Anne Gelb

John G. Kemeny Parents Professor · Department of Mathematics

Dartmouth College, 29 N. Main St. Hanover, NH 03755

Anne.E.Gelb@Dartmouth.edu | math.darmouth.edu/~annegelb

Professional Experience

2016–	**John G. Kemeny Parents Professor**, Department of Mathematics, Dartmouth College
2007-2016	**Professor**, School of Mathematical and Statistical Sciences, Arizona State University
2007-2009	**Associate Chair of Graduate Studies**, School of Mathematical and Statistical Sciences, Arizona State University
2001-2007	**Associate Professor**, Department of Mathematics & Statistics, Arizona State University
1998-2001	**Assistant Professor**, Department of Mathematics & Statistics, Arizona State University
1996-1998	**Postdoctoral Fellow**, Center for Research in Parallel Computing, California Institute of Technology

Research Interests

I am a numerical analyst focusing on developing highly accurate, robust, and efficient methods for computational partial differential equations, data assimilation, machine learning, signal and image restoration, classification, and change detection for real and complex-valued signals from temporal sequences of collected data. Much of my work is motivated by applications in synthetic aperture radar (SAR) imaging and sea ice prediction. Using *high order* approximation methods with provable convergence properties is critical for retaining important information stored in observable (sensing) data and numerical simulation (PDE) models. I regularly collaborate with scientists at the Wright-Patterson Air Force Research Lab (AFRL), Oak Ridge National Laboratory (ORNL), and the Cold Regions Research and Engineering Laboratory (CRREL).

Funding Since 2015

2024-2027	**Infrastructure and Application Aware Reduction Method for Scientific Data**, DOE	*(PI) $ 450,000*
2020-2025	**Integrated Foundations of Sensing, Modeling, and Data Assimilation for Sea Ice Prediction**, DoD(ONR)/MURI	*(PI) $ 7,270,751*
2022-2025	**Compressed Methods for Streaming**, DOE/ASCR (ORNL subaward)	*(PI) $ 300,000*
2023-2024	**Conference: North American High Order Methods Conference (NAHOMCon)**, NSF/DMS	*(PI) $29,500*
2022-2024	**Synthetic Aperture Radar (SAR) Imaging with Phase Retrieval and Uncertainty Quantification**, AFOSR/BAA	*(PI) $ 399,941*
2018-2024	**Collaborative: Accurate, efficient and robust computational algorithms for detecting changes in a scene given indirect data**, NSF/DMS	*(PI) $139,999*
2020-2022	**Compressed Single-Shot Photoacoustic Imaging with Optical Detection**, NIH/NIGMS	*(co-PI) $418,651*
2018-2021	**Improving robustness, efficiency and accuracy of synthetic aperture radar (SAR) imaging techniques using multi-measurement vectors**, AFOSR/BAA	*(PI)$429,058*
2015-2020	**RTG: Data-Oriented Mathematical and Statistical Sciences**, NSF/DMS	*(PI)$1,099,995*
2015-2018	**Developing Fast, Accurate, and Robust Numerical Algorithms for Extracting Actionable Information from Acquired Sensing Data**, AFOSR/BAA	*(PI) $607,643*
2015-2018	**Collaborative Research: An Integrated Approach to Convex Optimization Algorithms**, NSF/DMS	*(PI) $27,735*

Peer Reviewed Journal Publications

(* indicates undergraduate coauthor, ** indicates graduate student coauthor)

1. T. Li and **A. Gelb**, *A Bayesian framework for spectral reprojection*, Journal of Scientific Computing **102:3**, 1-28 (2025).
2. J. Lindbloom**, J. Glaubitz and **A. Gelb**, *Efficient sparsity-promoting MAP estimation for Bayesian linear inverse problems*, Inverse Problems **41**:2 025001 (2025).
3. Z. Chen, **A. Gelb** and Y. Lee, *Learning the Dynamics for Unknown Hyperbolic Conservation Laws Using Deep Neural Networks*, SIAM Journal on Scientific Computing, **46**:2 A825-A850 (2024).
4. J. Glaubitz and **A. Gelb**, *Leveraging joint sparsity in hierarchical Bayesian learning* SIAM/ASA Journal on Uncertainty Quantification **12**:2 442-472 (2024).

