposium on Optical Science and Technology*, San Diego, California, August 2003.

101. J. K. Romberg, M. B. Wakin, and R. G. Baraniuk, “Multiscale Geometric Image Processing,” invited to *SPIE Visual Communications and Image Processing*, Lugano, Switzerland, July 2003.
102. M. B. Wakin, J. K. Romberg, H. Choi, and R. G. Baraniuk, “Geometric Tools for Image Compression,” in *36th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, November 2002.
103. R. M. Castro, M. B. Wakin, and M. T. Orchard, “On the Problem of Simultaneous Encoding of Magnitude and Location Information,” in *36th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California, November 2002.
104. M. B. Wakin, J. K. Romberg, H. Choi, and R. G. Baraniuk, “Rate-Distortion Optimized Image Compression Using Wedgelets,” in *IEEE 2002 International Conference on Image Processing – ICIP-2002*, Rochester, New York, September 2002.
105. J. K. Romberg, M. B. Wakin, and R. G. Baraniuk, “Multiscale Wedgelet Image Analysis: Fast Decompositions and Modeling,” in *IEEE 2002 International Conference on Image Processing – ICIP-2002*, Rochester, New York, September 2002.
106. M. B. Wakin, J. K. Romberg, H. Choi, and R. G. Baraniuk, “Image Compression Using an Efficient Edge Cartoon + Texture Model,” in *IEEE Data Compression Conference – DCC*, Snowbird, Utah, April 2002.

### BOOK REVIEWS

1. M. B. Wakin, Review of *Sparse Image and Signal Processing: Wavelets, Curvelets, Morphological Diversity* by Jean-Luc Starck, Fionn Murtagh, and Jalal Fadili, *IEEE Signal Processing Magazine*, vol. 28, no. 5, pp. 144–146, September 2011.

### TECHNICAL REPORTS

1. F. Pourkamali-Anaraki and M. B. Wakin, “The Effectiveness of Variational Autoencoders for Active Learning,” arXiv preprint arXiv:1911.07716, 2019.
2. A. Eftekhari, L. Balzano, D. Yang, and M. B. Wakin, “SNIPE for Memory-Limited PCA From Incomplete Data,” Arxiv preprint arXiv:1612.00904v1, 2016.
3. C. W. Lim and M. B. Wakin, “Reconstruction of Frequency Hopping Signals From Multi-Coset Samples,” Arxiv preprint arXiv:1603.06886, 2016.
4. A. Eftekhari and M. B. Wakin, “Greed is Super: A Fast Algorithm for Super-Resolution,” Arxiv preprint arXiv:1511.03385, 2015.
5. C. W. Lim and M. B. Wakin, “Technical Report: Compressive Temporal Higher Order Cyclostationary Statistics,” Arxiv preprint arXiv:1410.7967, 2014.
6. A. C. Gilbert, J. Y. Park, and M. B. Wakin, “Sketched SVD: Recovering Spectral Features from Compressive Measurements,” Arxiv preprint arXiv:1211.0361, 2012.
7. B. M. Sanandaji, M. B. Wakin, and T. L. Vincent, “Technical Report: Observability with Random Observations,” Arxiv preprint arXiv:1211.4077, 2012.
8. B. M. Sanandaji, T. L. Vincent, and M. B. Wakin, “Concentration of Measure Inequalities for Toeplitz Matrices with Applications,” Arxiv preprint arXiv:1112.1968, 2012.
9. M. B. Wakin, “A Study of the Temporal Bandwidth of Video and its Implications in Compressive Sensing,” Colorado School of Mines Technical Report 2012-08-15, August 2012.
10. M. B. Wakin, “Manifold-Based Signal Recovery and Parameter Estimation from Compressive Measurements,” Arxiv preprint arXiv:1002.1247, September 2008.

