

# Misha Elena Kilmer

## Curriculum Vitae

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**Research Areas:** Numerical Linear and Multilinear Algebra, Scientific Computing, Inverse Problems, Image Classification and Recognition

### Employment History:

7/21 – 6/23 Deputy Director, ICERM, Brown University, Providence, RI  
8/16 – present William Walker Professor of Mathematics, Tufts University, Boston, MA  
9/05 – present Secondary Appt., Department of Computer Science, Tufts University, Boston, MA  
8/13 – 6/19 Department Chair, Department of Mathematics, Tufts University, Boston, MA  
9/05 – 8/16 Professor, Department of Mathematics, Tufts University, Boston, MA  
9/99 – 8/05 Assistant Professor, Mathematics, Tufts University, Boston, MA  
1/98 – 8/99 Visiting Scientist, ECE Dept., Northeastern University, Boston, MA  
9/94 – 12/97 Research Assistant University of Maryland, College Park, MD.

### Education:

Dec. 1997 Ph.D. in Applied Mathematics, University of Maryland, College Park  
May 1992 (1994) B.S. (M.A.) in Mathematics, Wake Forest University

### Research and Teaching Awards and Recognition:

- Kirk Fellow, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, Spring 2023.
- DISC Faculty Fellow, Tufts University, Jan. 2021 – Dec. 2021
- SIAM Fellow, Class of 2019, April 2019.
- ICERM (Brown Univ.) Semester on-site visitor, Model and Dimension Reduction in Uncertain and Dynamic Systems, January 27 - May 1, 2020.
- Householder XX Poster Blitz prize, 2017.
- Received Endowed Chair: William Walker Professor of Mathematics, 2016.
- Direct promotion to from Assistant Professor to Full Professor (skipping associate level), 2005.
- Tufts Undergraduate Initiative on Teaching Award, 2001.
- SIAM Student Paper Prize, 1997.

**Publication Summary:** Over 67 refereed publications (17 with citations over 100), 1 co-edited book with commentaries and 2 invited (refereed) book chapters. SIAM Review Research Spotlights summaries each issue. Over 6,700 citations, h-index of 33, i10-index of 55 (as of 02/13/23). See Google Scholar Profile for full publication list. Further details below.

### Editorial Work:

- Section Editor, SIAM Review, Research Spotlights, 2018 – Jan. 2023
- Associate Editor, La Matematica, 2021 –
- Guest (special issue) Associate Editor, Journal of Scientific Computing, 2021,22
- Associate Editor, SIAM Journal for Scientific Computing, 2009 – 2020
- Associate Editor, SIAM Journal for Matrix Analysis and Applications, 2012 – 2018
- Associate Editor, SIAM Undergraduate Research On-line, 2008 – 2014
- Special Issue Editor, Linear Algebra and its Applications, (G. W. Stewart birthday issue), 2010

### Patents/Filings:

- Horesh (IBM), Newman (Emory), Avron (Tel Aviv), Kilmer (Tufts), “Generating and Managing Deep Tensor Neural Networks,” Awarded 2022. US Patent 11,531,902.
- Horesh (IBM), O. A. Malik (U CO), S. Ubaru (IBM), Kilmer (Tufts), Avron (Tel Aviv) “Tensor-based predictions for analysis on time-varying graphs,” Awarded 2022. US Patent 11,386,507.
- Horesh (IBM), Hao (Oracle), R. Horesh (IBM), Nahamoo (IBM), and Kilmer (Tufts), “Mis-specified model supplementation” Patent number 10885241. Awarded 1/5/2021. US20190205488A1.
- Horesh (IBM), Kilmer (Tufts), Avron (Tel Aviv), Zhang, “Multi-linear Dynamical Model Reduction,” Awarded 11/30/21. US Patent number 11,188,616.
- Kilmer (Tufts), Horesh (IBM), Avron (Tel Aviv), Newman (Tufts), “System and Method for Optimal Multi-dimensional Data Compression by Tensor Tensor Decompositions,” Filing reference No. 16/289064, 2019.
- Kilmer (Tufts) and Hoge (Brigham and Womens Hospital, Boston), “Magnetic Resonance Imaging by Subspace Projection” Awarded 2010. US7869639B2.