5. D. Green**, J. Lindbloom** and **A. Gelb**, *Empirical Bayesian inference for complex-valued signals using support-informed priors*, Applied Mathematics for Modern Challenges **2**:4 382-408 (2024).
6. J. Han, Y. Lee and **A. Gelb**, *Learning in-between imagery dynamics via physical latent spaces*, SIAM Journal on Scientific Computing, **46**:5 C608-C632 (2024).
7. T. Li, **A. Gelb** and Y. Lee, *A structurally informed data assimilation approach for nonlinear partial differential equations*, J. Comput. Phys., **519** 113396 (2024).
8. J. Glaubitz, **A. Gelb** and G. Song, *Generalized sparse Bayesian learning and application to image reconstruction*, SIAM/ASA Journal on Uncertainty Quantification, **11**:1 pp. 262-284 (2023).
9. V. Churchill and **A. Gelb**, *Sub-aperture SAR Imaging with Uncertainty Quantification*, Inverse Problems, **39**:5 (2023).
10. D. Green**, J.R. Jamora and **A. Gelb**, *Leveraging Joint Sparsity in 3D Synthetic Aperture Radar Imaging*, Applied Mathematics for Modern Challenges, **1**:1 pp. 61-86 (2023).
11. T. Li, **A. Gelb** and Y. Lee, *Improving numerical accuracy for viscous-plastic formulation of sea ice*, J. Comput. Phys., **487** (2023).
12. G. Pease**, **A. Gelb**, Y. Lee and C.B. Keller, *A Bayesian Formulation for Estimating the Composition of the Earth's Crust*, Journal of Geophysical Research: Solid Earth **128**:7, e2023JB026353 (2023).
13. Y. Xiao**, **A. Gelb** and G. Song, *Sequential Edge Detection Using Joint hierarchical Bayesian Learning*, Journal of Scientific Computing **96**:80 (2023).
14. Y. Xiao, J. Glaubitz, **A. Gelb** and G. Song, *Sequential image recovery from noisy and under-sampled Fourier data*,Journal of Scientific Computing **91**:3 (2022).
15. V. Churchill** and **A. Gelb**, *Sampling-based spotlight SAR image reconstruction from phase history data for speckle reduction and uncertainty quantification*, SIAM/ASA Journal on Uncertainty Quantification, **10**:3 pp. 1225-1249 (2022).
16. J. Zhang*, **A. Gelb** and T. Scarnati, *Empirical Bayesian Inference Using a Support Informed Prior*, SIAM/ASA Journal on Uncertainty Quantification, **10**:2 745-774 (2022).
17. D. Green**, **A. Gelb** and G. Luke, *Sparsity-Based Recovery of Three-Dimensional Photoacoustic Images from Compressed Single-Shot Optical Detection*, Journal of Imaging, **7**:10 201 (2021).
18. J. Glaubitz and **A. Gelb**, *Stabilizing Radial Basis Function Methods for Conservation Laws Using Weakly Enforced Boundary Conditions*, J. Sci. Comput., **87**:40 (2021).
19. T. Scarnati and **A. Gelb**, *Accurate and Efficient Image Reconstruction from Multiple Measurements of Fourier Samples*, Journal of Computational Mathematics, **38** 798-828 (2020).
20. B. Adcock, **A. Gelb**, G. Song and Y. Sui**, *Joint sparse recovery based on variances*, SIAM Journal on Scientific Computing, **41:1** A246-A268 (2019).
21. V. Churchill**, R. Archibald and **A. Gelb**, *Edge-adaptive ℓ_2 regularization image reconstruction from non-uniform Fourier data*, Inverse Problems & Imaging, **13** (2019).
22. V. Churchill** and **A. Gelb**, *Detecting Edges from Non-uniform Fourier Data via Sparse Bayesian Learning*, Journal of Scientific Computing, **80**:2 762–783 (2019).
23. **A. Gelb**, X. Hou** and Q. Li, *Numerical Analysis for Conservation Laws Using ℓ_1 Minimization*, Journal of Scientific Computing, **81** 1240-1265 (2019).
24. **A. Gelb** and T. Scarnati, *Reducing Effects of Bad Data Using Variance Based Joint Sparsity Recovery*, Journal of Scientific Computing, **78:1** 94-120 (2019).
25. J. Glaubitz and **A. Gelb**, *High order Edge Sensors with ℓ^1 Regularization for Enhanced Discontinuous Galerkin Mehtods*, SIAM Journal on Scientific Computing, **41:2** A1304–A1330, (2019).
26. R. Shang**, R. Archibald, **A. Gelb** and G. Luke, *Sparsity-based photoacoustic image reconstruction with a linear array transducer and direct measurement of the forward model*, Journal of Biomedical Optics, **24**:3 (2019).
27. T. Scarnati** and **A. Gelb**, *Joint Image Formation and Two-Dimensional Autofocusing for Synthetic Aperture Radar Data*, Journal of Computational Physics, **374:1** 803-821 (2018).
28. X. Chen, J.H. Jung and **A. Gelb**, *Finite Fourier Frame Approximation Using the Inverse Polynomial Reconstruction Method*, Journal of Scientific Computing, **76**:2 1127-1147 (2018).