11. M. F. Duarte, S. Sarvotham, M. B. Wakin, D. Baron, and R. G. Baraniuk, "Theoretical Performance Limits for Jointly Sparse Signals via Graphical Models," Technical Report TREE-0802, Electrical and Computer Engineering Department, Rice University, July 2008.
12. C. Hegde, M. Wakin, and R. Baraniuk, "Random Projections for Manifold Learning: Proofs and Analysis," Technical Report TREE0710, Electrical and Computer Engineering Department, Rice University, October 2007.
13. D. Baron, M. B. Wakin, M. F. Duarte, S. Sarvotham, and R. G. Baraniuk, "Distributed Compressed Sensing," Technical Report ECE06-12, Electrical and Computer Engineering Department, Rice University, November 2006. Updated version: "Distributed Compressive Sensing," Arxiv preprint arXiv:0901.3403, 2009.
14. M. Davenport, M. B. Wakin, and R. G. Baraniuk, "Detection and Estimation with Compressive Measurements," Technical Report ECE06-10, Electrical and Computer Engineering Department, Rice University, November 2006.
15. S. Sarvotham, M. B. Wakin, D. Baron, M. F. Duarte, and R. G. Baraniuk, "Analysis of the DCS One-Stage Greedy Algorithm for Common Sparse Supports," Technical Report ECE05-03, Electrical and Computer Engineering Department, Rice University, October 2005.
16. V. Chandrasekaran, M. Wakin, D. Baron, and R. G. Baraniuk, "Compressing Piecewise Smooth Multidimensional Functions Using Surflets: Rate-Distortion Analysis," Technical Report, Electrical and Computer Engineering Department, Rice University, March 2004.
17. M. B. Wakin and C. J. Rozell, "A Markov Chain Analysis of Blackjack Strategy," 2004.

**EDUCATIONAL MATERIALS and PRESENTATIONS**

1. A. Drgac, M. Wakin, and D. Yang, "Algorithms and Everyday Life," K-12 Outreach Lesson, *TeachEngineering Digital Library*, 2020.
2. A. Drgac, M. Wakin, and D. Yang, "Acting Like an Algorithm," K-12 Outreach Activity, *TeachEngineering Digital Library*, 2020.
3. M. B. Wakin, D. Yang, and K. R. Feaster, "Filtering: Extracting What We Want from What We Have," K-12 Outreach Lesson, *TeachEngineering Digital Library*, 2015.
4. C. McKay, C. Light, A. Adekola, M. B. Wakin, D. Yang, and K. R. Feaster, "Filtering: Removing Noise from a Distress Signal," K-12 Outreach Activity, *TeachEngineering Digital Library*, 2015.
5. M. B. Wakin, "Concise Signal Models," Connexions modules endorsed by the IEEE Signal Processing Society (see `http://cnx.org/content/col10635/latest/`).

Lessons and activities related to Electrical Engineering, digital cameras and image compression, signal filtering, sampling and aliasing, movie recommendation systems, Google PageRank, digital logic, and signal and video enhancement were presented by myself and/or my students at the Mines Tech Camp/Discover STEM summer outreach program for middle school students (2012–2016), the Discovering Technology program for local 5th/6th grade girls (2015), the Creating Technology program for high school girls (2015), the Trefny Summer Workshop at Mines for local teachers (2015), the Rocky Mountain Camp (RMC) summer camp for dyslexic kids (2018), the Society of Women Engineers' Girls Lead the Way event (2019), the Vertical Skills Academy (2019), and Mitchell Elementary (2020–2021). Students have also served as lab leaders and assistants in the STEM Scouts program in local schools (2019–2020).

**STEM KITS**

In coordination with Scouting Colorado, and with the help of Mines students and the financial support of the NSF, we have completed the design, instructions, and packaging of over 300 STEM Kits for free distribution to local schools and youth organizations, broadening participation in STEM. The STEM Kits focus on three themes: Sensing Circuits; Machines Lend a Hand; and Earth, Energy, & Environment. These STEM Kits have been presented at the Rocky Mountain MESA outreach program with local teachers and Mines graduate students (2023), at the SWE Girls Exploring Science, Technology, Engineering, and Math event (GESTEM 2025), at summer camps organized by Scouting Colorado (2025), and at the Rocky Mountain Camp (RMC) summer camp for dyslexic kids (2023, 2025).