### Grants Awarded:

- (Co-PI) NSF HDR grant CCF-1934553 10/1/2019 – 09/30/2023. “HDR TRIPODS: Building the Theoretical Foundation for a Data-Intensive Studies Center.” \$1.5M.
- (PI) NSF DMS-1821148, 9/1/2018 – 8/30/2021. “Collaborative Proposal: A TensorBased Computational Framework for Model Reduction and Structured Matrices.” Tufts: \$140,000.
- (PI) IBM TJ Watson, 1/2018 – 12/2019. “Tensor Decompositions and Quantum Computing.” \$100,000.
- (Co-PI) NSF DMS-1720291, 9/1/2017 – 8/30/2020. “Collaborative Proposal: NoFRILS Inversion: Novel Feature-Based, Randomized Methods for Large Scale Inversion.” Tufts: \$284,131.
- (PI) sub from USC, Janus-GLAIVE (IARPA primary), 2015-2016 Phase I-II Total \$363, 577.
- (Co-PI) NSF:CIF:SMALL 1319653, 9/1/2013 8/30/2016: “Optimal Sampling and Recovery for Multilinear Signals and Systems”. \$483,000.
- (PI) NSF DMS 1217161, 9/1/2012 – 8/30/2015. “Collaborative Research: Innovative, Integrated Strategies for Nonlinear Parametric Inversion.” \$190,001.
- (Co-PI) NIH R01-CA154774 7/12/2011 – 6/30/2016. “Near Infrared Spectral Imaging of the Breast for Cancer Detection and Monitoring.” Total Award to Tufts: \$2,223,119.
- (PI) NSF-DMS 0914957, PI, “Collaborative Research: Multilinear Algebra Computations with Higher-Order Tensors,” Aug. 1, 2009 July 31, 2012. Total Award to Tufts: \$221,217.
- DARPA grant subcontracted through BAE Systems: Interior Intelligence by Networked Sensing, Imaging and Global Hierarchical Tomography (I2NSIGHT). 2006-2007.
- (co-PI) NSF: BCP Supplement (20K) to current CCF grant to initiate Computing Undergraduate Scholars Program (CUSP) jointly with other faculty from Tufts. 2006-2008.
- Senior Personnel: NSF grant for Acquisition of a Scientific Visualization Facility, Fall 2006.
- (Co-PI) NSF 0631054 S-STEM: CSEMS Scholars Program, 8/16/2006-8/15/2010.
- (PI) NSF 0342559 ACR Grant Collaborative Research: Tuning Libraries to Eectively Exploit the Memory Hierarchy, 9/01/04- 8/08. PI
- (Co-PI) NSF 0139968 Inverse Scattering Models and Algorithms for Functional Brain Imaging with Diuse Optical Waveelds, 9/01/02 8/31/05. co-PI
- (Co-PI) NSF 0208548, Toward a Unied Approach to Diuse Wave Inverse Problems, 8/01/02 7/31/05. co-PI
- (Co-PI) NSF 0220651, Tufts-CSEMS Scholars Program, 9/15/02-9/14/06. co-PI
- (PI) Subcontract award from Northeastern University to work designing preconditioners for 3D-vector Maxwells equations with PML boundary conditions, Summer 2000.
- (PI) Awarded Northeastern University seed funding for research related to the Center for Subsurface Sensing and Imaging Technologies, Jun. 1998.

### Plenary/Keynote Presentations:

- BIRS workshop on New Directions in Applied Linear Algebra, Banff, August 2023.
- Public Kirk Fellow lecture, Cambridge, UK, Spring 2023.
- SIAG-LA Plenary, International Linear Algebra Society (ILAS) Annual Meeting, Galway, Ireland, June 2022 **rescheduled from 2020** .
- Mathematics Continued Conference, Univ. of Connecticut, Oct. 2020.
- One World IMAGINE Seminar (virtual), Oct. 2020. (Video is here.)
- Plenary, Cormack Conference, Tufts University, August 2019.
- Keynote Address, Sonia Kovalevsky Days, WPI, March 2019.
- Plenary, 6th IMA Conference on Numerical Linear Algebra and Optimization, Birmingham, UK, Jun. 2018.
- Plenary, Advancing Women's Impact in Mathematics Symposium, WPI, Apr. 2018.
- Keynote, Computational Inverse Problems (PCH 60), Denmark, Aug. 2017.
- Plenary, SIAM Computational Science and Engineering, Atlanta, Feb. 2017. (See also SIAM News Article about this talk.)
- Keynote, Mid-Atlantic Numerical Analysis Day, Temple University, Nov. 2015.
- Plenary, Householder Symposium, XIX, Belgium, June 2014.
- Plenary, SIAM Applied Linear Algebra Meeting, Valencia, Spain, June 2012.
- Plenary, Householder Symposium XVIII, CA, June 2011.
- Plenary, Householder Symposium XVII, Germany, June 2008.
- Plenary, Preconditioning 2005, Emory University, Atlanta, May 2005.
- Plenary, Householder Symposium XVI, PA, May 2005.
- SIAG-LA plenary, International Linear Algebra Society (ILAS) Annual Meeting, Auburn University, AL, June 2002.

### Recent Workshop Talks/Tutorials (\*=invited):

- \*Rich and non-linear tomography in medical imaging, materials and non destructive testing, Cambridge, UK, March 2023
- \*47th University of Arkansas Spring Lecture Series (SLS), April 6-8, 2022. (Canceled for medical reason)
- \*Women in Inverse Problems, BIRS, Canada, Dec, 2021.
- \*WPI AWM-Chapter talk, Sept. 2021.
- MSRI Summer School lecturer, Mathematics of Big Data: Sketching and (Multi-) Linear Algebra, June-July, 2021.
- Tensor Tutorial, Semester on Model and Dimension Reduction in Uncertain and Dynamic Systems, (semester co-organizer and scholar in residence), ICERM, Feb 2020. (Video of presentation.)
- WiSDM (Women in Data Science and Mathematics), workshop group leader, ICERM, July 2019.
- \*RMMC Summer School, Inverse Problems in Imaging, Univ. of Wyoming, June 2019.
- \*IMA Workshop "Recent Advances in Machine Learning and Computational Methods for Geoscience," Minneapolis, MN, Oct. 2018. (Video of this talk.)
- \*Manitoba Workshop on Mathematical Imaging Science, May 2017. (Video of presentation.)