29. T. Scarnati**, **A. Gelb**, and R Platte, *Using ℓ_1 Regularization to Improve Numerical Partial Differential Equation Solvers*, Journal of Scientific Computing, bf 75:1, 225-252 (2018).

30. T. Sanders, **A. Gelb** and R. Platte, *Composite SAR Imaging Using Sequential Joint Sparsity*, Journal of Computational Physics, **338** 357–370 (2017).

31. D. Denker** and **A. Gelb**, *Edge Detection of Piecewise Smooth Functions from Under-Sampled Fourier Data Using Variance Signatures*, SIAM Journal on Scientific Computing, **39:2** A559-A592 (2017).

32. T. Sanders, **A. Gelb**, R. Platte, I. Arslan, and K. Landskron, *Recovering Fine Details from Under-Resolved Electron Tomography Data using Higher Order Total Variation l_1 Regularization* Ultramicroscopy, **174** 97–105 (2017).

33. **A. Gelb** and G. Song, *Detecting Edges from Non-uniform Fourier Data Using Fourier Frames,* Journal of Scientific Computing, **71:2** 737–758 (2017).

34. G. Song, J. Davis, and **A. Gelb**, *A High-Dimensional Inverse Frame Operator Approximation Technique*, SIAM J. Numerical Analysis, **54**:4 2282-2301 (2016).

35. R. Archibald, **A. Gelb**, and R. Platte, *Image Reconstruction from Undersampled Fourier Data Using the Polynomial Annihilation Transform*, Journal of Scientific Computing, **67** 432–452, (2016).

36. G. Wasserman*, R. Archibald and **A. Gelb**, *Image Reconstruction from Fourier Data Using Sparsity of Edges*, Journal of Scientific Computing, **65**:2 533–552, (2015).

37. R.B. Platte, A. Gutierrez*, and **A. Gelb**, *Fourier reconstruction of univariate piecewise-smooth functions from non-uniform spectral data with exponential convergence rates,* ACHA, **39**:3 427–449 (2015).

38. **A. Gelb** and G. Song, *A Frame Theoretic Approach to the Nonuniform Fast Fourier Transform*, SIAM J. Numer. Anal., **52:3** 1222-1242 (2014).

39. A. Martinez*, **A. Gelb** and A. Gutierrez*, *Edge Detection from Non-Uniform Fourier Data Using the Convolutional Gridding Algorithm,* Journal of Scientific Computing, **61:3** 490-512 (2014).