For more information, please visit: `https://sites.google.com/view/costemkits`

## INVITED PRESENTATIONS

1. "Infrastructure Perception and Control (IPC): Creating a Real-Time Digital Twin of Traffic to Create Safe, Efficient, and Reliable Intersections," Mines/NREL Nexus Seed Funding Wrapup Presentation, May 2024. (Joint presentation with Rimple Sandhu from NREL.)
2. "All Aboard the Tensor Train," Bellairs Workshop on Machine Learning and Statistical Signal Processing for Data on Graphs, Barbados, January 2024.
3. "When Randomness Helps in Undersampling," Spatial Stats/Kernel Klub meeting, Colorado School of Mines, February 2023.
4. "Stable embeddings of manifold models: Dimensionality reduction for signals and systems," Computational Microscopy Seminar Series, UCLA Institute for Pure & Applied Mathematics (IPAM), September 2022.
5. "Modal Analysis from Random and Compressed Samples," NDT4Industry webinar-series hosted by RECENDT, the Research Center for Non-Destructive Testing, Austria, July 2022.
6. "Nonconvex and Distributed Machine Learning," Center for Wave Phenomena (CWP), Colorado School of Mines, October 2021.
7. "Spectral Properties of Time-limited Toeplitz Operators and Applications in Signal Processing," One World Mathematics of INformation, Data, and Signals (1W-MINDS) Seminar (virtual), April 2021.
8. "Stable embeddings of manifold models: Dimensionality reduction for signals and systems," *NSF Research Training Group (RTG) on Data-oriented Mathematical and Statistical Sciences*, Arizona State University (virtual), February 2021.
9. "Sparsity, Optimization, and Compressive Sensing for Electromagnetic Spectrum Applications," hosted by *IEEE Aerospace and Electronic Systems Society (AESS) Denver Chapter and the Association of Old Crows (AOC)*, Colorado School of Mines, November 2019.
10. "Compressive Sensing Overview," *Reservoir Characterization Project (RCP) Sponsor Meeting*, Colorado School of Mines, November 2018.
11. "Modal Analysis from Random and Compressed Samples," *Applied Mathematics & Statistics Departmental Colloquium*, Colorado School of Mines, August 2018.
12. "Modal Analysis from Random and Compressed Samples," *Biomedical Imaging Center*, Pontificia Universidad Católica de Chile, Santiago, Chile, July 2017.
13. "Modal Analysis from Random and Compressed Samples," *Department of Electrical Engineering*, University of Chile, Santiago, Chile, July 2017.
14. "Phase Transitions in the Spectra of Toeplitz Matrices in Signal Processing," *University of Oxford*, United Kingdom, July 2017.
15. "Modal Analysis from Random and Compressed Samples," *Alan Turing Institute*, London, United Kingdom, July 2017.
16. "Stabilizing Embedology: When Do Delay-Coordinate Maps Preserve Geometry?" *SIAM Conference on Applications of Dynamical Systems*, Snowbird, Utah, May 2017.

17. “Subspace Modeling Off-the-Grid,” *Electrical Engineering Colloquium*, Colorado School of Mines, November 2016.

18. “Subspace Approximations on the Continuum,” *IEEE Image Video and Multidimensional Signal Processing (IVMSP) Workshop*, Bordeaux, France, July 2016.

19. “Through-the-Wall Radar Imaging Using Discrete Prolate Spheroidal Sequences,” *SIAM Conference on Imaging Science*, Albuquerque, New Mexico, May 2016.

20. “Compressive Sensing,” tutorial at *Center for Wave Phenomena (CWP) Annual Meeting*, Colorado Springs, Colorado, May 2016.

21. “Slepian Sequences and Subspace Models for Signal Processing,” *Applied Mathematics Department Colloquium*, University of Colorado at Boulder, February 2016.

22. “An Overview of Compressive Sensing,” *Center for Wave Phenomena (CWP) Seminar*, Colorado School of Mines, October 2015.

23. “Stable embeddings of manifold models: Dimensionality reduction for signals and systems,” *Distinguished Speaker Series in Data Science*, Washington State University, September 2015.

24. “New Analysis of Multiband Modulated DPSS Dictionaries,” *AMS Central Spring Sectional Meeting*, *Special Session on Approximation Theory in Signal Processing and Computer Science*, Michigan State University, March 2015.

25. “The Sketched SVD and Applications in Structural Health Monitoring,” *Mathematics of Information and Applications Seminar*, University of British Columbia, November 2014.

26. “Applications of Discrete Prolate Spheroidal Wave Functions in Sparse Recovery Problems,” *DNOISE Seminar*, Seismic Laboratory for Imaging and Modeling, University of British Columbia, November 2014.

27. “The Sketched SVD and Applications in Structural Health Monitoring,” *Center for Signal and Information Processing (CSIP) Seminar*, Georgia Institute of Technology, September 2014.

28. “Modal Analysis with Compressive Measurements,” *SIAM Annual Meeting*, *Minisymposium on Mathematics of Information and Low Dimensional Models*, Chicago, Illinois, July 2014.

29. “Applications of Discrete Prolate Spheroidal Wave Functions in Sparse Recovery Problems,” *AMS Spring Central Sectional Meeting*, *Special Session on Approximation Theory in Signal Processing*, Texas Tech University, April 2014.

30. “Applications of Discrete Prolate Spheroidal Wave Functions in Sparse Recovery Problems,” *AMS Western Spring Sectional Meeting*, *Special Session on Harmonic Analysis and Its Applications*, University of New Mexico, April 2014.