### Selected Recent Seminar/Colloquium/Minisymposia Talks:

- Oxford University Computational Mathematics and Applications Seminar, Jan. 2023.
- Cambridge University, Isaac Newton Institute Program talk, Jan. 2023.
- WPI Mathematics Colloquium, Dec. 2022.
- Invited Minisymposium speaker, SIAM Mathematics of Data Science, Sept. 2022.
- Rutgers Univeristy Mathematics Department Colloquium, Nov. 2021.
- Minisymposium co-organizer and speaker, SIAM Applied Linear Algebra, May 2021.
- Invited minisymposium speaker, SIAM Computational Science and Engineering meeting, March 2021.
- Invited minisymposium speaker, SIAM Imaging Sciences (virtual), July 2020.
- Invited minisymposium speaker, SIAM Mathematics of Data Science (virtual), June 2020.

- Invited workshop speaker, ICERM, Algorithms for Dimension and Complexity Reduction, Mar. 2020 (livestreamed).
- NC State, Applied Mathematics Seminar, Nov. 2019.
- Penn State, Computational and Applied Mathematics Seminar, Oct. 2019.
- Invited speaker, AMS Special Session on Recent Advances in Structured Matrices and Their Applications, April 2019.
- Minisymposium co-organizer and speaker, AMS/SIAM/MAA Joint Meetings, Jan 2018.
- ICERM: Recent Advances in Seismic Modeling and Inversion: From Analysis to Applications, Fall 2017.
- Distinguished Lecture Series in Computational Science and Engineering, MIT, April 2017.
- Algorithm and Theory Distinguished Lecture Series, IBM Watson, Dec. 2016.
- SIAM Annual Meeting, Session on Model reduction approaches in wavefield simulations and imaging, July, 2016.
- ICIAM 2015, China, Mini on Optimality in reduced order modeling and inversion.
- ICIAM 2015, China, Mini on Image restoration: new algorithms and new applications.
- Copper Mountain Conference on Iterative Methods, Spring 2018, 2016, 2014.

**Books:** *Selected Works of G. W. Stewart, with Commentaries*, Misha E. Kilmer and Dianne P. O’Leary, Editors. Birkhauser, July, 2010. 6/19 Chapter download report from SpringerLink: 18,353 chapter downloads since published.

#### **Book Chapters (Invited):**

1. Ning Hao, Lior Horesh, and Misha E. Kilmer, Nonnegative Tensor Decomposition, in *Compressed Sensing and Sparse Filtering*, Springer Series on Signals and Communication Technology, Avisha Y. Carmi, Lyudmila Mihaylova, Simon J. Godsill, Eds., 2014.
2. Ning Hao, Lior Horesh, and Misha E. Kilmer, Nuclear norm optimization and its application to observation model specification, in *Compressed Sensing and Sparse Filtering*, Springer Series Signals and Communication Technology, Avisha Y. Carmi, Lyudmila Mihaylova, Simon J. Godsill, Eds., 2014

#### **Publications (Preprint and Peer Reviewed):**

1. E. Ozsar, M. E. Kilmer, Eric Miller, Eric de Sturler, A. Saibaba, *Parametric Level-sets Enhanced To Improve Reconstruction (PaLEnTIR)*, arXiv preprint arXiv:2204.09815; journal paper submitted, Sept. 2022.
2. A. K. Saibaba, R. Minster, and M. E. Kilmer, *Efficient randomized tensor-based algorithms for function approximation and low-rank kernel interactions*, *Advances in Computational Mathematics*, Vol. 48, Issue 5, Oct. 2022. Available also as arXiv:2107.13107.
3. M. E. Kilmer and A. K. Saibaba, *Structured Matrix Approximations via Tensor Decompositions*, *SIAM J. Matrix Anal. Appl.*, Vol. 43, Issue 4, pp. 1599-1626, 2022. Available also as arXiv:2105.01170.
4. O. A. Malik, S. Ubaru, L. Horesh, M. E. Kilmer, H. Avron, *Dynamic Graph Convolutional Networks Using the Tensor M-Product*, *Proceedings of the 2021 SIAM International Conference on Data Mining* (peer reviewed – acceptance rate 21.25%), 729-737, 2021.
5. A. Saibaba, P. Prasad, E. de Sturler, E. Miller, M. E. Kilmer, *Randomized Approaches to Accelerate MCMC Algorithms for Bayesian Inverse Problems*, *Journal of Computational Physics*, Vol. 440, 2021.
6. M. E. Kilmer, L. Horesh, H. Avron, E. Newman, *Tensor-Tensor Products for Optimal Representation and Compression of Multiway Data*, *Proceedings of the National Academy of Sciences*, Vol. 118, No. 28, 2021.
7. K. M. Soodhalter, E. de Sturler, and M. E. Kilmer. *A survey of subspace recycling iterative methods*, Invited survey paper for Gesellschaft für angewandte Mathematik und Mechanik (GAMM) Mitteilung: Applied and Numerical Linear Algebra topical issue, Vol. 43, No. 4, 2020. Link to pdf.
8. S. Gazzola, M. E. Kilmer, J. Nagy, O. Smerici, E. L. Miller, *An Inner-Outer Iterative Method for Edge Preservation in Image Restoration and Reconstruction*, *Inverse Problems*, Vol. 36, No. 12, 2020.
9. E. Newman and M. E. Kilmer, *Non-negative Tensor Patch Dictionary Approaches for Image Compression and Deblurring Applications*, *SIAM J. on Imaging Sciences*, Vol. 13, No. 3, 2020.