40. G. Song and **A. Gelb**, *Approximating the Inverse Frame Operator from Localized Frames*, Applied and Computational Harmonic Analysis, **35:1** 94-110 (2013).

41. **A. Gelb** and T. Hines**, *Recovering Exponential Accuracy from Nonharmonic Fourier Data Through Spectral Reprojection*, Journal of Scientific Computing, **51**:1 158-182 (2012).

42. A. Petersen*, **A. Gelb** and R. Eubank, *Hypothesis Testing for Fourier Based Edge Detection Methods*, Journal of Scientific Computing, **51**:3 608-630 (2012).

43. W. Stefan, A. Viswanathan**, **A. Gelb** and R. Renaut, *Sparsity Enforcing Edge Detection Method for Blurred and Noisy Fourier Data*, Journal of Scientific Computing, **50**:3 536-556 (2012).

44. A. Viswanathan**, D. Cochran and **A. Gelb**, *Iterative Design of Concentration Factors for Edge Detection*, Journal of Scientific Computing, **51:3** 631-649 (2012).

45. **A. Gelb** and T. Hines**, *Detection of Edges from Nonuniform Fourier Data*, Journal of Fourier Analysis and Applications, **17**:6 1152-1179 (2011).

46. A. Viswanathan**, **A. Gelb**, D. Cochran and R. Renaut, *On Reconstruction From Non-uniform Spectral Data*, Journal of Scientific Computing, **45**:1-3 487-513 (2010).

47. W. Stefan**, R. Renaut and **A. Gelb**, *Improved Total Variation-type Regularization Using Higher-order Edge Detectors*, SIAM Journal on Imaging Sciences, **3**:2 232-251 (2010).

48. R. Archibald, **A. Gelb**, R. Saxena** and D.B. Xiu, *Discontinuity Detection in Multivariate Space for Stochastic Simulations*, Journal of Computational Physics, **228**:7 2676–2689 (2009).

49. R. Platte and **A. Gelb**, *A Hybrid Fourier-Chebyshev Method for Partial Differential Equations,* Journal of Scientific Computing, **39** 244-264 (2009).

50. **A. Gelb** and D. Cates**, *Segmentation of Images from Fourier Spectral Data*, Communications in Computational Physics, **5** 326–349 (2009).

51. R. Saxena**, **A. Gelb** and H. Mittelmann, *A High Order Method for Determining the Edges in the Gradient of a Function*, Communications in Computational Physics, **5** 694–711 (2009).

52. R. Archibald, **A. Gelb** and J. Yoon, *Determining the Locations and Discontinuities in the Derivatives of Functions*, Applied Numerical Mathematics, **58** 577–592 (2008).

53. **A. Gelb**, R. Platte and W. S. Rosenthal*, *The Discrete Orthogonal Polynomial Least Squares Method for Approximation and Solving Partial Differential Equations*, Communications in Computational Physics, **3** 734–758 (2008).

54. C. Blakely*, **A. Gelb** and A. Navarra, *An Automated Method for Recovering Piecewise Smooth Functions on Spheres Free from Gibbs Oscillations*, Sampling Theory in Signal and Image Processing, **6** 323–346 (2007).

55. D. Cates** and **A. Gelb**, *Determining the Locations of the Discontinuities in the Derivatives of Functions Using Spectral Methods*, Numerical Algorithms, **49** 59–84 (2007).

56. **A. Gelb** and D. Cates**, *Detection of Edges in Spectral Data III – Improvements in the Presence of Noise*, Journal of Scientific Computing, **36**:1 1–43 (2008).

57. **A. Gelb**, *Reconstruction of Piecewise Smooth Functions from Non-Uniform Grid Point Data*, Journal of Scientific Computing, **30**:3 409–440 (2007).

58. **A. Gelb** and E. Tadmor, *Adaptive Edge Detectors for Piecewise Smooth Data Based on the MinMod Limiter,* Journal of Scientific Computing, **28**:2-3 279–306 (2006).