31. “The Sketched SVD and Applications in Structural Health Monitoring,” *Systems Information Learning Optimization (SILO) Seminar*, Wisconsin Institute for Discovery at the University of Wisconsin-Madison, April 2014.

32. “The Sketched SVD and Applications in Structural Health Monitoring,” *Machine Learning Seminar*, Information Initiative at Duke University, December 2013.

33. “The Sketched SVD and Applications in Structural Health Monitoring,” *Network Science Seminar*, Arizona State University, October 2013.

34. “An Introduction to Compressive Sensing and its Applications,” *SmartGeo Seminar*, Colorado School of Mines, April 2013.

35. “Parameter Estimation and Compressive Sensing of Analog Signals,” *Electrical and Computer Engineering Graduate Seminar*, University of Denver, January 2013.

36. “Parameter Estimation and Compressive Sensing of Analog Signals,” *JASON Defense Advisory Panel on Compressive Sensing for DoD Sensor Systems*, La Jolla, California, June 2012.

37. "An Introduction to Compressive Sensing and its Applications," *IEEE Signal Processing Society – Denver Section Meeting*, Boulder, Colorado, June 2012.
38. "Managing Model Complexity in High Frame Rate Compressive Video Sensing," *SIAM Conference on Imaging Science*, Philadelphia, Pennsylvania, May 2012.
39. "A Probabilistic Analysis of the Compressive Matched Filter," *Applied Mathematics & Statistics Departmental Colloquium*, Colorado School of Mines, January 2012.
40. "An Efficient Dictionary for Reconstruction of Sampled Multiband Signals," *Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, Duke University, July 2011.
41. "Compressive Inference of Signals and Systems from Measurements with Spatial and/or Temporal Diversity," *International Symposium in Approximation Theory*, Vanderbilt University, May 2011.
42. "Efficient Parameter Estimation from Random Measurements and the Compressive Matched Filter," DSO National Laboratories, Singapore, May 2011.
43. "Matched Filtering from Limited Frequency Samples," *AMS Spring Southeastern Section Meeting*, *Special Session on Sparse Data Representations and Applications*, Georgia Southern University, March 2011.
44. "Matched Filtering from Limited Frequency Samples," *Information Theory and Applications Workshop*, San Diego, California, February 2011.
45. "Efficient Parameter Estimation from Random Measurements and the Compressive Matched Filter," *Electrical & Computer Engineering Seminar*, Colorado State University, February 2011.
46. "An Introduction to Compressive Sensing and its Applications," *Physics Departmental Colloquium*, Colorado School of Mines, October 2010.
47. "The Multiscale Structure of Non-Differentiable Image Manifolds," *Computational Optical Sensing and Imaging (COSI) Seminar*, University of Colorado at Boulder, August 2010.
48. "A Multiscale Framework for Compressive Sensing of Video," *SIAM Conference on Imaging Science*, *Minisymposium on Applications of Compressive Imaging*, Chicago, Illinois, April 2010.
49. "Geometric Methods for Compressive Multi-Signal Processing," highlight talk at *DARPA Young Faculty Award 2007 Review and 2009 Kickoff Meeting*, Arlington, Virginia, October 2009.
50. "Sparse and Geometric Models for Signal Understanding from Compressive Measurements," *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting*, *Special Session on Compressed Sensing Theory and Applications*, San Diego, California, October 2009.
51. "Manifold-based Signal Understanding from Compressive Measurements," *Electrical and Computer Engineering Department Seminar*, Duke University, June 2009.
52. "Concise Models for Multi-Signal Compressive Sensing," *8th International Conference on Sampling Theory and Applications (SampTA 2009)*, *Special Session on Mathematical Aspects of Compressed Sensing*, Marseille, France, May 2009.
53. "Compressive Signal Processing using Manifold Models," *Department of Mathematics Computational Analysis Seminar*, Vanderbilt University, December 2008.
54. "A Geometric Introduction to Compressive Sensing," *Mathematical and Computer Sciences Departmental Colloquium*, Colorado School of Mines, September 2008.
55. "Manifold-based Image Understanding from Compressive Measurements," *SIAM Conference on Imaging Science*, *Minisymposium on Applications of Compressive Imaging*, San Diego, California, July 2008.
56. "Manifold Models for Compressive Imaging," *Foundations of Computational Mathematics Conference*, *Workshop on Image and Signal Processing*, Hong Kong, June 2008.