10. R. Minster, A.K. Saibaba, and M. E. Kilmer, *Randomized Algorithms for low-rank Decompositions in the Tucker Format*, SIAM Journal on Mathematics of Data Science, Vol. 2, No. 1, 2020. *Among the 10 most read Data Science published papers in SIMODS, Vol 2, as of 5/28/20.*
11. E. Newman, L. Horesh, H. Avron, M. E. Kilmer, *Stable Tensor Neural Networks for Rapid Deep Learning*, arXiv preprint arXiv:1811.06569, 2019. Journal submission pending.
12. S. S. Aslan, E de Sturler, M. E. Kilmer, *Randomized Approach to Nonlinear Inversion Combining Random and Optimized Simultaneous Sources and Detectors*, SIAM Journal on Scientific Computing, Vol. 41, No. 2, B229-B249, 2018. (preprint version exists arXiv:1706:05586)
13. J. Zhang, A. K. Saibaba, M. E. Kilmer, and S. Aeron, *A Randomized Tensor Singular Value Decomposition Based on the  $t$ -Product*, Numerical Linear Algebra with Applications, Vol. 25, No. 5, 2018.
14. E. Newman, M. E. Kilmer, L. Horesh, *Image Classification Using Local Tensor Singular Value Decomposition*, 2017 IEEE 7th International workshop on Computation Advances in Advances in Multi-Sensor Adaptive Processing (CAMSAP), 2017.
15. M. O’Connell, M. E. Kilmer, E. de Sturler, S. Gugercin, *Computing Reduced Order Models via Inner-Outer Krylov Recycling*, SIAM Journal on Scientific Computing, Vol. 39, No. 2, B272-B297, 2017.
16. S. Soltani, M. E. Kilmer, P. C. Hansen, *A Tensor-based Dictionary Learning Approach to Tomographic Image Reconstruction*, BIT Numerical Mathematics, Vol. 56, No. 4, 1425-1454, 2016.
17. E. Kernfeld, N. Majumder, S. Aeron, M. E. Kilmer, *Multilinear Subspace Clustering*, 2016 IEEE Statistical Signal Processing Workshop (SSP), 2016.
18. E. Kernfeld, M. E. Kilmer, S. Aeron, *Tensor-tensor Products with Invertible Linear Transforms*, Linear Algebra and its Applications, Vol 485, 545–570, 2015.
19. A. K. Saibaba, M. E. Kilmer, E. L. Miller, S. Fantini, *Fast Algorithms for Hyperspectral Diffuse Optical Tomography*, SIAM Journal on Scientific Computing, Vol. 37, No. 5, B712-B743, 2015.
20. E. de Sturler, S. Gugercin, M. E. Kilmer, S. Chaturantabut, C. Beattie, M. O’Connell, *Nonlinear Parametric Inversion Using Interpolatory Model Reduction*, SIAM Journal on Scientific Computing, Vol. 37, No. 3, B495-B517, 2015.
21. G. Ely, S. Aeron, N. Hao, M. E. Kilmer, *5D Seismic Data Completion and Denoising Using a Novel Class of Tensor Decompositions*, Geophysics, Vol. 80, No. 4, V83-V95, 2015.
22. J. M. Chung, M. E. Kilmer, D. P. O’Leary, *A Framework for Regularization via Operator Approximation*, SIAM Journal on Scientific Computing, Vol. 37, No. 2, B332-B359, 2015.
23. A. K. Saibaba, N. Krishnamurthy, P. G. Anderson, J. M. Kainerstorfer, A. Sassaroli, E. L. Miller, S. Fantini, M. E. Kilmer, *3D Parameter Reconstruction in Hyperspectral Diffuse Optical Tomography*, Conference Proceedings, Optical Tomography and Spectroscopy of Tissue XI, 2015.
24. E. Kernfeld, S. Aeron, M. E. Kilmer, *Clustering Multi-way Data: A Novel Algebraic Approach*, arXiv preprint arXiv:1412.7056, 2014.
25. M. I. Espanol and M. E. Kilmer, *A Wavelet-based Multilevel Approach for Blind Deconvolution Problems*, SIAM J. on Scientific Computing, Vol. 36, No. 4, 1678-1693, 2014.
26. O. Smerici, N. Hao, M. E. Kilmer and E. L. Miller, *Tensor-based Formulation and Nuclear Norm Regularization of Multienergy Computed Tomography*, IEEE Trans. on Image Processing, Vol. 23, No. 4, 1678-1693, 2014.
27. A. R. Nectow, M. E. Kilmer, and D. L. Kaplan, *Quantifying Cellular Alignment of Anisotropic Biomaterial Platforms*, Journal of Biomedical Materials Research Part A, Vol. 102, No. 2, 420-428, 2014.
28. Z. Zhang, G. Ely, S. Aeron, N. Hao, M. E. Kilmer, *Novel Methods for Multilinear Data Completion and De-noising Based on Tensor-SVD*, Proceedings of the IEEE CVPR (selected for presentation), 2014. See also arXiv:1307.0805.
29. D. Chen, M. E. Kilmer and P. C. Hansen, *“Plug-and-Play” Edge-Preserving Regularization*, Electronic Transactions on Numerical Analysis, Vol. 41, 465-477, 2014.
30. G. Ely, S. Aeron, N. Hao and M. E. Kilmer, *5D and 4D Pre-stack Seismic Data Completion Using Tensor Nuclear Norm (TNN)*, SEG 2013, Houston, TX, 2013.
31. F. Larusson, P. G. Anderson, E. Rosenberg, M. E. Kilmer, A. Sassaroli, S. Fantini, E. L. Miller, *Parametric Estimation of 3D tubular Structures for Diffuse Optical Tomography*, Biomedical Optics