57. "Sparse Representations, Manifold Models, and Geometry in Compressive Sensing," *MIT/AFOSR Workshop on Geometric Approaches in Communications and Signal Processing*, Cambridge, Massachusetts, May 2008.
58. "The Geometry of Compressive Sampling," *MIT Stochastic Systems Group*, May 2008.
59. "Geometric Models for Dimensionality Reduction in Signal and Data Processing," *Electrical and Computer Engineering Department Seminar*, University of Colorado at Boulder, April 2008.
60. "Geometric Models for Dimensionality Reduction in Signal and Data Processing," Division of Engineering, Colorado School of Mines, March 2008.
61. "Compressive Sensing," short course at *Information Theory and Applications Workshop*, San Diego, California, February 2008.
62. "Manifold Models for Compressive Imaging," *Computational Imaging VI at IS&T/SPIE Electronic Imaging*, San Jose, California, January 2008.
63. "The Geometry of Compressed Sensing," *Applied Mathematics Department Colloquium*, University of Colorado at Boulder, November 2007.
64. "Dimensionality Reduction of Manifold-Modeled Data via Random Projections," *AMS Fall Western Section Meeting*, *Special Session on Computational Methods in Harmonic Analysis and Signal Processing*, Albuquerque, New Mexico, October 2007.
65. "Compressed Sensing: A Tutorial," *IEEE Statistical Signal Processing Workshop*, Madison, Wisconsin, August 2007.
66. "Sparse Representations and Low-Dimensional Geometry in Image Recovery," *Conference on Applied Inverse Problems*, Vancouver, Canada, June 2007.
67. "Geometric Models for Dimensionality Reduction in Signal and Data Processing," Department of Electrical Engineering and Computer Science, University of Michigan, March 2007.
68. "Geometric Models for Dimensionality Reduction in Signal and Data Processing," *Center for the Mathematics of Information (CMI) Seminar*, Caltech, January 2007.
69. "Compressive Sensing, Sparsity, and Manifolds," ExxonMobil Upstream Research Company, July 2006.
70. "Manifold-based Models for Image Processing," *Los Alamos National Laboratory Speaker Series in Data Driven Modeling & Analysis*, June 2006.
71. "The Multiscale Structure of Non-Differentiable Image Manifolds," *Texas Instruments DSP Leadership Meeting*, Dallas, Texas, October 2005.
72. "Multiscale Geometric Analysis for Image Compression," *Rice University ECE Affiliates Meeting*, September 2005.
73. "Wedgelets: A Multiscale Geometric Representation for Images," *UCLA IPAM Tutorials on Multiscale Geometry and Analysis in High Dimensions*, Los Angeles, California, September 2004.
74. "Approximation and Compression of Piecewise Smooth Multidimensional Functions," *2nd International Conference on Computational Harmonic Analysis*, Vanderbilt University, Nashville, Tennessee, May 2004.
75. "Approximation and Compression of Piecewise Smooth Images using Wedgeprints," *6th International Joint Meeting of the AMS and the Sociedad Matemática Mexicana*, Houston, Texas, May 2004.

## POSTERS and CONTRIBUTED PRESENTATIONS

1. Z. Qin, Z. Zhu, C. Jameson, A. Goldar, Z. Gong, and M. B. Wakin, "Sample-optimal quantum state tomography for structured quantum states in one dimension," *Quantum Information Processing Conference (QIP)*, Raleigh, North Carolina, February 2025.