- Express, 2013.
32. A. Nectow, M. E. Kilmer and D. Kaplan, *Quantitative Assessment of Nerve Cell Alignment*, Tissue Engineering Part C: Methods, 2013.
  33. N. Hao, M. E. Kilmer, K. Braman and R. C. Hoover, *Facial Recognition using Tensor-Tensor Decomposition*, SIAM Journal on Imaging Science, 2013.
  34. M. E. Kilmer, K. Braman, N. Hao and R. C. Hoover, *Third Order Tensors as Operators on Matrices: A Theoretical and Computational Framework with Applications in Imaging*, SIAM Journal on Matrix Analysis and Applications, 34, 148–172, 2013.
  35. A. Nectow, E. Seok, D. Kaplan and M. E. Kilmer, *A Statistical Algorithm for Assessing Cellular Alignment*, *Journal of Biomedical Materials Research: Part A*, 101 (3), pages 884-91, 2012.
  36. D. Chen, S. MacLachlan, and M. E. Kilmer, *Iterative Parameter Choice and Algebraic Multigrid for Anisotropic Diffusion Denoising*, Copper Mountain 2010 special issue, SIAM J. Sci. Comput. 33, 2011, pp. 2972-2994.
  37. A. Aghasi, M. E. Kilmer, E. Miller, *Parametric Level Set Methods for Inverse Problems*, SIAM J. Imaging Sci. 4, 2011, pp. 618-650.
  38. E. de Sturler and M. E. Kilmer, *A Regularized Gauss-Newton Trust Region Approach to Imaging in Diffuse Optical Tomography*, Copper Mountain 2010 Special Issue, SIAM J. Sci. Comput. 33, 2011, pp. 3057-3086.
  39. M. E. Kilmer and C. D. Martin, *Factorization Strategies for Third-Order Tensors*, Linear Algebra and its Applications (special issue in honor of G.W. Stewart), Vol. 435, Aug. 2011, pp 641-658.
  40. M. I. Espanol and M. E. Kilmer, *A Multilevel Approach for Signal Restoration Problems with Toeplitz Matrices*, SIAM J. Sci. Comput., Copper Mountain Conference on Iterative Methods Special Issue, vol. 32, 2010, pp. 299-310.
  41. P.C. Hansen and M. E. Kilmer, *A Parameter Choice Method that Exploits Residual Information*, PAMM, Special Issue: Sixth International Congress on Industrial and Applied Mathematics (ICIAM07) and GAMM Annual Meeting, Zurich, 2007, Vol. 7, Issue 1, Dec. 2007.
  42. D. Hyde, M. E. Kilmer, E. L. Miller, D. Brooks, *Analysis and Exploitation of Matrix Structure Arising in Linearized Inverse Scattering*, SIAM J. Matrix Anal. Appl., Vol. 29, pp. 1065-1082, 2007.
  43. Misha E. Kilmer and James Nagy, *Kronecker Product Approximations for Dense Block Toeplitz-plus-Hankel matrices*, Numerical Linear Algebra with Applications, Vol. 14, 2007, pp. 581-602.
  44. W. S. Hoge, M. E. Kilmer, C. Zacarias-Almarcha, D. H. Brooks, *Fast Regularized Reconstruction of Non-uniformly Subsampled Partial-Fourier Parallel MRI Data*, International Symposium on Biomedical Imaging, 2007 Proceedings (peer-reviewed).
  45. M. E. Kilmer, P. C. Hansen and M. Espanol, *A Projection-based Approach to General Form Tikhonov Regularization*, SIAM J. Sci. Comput., Vol. 29, p 315-330, 2007.
  46. W. S. Hoge, M. E. Kilmer, S. J. Haker, D. H. Brooks, W. E. Kyriakos, *Fast Regularized Reconstruction of Non-Uniformly Subsampled Parallel MRI Data*, International Symposium on Biomedical Imaging, 2006 Proceedings (peer-reviewed).
  47. P. C. Hansen, M. E. Kilmer and R. Kjellden, *Exploiting Residual Information in the Parameter Choice for Discrete Ill-Posed Problems*, BIT, Vol 46, pp. 41-59, 2006.
  48. M. E. Kilmer and E. de Sturler, *Recycling Subspace Information for Diuse Optical Tomography*, SIAM J. Sci. Comput., Vol. 27, No. 6, pp. 2140-2166, 2006.
  49. J. Nagy and M. E. Kilmer, *Kronecker Product Approximation for Three-Dimensional Imaging Applications*, IEEE Trans. Image Proc., Vol. 15, No. 3, Mar. 2006.
  50. A. Hamdi and E. L. Miller, D. Boas and M. A. Franceschini, and M. E. Kilmer, *Recursive estimation methods for tracking of localized perturbations in absorption using diffuse optical tomography*, vol 5674, in *Computational Imaging III*, Charles A. Bouman and Eric L. Miller, eds., International Society for Optics and Photonics, SPIE, 316 – 327, 2005.
  51. A. Li, G. Boverman, Y. Zhang, D. Brooks, Q. Zhang, E. Hillman, M. E. Kilmer, E. L. Miller, D. Boas, *An Optimal Linear Inverse Solution Given Multiple Priors in Diuse Optical Tomography*, Applied Optics, 2004.
  52. M. E. Kilmer and C. D. Martin, *Decomposing a Tensor*, SIAM News, Vol. 37, No. 9, Nov. 2004.
  53. M. E. Kilmer, E. L. Miller, M. Enriquez, D. Boas, *Cortical Constraint Method for Diuse Optical Brain*