2. P. Sengduean, R. Snieder, and M. B. Wakin, "Weighted compressive sensing applied to seismic interferometry," *American Geophysical Union (AGU) Fall Meeting*, New Orleans, Louisiana, December 2021.
3. M. Wakin, Q. Li, G. Tang, Z. Zhu, W. Bajwa, and S. Wright, "Fast Communication-efficient Algorithms for Distributed and Multi-modal Dictionary Learning," *Workshop on Naval Applications of Machine Learning (NAML)*, virtual, March 2021.
4. S. Li, D. Gaydos, P. Nayeri, and M. Wakin, "Robust Multibeam Interference Cancellation Using Atomic Norm Minimization," in *54th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, California (virtual), November 2020.
5. "Learning a second-moment matrix without gradients," presentation at *SIAM Workshop on Parameter Space Dimension Reduction (DR17)*, Pittsburgh, Pennsylvania, July 2017.
6. "Atomic Norm Minimization for Modal Analysis from Compressive Measurements," poster presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'17*, Lisbon, Portugal, June 2017.
7. "SNIPE for Memory-Limited PCA From Incomplete Data: From Failure to Success," poster presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'17*, Lisbon, Portugal, June 2017.
8. "The Nonconvex Geometry of Low-Rank Matrix Optimizations," presentation delivered on behalf of G. Tang at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'17*, Lisbon, Portugal, June 2017.
9. "Compressive Sensing," presentation at *IEEE Student Meeting*, Colorado School of Mines, March 2017.
10. "A Low-Rank Model for Recovering Non-Transitive Pairwise Comparison Matrices," presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'15*, Cambridge, England, July 2015.
11. "New Analysis of Multiband Modulated DPSS Dictionaries," poster presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'15*, Cambridge, England, July 2015.
12. "Sketched SVD: Recovering Spectral Features from Compressive Measurements," presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'13*, Lausanne, Switzerland, July 2013. **(Jae Young Park received Best Student Paper award.)**
13. "Signal Space CoSaMP for Sparse Recovery with Redundant Dictionaries," poster presented at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'13*, Lausanne, Switzerland, July 2013.
14. "Concentration Inequalities and Isometry Properties for Compressive Block Diagonal Matrices," presentation at *Workshop on Signal Processing with Adaptive Sparse Structured Representations – SPARS'11*, Edinburgh, Scotland, June 2011.
15. "Statistical Guarantees for Manifold-Based Signal Recovery from Compressive Measurements," presentation at *AAAI Fall Symposium on Manifold Learning and its Applications*, Arlington, VA, November 2010.
16. "The Multiscale Structure of Non-Differentiable Image Manifolds," presentation at Sensing, Communications, and Control Seminar, *Colorado School of Mines*, October 2010.
17. "Dimensionality Reduction of Manifold-Modeled Data via Random Projections," presentation at *AMS von Neumann Symposium on Sparse Representation and High-Dimensional Geometry*, Snowbird, Utah, July 2007.
18. "Scalable Inference and Recovery from Compressive Measurements," poster presented at *NIPS Workshop on Novel Applications of Dimensionality Reduction*, Whistler, Canada, December 2006.

## PATENTS and PATENT APPLICATIONS

1. R. G. Baraniuk, M. F. Duarte, M. A. Davenport, and M. B. Wakin, "Method and Apparatus for Signal Detection, Classification and Estimation from Compressive Measurements," U.S. Patent 8,483,492 B2, issued July 9, 2013.
2. R. G. Baraniuk, D. Z. Baron, M. F. Duarte, K. F. Kelly, C. C. Lane, J. N. Laska, D. Takhar, and M. B. Wakin, "Method and Apparatus for Compressive Imaging Device," U.S. Patent 8,199,244, issued June 12, 2012 and U.S. Patent 8,848,091 B2, issued September 30, 2014.
3. R. G. Baraniuk, D. Z. Baron, M. F. Duarte, S. Sarvotham, M. B. Wakin, and M. A. Davenport, "Method and Apparatus for Distributed Compressed Sensing," U.S. Patent 7,271,747, issued September 18, 2007, and U.S. Patent 7,511,643 B2, issued March 31, 2009.
4. R. G. Baraniuk, D. Z. Baron, M. F. Duarte, M. Elnozahi, M. B. Wakin, M. A. Davenport, J. N. Laska, J. A. Tropp, Y. Massoud, S. Kirolos, and T. Ragheb, "Method and Apparatus for On-Line Compressed Sensing," U.S. Patent 8,687,689, issued April 1, 2014.

## OPINION PIECES and EDITORIALS

1. C.-B. Schönlieb, H. Zhao, G. Steidl, and M. B. Wakin, "Principles and Trends in Mathematical Imaging," *SIAM News*, March 01, 2021.
2. M. Davenport, J. Laska, C. Rozell, and M. Wakin, "The Way I See It: The Lessons of Rejection Shouldn't be Overlooked," Rice University News, July 15, 2009.

## INTERVIEWS

1. Colorado School of Mines Blastercast Podcast, July 2014.
2. Featured Engineer on EEWeb.com, June 2011.
3. "Emmanuel Candès & Michael Wakin Discuss the New Discovery of Compressive Sampling," Emerging Research Fronts Commentary, Thomson Reuters ScienceWatch.com, June 2011.