- Imaging*, SPIE Proceedings of the Annual Meeting, Vol. 5559, 2004, pp. 381-391.
54. M. Horn, C. Cao, M. Kilmer, L. Baise, S. Hassoun, D. Souvaine, *Model for Mentoring and Retaining Engineering Students from Underrepresented Groups*, Proceedings of the ASEE New England Section 2004 Annual Conference, 2004.
  55. C. M. Rappaport, Q. Dong, E. Bishop, A. Morgenthaler, M. E. Kilmer, *Finite Difference Frequency Domain (FDFD) Modeling of Two Dimensional TE Wave Propagation*, URSI Symposium Conference Proceedings, Pisa, Italy, May 2004.
  56. M. E. Kilmer, E. L. Miller, A. Barbaro, D. Boas, *3D Shape-Based Imaging for Diuse Optical Tomography*, Applied Optics, Vol. 42, pp. 3129-3144, 2003.
  57. A. Li, E. L. Miller, M. E. Kilmer, T. Brukilacchio, T. Chaves, J. Stott, Q. Zhang, T. Wu, M. Chorlton, R. Moore, D. Kopans, D. Boas, *Tomographic Optical Breast Imaging Guided by 3-D Mammography*, Applied Optics, 2003.
  58. E. L. Miller, M. Cheney, M. E. Kilmer, G. Boverman, A. Li, D. Boas, *Feature-Enhancing Inverse Methods for Limited-View Tomographic Imaging Problems*, Subsurface Sensing Technologies and Applications, Vol. 4, No. 4, pp. 327-353, 2003.
  59. M. Belge, M. E. Kilmer, E. L. Miller, *Ecient Selection of Multiple Regularization Parameters in a Generalized L-curve Framework*, Inverse Problems, Vol. 28, pp. 1161-1183, 2002.
  60. D. Boas, D. Brooks, E. L. Miller, C. DiMarzio, M. E. Kilmer, R. Gaudette, Q. Zhang, *Imaging the Body with Diuse Optical Tomography*, IEEE Signal Processing Magazine, Vol. 18, No. 6, pp. 57-75, 2001.
  61. M. E. Kilmer and D. P. OLeary, *Choosing Regularization Parameters in Iterative Methods for Ill-Posed Problems*, SIAM Journal on Matrix Analysis and Applications, Vol. 22, No. 4, pp. 1204-1221, 2001.
  62. M. E. Kilmer, E. L. Miller, C. Rappaport, *A QMR-based Projection Technique for the Solution of Non-Hermitian Systems with Multiple Right Hand Sides*, SIAM Journal on Scientific Computing, Vol. 23, No. 3, pp. 761-780, 2001.
  63. M. Belge, M. E. Kilmer, E. L. Miller, *Wavelet Domain Image Restoration with Adaptive Edge-Preserving Regularization*, IEEE Transactions on Image Processing, Vol. 9, No. 4, p 598-608, 2000.
  64. M. E. Kilmer, E. L. Miller, D. Boas, D. Brooks, *A Shape-Based Reconstruction Technique for DPDW Data*, Optics Express (focused issue), Vol. 7, No. 13, pp. 461, 2000.
  65. E. L. Miller, M. E. Kilmer, C. Rappaport, *A New Shape-Based Method for Object Localization and Characterization from Scattered Field Data*, IEEE Transactions on Geoscience and Remote Sensing, Vol. 38, No. 4, pp. 1682-1696, 2000.
  66. C. Rappaport, M. E. Kilmer, E. L. Miller, *Accuracy Considerations in Using the PML ABC with FDFD Helmholtz Equation Computation*, Focused Issue of the International Journal of Numerical Modeling, Vol. 13, No. 471, pp. 471-482, 2000.
  67. R. Gaudette, D. Brooks, C. DiMarzio, M. E. Kilmer, E. L. Miller, T. Gaudette, D. Boas, *A Comparison Study of Linear Reconstruction Techniques for Diffuse Optical Tomographic Imaging of the Absorption Coefficient*, Physics in Medicine and Biology, Vol. 45, No. 4, pp. 1051-1070, 2000.
  68. M. E. Kilmer, *Cauchy-like Preconditioners for 2-Dimensional Ill-posed Problems*, SIAM Journal on Matrix Anal. and Appl., Vol 20, No. 3, 1999. Awarded 1997 SIAM Student Paper Prize.
  69. M. E. Kilmer and D. P. OLeary, *Pivoted Cauchy-like Preconditioners for the Regularized Solution of Ill-Posed Problems*, SIAM Journal on Sci. Comput., Vol. 21, No. 1, 1999.
  70. M. E. Kilmer and G. W. Stewart, *Iterative Regularization and MINRES*, SIAM Journal on Matrix Anal. and Appl., Vol 21, No. 2, pp. 613-628, 1999.
  71. C. Rappaport, S. Wu, M. Kilmer, E. Miller, *Distinguishing Shape Details of Buried Non-metallic Mine-like objects with GPR*, SPIE Aerosense Conference, Orlando, FL, pp. 1419-1428, April 1999.
  72. M. E. Kilmer, E. L. Miller, D. A. Boas, D. H. Brooks, C. A. DiMarzio, and R. J. Gaudette, *Direct Object Localization and Characterization from Diuse Photon Density Wave Data*, Jan. 1999 Proceedings of the SPIE Photonics West Conference, 1999.
  73. M. E. Kilmer, *Regularization of Ill-Posed Problems Using (Symmetric) Cauchy-like Preconditioners*, Proceedings of the Annual SPIE meeting, Advanced Signal Processing Algorithms, Architectures, and Implementations VIII, 1998.
  74. M. Belge, M. E. Kilmer, E. L. Miller, *Simultaneous Selection of Multiple Regularization Parameters by Means of the L-hypersurface Method*, Proceedings of the SPIE Annual Meeting, Bayesian Inference for Inverse Problems, 1998.

75. Misha E. Kilmer, *Regularization of Ill-Posed Problems*, Ph.D. dissertation, University of Maryland, College Park, Dec. 1997.
76. Misha Clark, *An Iterative Reconstruction Technique for Positron Emission Tomography*, Masters thesis, Mathematics and Computer Science Department, Wake Forest University, April 1994.

**Selected SIAM Service:**

- Member SIAM Fellows Selection Committee, 2022-2023
- Co-Chair, SIAM Applied Linear Algebra Meeting, 2021
- Co-Chair, SIAM Computational Science and Engineering Meeting, 2021
- Member, Wilkinson Prize Committee, 2020
- Mid-Career Panelist, SIAM Computational Science and Engineering Meeting, 2019, see recent SIAM News article for quotations
- Committee Member, Gene Golub SIAM Summer School, Jan. 2018 – Dec. 2021
- Invited Minisymposium organizer to represent the SIAG/LA; SIAM Annual Meeting, July 2016
- Program Committee Member:
  - SIAM Annual Meeting 2012
  - SIAM Conference on Imaging Science, 2012
  - SIAM Computational Science and Engineering Meeting 2009
  - SIAM Linear Algebra Meeting 2009; Preconditioning 2007
- Co-organizer, Session on Career Development, SIAM Annual 2008, SIAM CS&E Mar. 2009
- Prize Committee Member:
  - SIAM CSE Early Career Prize Committee, 2016-2017
  - SIAM Activity Group on Linear Algebra, Best LA Paper Prize Committee, 2015
  - AWM/SIAM Sonia-Kovalesky Lecture Prize Selection Committee, 2007–2009
- Panelist, Mid-career Transition Panel, SIAM CS&E Meeting, 2019
- Panelist, SIAM Career Panel, SIAM CS&E Meeting, 2017 and SIAM Annual Meeting 2016
- Secretary, SIAM Activity Group on Linear Algebra, 2004-2006; Nominating Cmte. Chair, 2006