## PROFESSIONAL ACTIVITIES

| | |
|---|---|
| Fellow: | IEEE |
| Member: | Phi Beta Kappa, Tau Beta Pi, Eta Kappa Nu, SIAM |
| Senior Area Editor: | *IEEE Transactions on Signal Processing*, 2022–2024 |
| Associate Editor: | *IEEE Transactions on Signal Processing*, 2018–2022<br>*IEEE Signal Processing Letters*, 2013–2015 |
| Lead Guest Editor: | *IEEE Journal of Selected Topics in Signal Processing*, Special Issue on Structured Matrices in Signal and Data Processing, June 2016 |
| Guest Editor: | *IEEE Journal on Selected Areas in Information Theory (JSAIT)*, Special Issue on Sensing: Fundamental Limits and Modern Applications, 2023 |
| Reviewer (journals): | *Applied and Computational Harmonic Analysis*<br>*Additive Manufacturing*<br>*Discrete & Computational Geometry*<br>*EURASIP Journal on Applied Signal Processing*<br>*Geophysics*<br>*IEEE Communications Letters*<br>*IEEE Journal on Selected Areas in Information Theory (JSAIT)*<br>*IEEE Journal of Selected Topics in Signal Processing* |

*IEEE Signal Processing Letters*
*IEEE Transactions on Aerospace and Electronic Systems*
*IEEE Transactions on Computational Imaging*
*IEEE Transactions on Geoscience and Remote Sensing*
*IEEE Transactions on Image Processing*
*IEEE Transactions on Information Theory*
*IEEE Transactions on Signal Processing*
*Image and Vision Computing Journal*
*Information and Inference: a Journal of the IMA*
*International Journal of Electrical Power & Energy Systems*
*Journal of Fourier Analysis and Applications*
*Journal of Machine Learning Research*
*Mathematical Reports of the Academy of Science, Royal Society of Canada*
*Mechanical Systems and Signal Processing*
*Physica A*
*Proceedings of the IEEE*
*Proceedings of the National Academy of Sciences (PNAS)*
*Pure and Applied Analysis*
*Pure and Applied Functional Analysis*
*Sampling Theory, Signal Processing, and Data Analysis*
*Sensors*
*SIAM Journal on Imaging Sciences*
*SIAM Journal on Multiscale Modeling and Simulation*
*SIAM Journal on Numerical Analysis*
*SIAM Journal on Optimization*
*Signal, Image and Video Processing*
*Signal Processing*
*WIREs Computational Statistics*

Reviewer (conferences):
*AAAI Conference on Artificial Intelligence (AAAI)*
*European Signal Processing Conference (EUSIPCO)*
*IEEE AP-S Symposium on Antennas and Propagation and CNC/USNC-URSI Joint Meeting*
*IEEE Information Theory Workshop (ITW)*
*IEEE International Symposium on Circuits and Systems*
*IEEE International Symposium on Information Theory (ISIT)*
*IEEE Global Conference on Signal and Information Processing (GlobalSIP)*
*IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*
*International Applied Computational Electromagnetics Society (ACES) Symposium*
*International Conference on Sampling Theory and Applications (SampTA)*
*Military Communications Conference (MILCOM)*
*Neural Information Processing Systems (NeurIPS)*—Top 10% reviewer, 2020
*Signal Processing with Adaptive Sparse Structured Representations (SPARS)*

Reviewer (proposals):
*Panelist/Virtual Panelist (10×), National Science Foundation Proposal Review*
*Site Visitor, NSF Institute*
*Proposal Reviewer, Air Force Office of Scientific Research*
*Proposal Reviewer, Army Research Office*
*Proposal Reviewer, Austrian Science Fund*
*Proposal Reviewer, DOE Office of Advanced Scientific Computing Research*

| | |
|---|---|
| | *Proposal Reviewer, Netherlands Organisation for Scientific Research (NWO)*<br>*Proposal Reviewer, Research Commission EPFL* |
| Secretary: | *SIAM Activity Group on Imaging Science (SIAG/IS)*, 2020–2021 |
| Co-Organizer: | *Special Session on Mathematical Methods for Array Processing and its Applications, IEEE AP-S Symposium on Antennas and Propagation and CNC/USNC-URSI Joint Meeting, July 2020*<br>*Special Session on Sparse Array Processing and Radar Sensing, International Applied Computational Electromagnetics Society (ACES) Symposium*, March 2020<br>*Special Session in Honor of John Cozzens, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, March 2017<br>*Special Session on Exploiting Sparsity and Compressive Sensing in System Identification, IEEE Conference on Decision and Control*, December 2010<br>*NIPS Workshop on Manifolds, Sparsity, and Structured Models*, December 2009 |
| Organizing Committee: | *SIAM Workshop on Parameter Space Dimension Reduction*, July 2017<br>*SIAM Conference on Imaging Science (IS26)*, November 2026 |
| Technical Committee: | *International Applied Computational Electromagnetics Society (ACES) Symposium*, March 2020 (TPC Co-Chair, Student Paper Competition Chair)<br>*Workshop on Sparsity and Compressive Sensing in Multimedia (MM-SPARSE)*, July 2016<br>*International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing (CoSeRa)*, June 2015<br>*IEEE Statistical Signal Processing Workshop*, August 2012 |