**Selected Additional Professional Service:**

- AMS Simons Travel Grant review committee, Spring 22 – current.
- AMS Committee on Publications, Spring 22 – current
- External Reviewer, Ph.D. Thesis, University of Bologna, Fall 2021.
- Reviewer, Computer Innovations Fellows applications, July 2020.
- Member, Scientific Advisory Board, ICERM (Brown Univ.), 2019 - 2021.
- Member, Advisory Board, International Linear Algebra Society (ILAS), spring 2020 - current
- Representative to the AMS-MAA-SIAM Committee on the Porter Public Lecture, 2/20 - 1/23
- Copper Mountain Conference on Iterative Methods Organizing committee; Student Paper Prize Committee, 2008-current
- NSF Panel and Site Team Reviews
- Minisymposium organizer (SIAG-LA invited), SIAM Annual Meeting, July 2016.
- Minisymposium co-organizer, SIAM Imaging Sciences, May, 2016.
- Minisymposium co-organizer, Celebrating the Contributions of Dianne P. OLeary, SIAM Applied Linear Algebra, 2015.
- Minisymposium co-organizer (x 2), SIAM Computational Science and Engineering, 2015.
- Mathematics Department Colloquium, VA Tech, Nov. 2014.
- Reviewer for DOE and several International funding agencies
- Prize/awards committees (SIAM, AMS)
- External International Thesis examiner

**Selected Recent Tufts University and Departmental Service**

UNIVERSITY:



- Elected to 5 year term on the Faculty Advisory Board, 2021
- Member, Data Intensive Studies Center Faculty Advisory Committee, 2019 – current
- Member, Research & Scholarship Subcommittee of the IT Governance Committee, Fall 2019 – current
- Member, Search Committee for Director of the Data Intensive Studies Center, 2017 – 2019
- Co-Chair, Research and Scholarship Subcommittee, IT Governance, 2015 – Spr 19
- Member, IT Steering Committee, 2015 – 2019
- Member, planning committee, Ctr. for Computational & Data-Enabled Research, 2015 – 2016
- GREAT, 2015 panelist
- Co-Chair, Computational Subcommittee, SEC Leaders group, 2014 – 2015
- Thematic Area Working Group on Computational and Quantitative Skills and Methods, Co-Chair of the Computational Subcommittee, 2014 – 2015
- Tufts Summer Scholars Evaluation Committee member, Spring 2013
- Tufts Univ. Special Advisor to the President and Interim Provost on Matters of Academic Appointments 09/2011 – 06/2012
- Arts and Sciences Dean Search Committee, Spring-Summer 2010
- Arts, Sciences and Engineering Tenure and Promotion Committee, May 2007 – Aug 2008, May 2009 – April 2011 (Chair, May 2010 – April 2011)

**DEPARTMENT:**

- Math 70 review coordinator, spring 2021 –
- OGSM speaker, spring 2021
- Panel participant, Graduate Development Seminar, spring 2021
- Workload Committee, spring 2021 –
- Curriculum Committee, 2014 – 2016, 2020 –
- Preparator for 4 year Review case, Fall 2020
- Preparator for Tenure Case, Summer 2019
- Transfer of Credit Advisor, Sept 2020 –
- Department Chair, Sept. 2013 – Summer 2019
- NWAP Hiring Committees, 2013 – 2014, 2016 – 2017, 2018 – 2019
- CDA Hiring Committee, 2017 – 2018
- Course Assignment Committee, 2013 – 2019
- Graduate Committee, multiple (non-consecutive) years
- Scientific Computing Hiring Committee, 2013 – 2014
- Dept. representative, Tufts Open House and Majors events, (multiple years)
- NA, PDE, Qual Examiner (multiple years)

**Students and Postdocs Supervised:** 2 Postdocs, 7 PhD, 4 MA (thesis), 19 undergrad RAs, 7 visiting students

**Referee Work:** *SIAM Review, ISSAC97, proceedings for ICS03, International Conference on Supercomputing, Math Comp., SIAM Journal on Matrix Analysis and Appl., SIAM Journal on Sci. Comput., IEEE Trans. on Signal Processing, IEEE Trans. Geoscience and Remote Sensing, Linear Algebra and its Applications, Computers and Mathematics with Applications, IEEE Trans. Image Processing, Optics Express, Stat, Applied Optics, BIT, Journal of Computational and Applied Math, Applied and Computational Harmonic Analysis, IEEE Signal Processing Letters, Inverse Problems, Optimization Methods and Software, SIAM Journal on Numerical Analysis, Computational Optimization and Applications, Communications in Nonlinear Science and Numerical Simulations, Pattern Analysis and Applications, Applied Numerical Mathematics, Computational Statistics and Data Analysis, IEEE Trans. Neural Networks and Learning Systems, Numerical Algorithms, Proceedings of the AWM Springer series “Advances in Data Sciences”.*

**Memberships:**

- Society for Industrial and Applied Mathematics

- Activity Group on Applied Linear Algebra
  - Computational Science and Engineering Activity Group
  - Data Mining and Analytics Activity Group
  - Activity Group on Imaging Science
- American Mathematical Society (AMS)
  - Association for Women in Mathematics (AWM)
  - International Linear Algebra Society (ILAS)