## TEACHING EXPERIENCE

| | | | |
|---|---|---|---|
| Professor (Mines): | EENG 310 | Information Systems Science I<br>formerly listed as EGGN 388 and EENG 388 | |
| | EENG 311 | Information Systems Science II | |
| | EENG 411 | Digital Signal Processing<br>formerly listed as EGGN 481 | |
| | EGGN 483 | Analog and Digital Communication Systems | |
| | EGGN 504 | Seminar in Sensing, Communications, and Control | |
| | EENG 509 | Sparse Signal Processing<br>formerly listed as EGGN 509 | |
| | EGGN 510 | Advanced Digital Signal Processing (Online) | |
| | EGGN 511 | Digital Signal Processing | |
| | EENG 515 | Mathematical Methods for Signals and Systems<br>formerly listed as EGGN 515 | |
| | EENG 521 | Numerical Optimization<br>cross-listed as MATH 521 | |
| Professor (Michigan): | EECS 451 | Digital Signal Processing and Analysis | (F'07) |
| | EECS 556 | Image Processing | (W'08) |
| Teaching Fellow (Rice): | ELEC 301 | Signal and Systems | (F'02) |

## UNIVERSITY SERVICE

| | |
|---|---|
| 2022–2025 | Mines Research Council |
| 2023–2024 | Faculty Search Committee for Mechanical Engineering Department, Additive |

| | |
|---|---|
| | Manufacturing Specialization |
| 2022–2023 | Mines Research Integrity and Security Committee (RISC) |
| 2021–2022 | Faculty Search Committee for Cluster Hire in Sustainable Energy and Power Systems |
| 2020–2021 | Faculty Search Committee for Cluster Hire in Quantum Information, Electronic Materials and Devices, Mines (Co-Chair) |
| 2018–2021 | Mines Research Advisory Board |
| 2019 | Research Information Management System (RIMS) Selection Committee, Mines |
| 2015–2018 | Mines Graduate Council |
| 2017 | Computer Science Promotion & Tenure Committee, Mines |
| 2017 | Applied Mathematics and Statistics Faculty Search Committee, Mines |
| 2017 | Research Task Force 2.0, Mines |
| 2017–2018 | Judge, Graduate Research and Discovery Symposium (GRADS), Mines |
| 2016–2017 | Rath Award Committee, Mines |
| 2009 | Applied Statistics Faculty Search Committee, Mines |
| 2003–2004 | Community Associate (Brown College), Rice University |

## DEPARTMENTAL SERVICE

| | |
|---|---|
| 2025–present | EE Graduate Committee, Mines (Chair) |
| 2021–present | Faculty Advisor for Mines IEEE Student Chapter |
| 2013–present | Departmental Promotion & Tenure Committee, Mines (Chair, 2019) |
| 2024–2025 | EE Faculty Search Committee in Quantum Technology (2 positions, Chair) |
| 2021–2025 | EE Undergraduate Committee, Mines |
| 2020–2021 | EE Operational Project Team, Mines (Chair) |
| 2016–2021 | EE Graduate Committee, Mines (Chair, 2017–2018) |
| 2019–2020 | EE Strategic Advisory Council, Mines (Chair) |
| 2019 | EE Diversity, Inclusion, and Access Committee, Mines |
| 2018–2019 | Electrical Engineering Department Head Search Committee, Mines (Chair) |
| 2016–2017 | EE Research Committee, Mines |
| 2016 | EECS Faculty Search Committee, Mines |
| 2015–2016 | EECS Research Committee, Mines |
| 2013–2015 | EECS Graduate Committee, Mines |
| 2012–2013 | EECS Strategic Planning Committee, Mines |
| 2012–2013 | EECS Assistant and Associate Professor (4 positions) Search Committee, Mines (Member, 2012; Chair, 2013) |
| 2008–2012 | Electrical Engineering Graduate Admissions and Recruiting Committee, Mines (Member, 2008–2011; Chair, 2011–2012) |
| 2012 | Electrical Engineering and Computer Science Department Head Search Committee, Mines |
| 2011 | Energy and Power Faculty Search Committee, Mines |
| 2008 | ECE Systems Graduate Admissions Committee, University of Michigan |
| 2004 | Accounts Manager, Duncan Hall Fridge Co-Op, Rice University |
| 2001–2002 | Graduate Student Council (ECE Department), Rice University |
| 2001–2002 | Student Representative to ECE Graduate Committee, Rice University |