59. R. Archibald, **A. Gelb**, S. Gottlieb and J. Ryan, *One-Sided Post-Processing for the Discontinuous Galerkin Method Using ENO Type Stencil Choosing and the Local Edge Detection Method,* Journal of Scientific Computing, **28**:2-3 167–190 (2006).

60. **A. Gelb** and Z. Jackiewicz, *Determining Analyticity for Parameter Optimization of the Gegenbauer Reconstruction Method*, SIAM Journal on Scientific Computing, **27**:3 1014–1032 (2006).

61. **A. Gelb** and J. Tanner, *Robust Reprojection Methods for the Resolution of the Gibbs Phenomenon,* Applied Computational and Harmonic Analysis, **20**:1 3–25 (2006).

62. R. Archibald, **A. Gelb** and J. Yoon, *Polynomial Fitting for Edge Detection in Irregularly Sampled Signals and Images*, SIAM Journal on Numerical Analysis, **43**, 259–279 (2005).

63. Y. Ha**, C. L. Gardner, **A. Gelb** and C.-W. Shu, *Numerical Simulation of High Mach Number Astrophysical Jets with Radiative Cooling,* Journal of Scientific Computing, **24**:1 29–44 (2005).

64. R. Archibald**, J. Hu, **A. Gelb** and G. Farin, *Improving the Accuracy of Volumetric Segmentation Using Pre-Processing Boundary Detection and Image Reconstruction,* IEEE Transactions on Image Processing, **13**:4 459–466 (2004).

65. **A. Gelb**, *Parameter Optimization and Reduction of Round Off Error for the Gegenbauer Reconstruction Method*, Journal of Scientific Computing, **20**:3 433–459 (2004).

66. J. P. Gleeson, O. M. Roche, J. West and **A. Gelb**, *Modelling Annular Micromixers,* SIAM J. Appl. Math., **64**:4 1294–1310 (2004).

67. R. Archibald*∗, K. Chen, **A. Gelb** and R. Renaut, *Improving Tissue Segmentation of Human Brain MRI Through Pre-Processing by the Gegenbauer Reconstruction Method,* NeuroImage, **20**:1 489–502 (2003).

68. R. Archibald** and **A. Gelb**, *A Method to Reduce the Gibbs Ringing Artifact in MRI Scans While Keeping Tissue Boundary Integrity,* IEEE Medical Imaging, **21**:4 305–319 (2002).

69. R. Archibald and **A. Gelb**, *Reducing the Effects of Noise in Image Reconstruction,* Journal of Scientific Computing, **17**:1–4 167–180 (2002).

70. C. L. Gardner, **A. Gelb**, and J. Hernandez**, *A Comparison of Modern Hyperbolic Methods for Semiconductor Device Simulation: NTK Central Scheme vs. CLAWPACK,* VLSI Design **15** 721–728 (2002).

71. **A. Gelb**, Z. Jackiewicz and B. Welfert, *Absorbing Boundary Conditions of the Second Order for the Pseudospectral Chebyshev Methods for Wave Propagation,* Journal of Scientific Computing, **17**:1–4 501–512 (2002).

72. **A. Gelb** and E. Tadmor, *Spectral Reconstruction of Piecewise Smooth Functions from Their Discrete Data*, Mathematical Modelling and Numerical Analysis, **36**:2 155–175 (2002).

73. **A. Gelb**, *A Hybrid Approach to Spectral Reconstruction of Piecewise Smooth Functions*, Journal of Scientific Computing, **15** 293–322 (2001).

74. **A. Gelb** and J. P. Gleeson, *Spectral Viscosity for Shallow Water Equations in Spherical Geometry*, Monthly Weather Review, **129**:9 2346–2360 (2001).

75. **A. Gelb** and E. Tadmor, *Enhanced Spectral Viscosity Approximations for Conservation Laws* Applied Numerical Mathematics **33** 3–21 (2000).
76. **A. Gelb** and E. Tadmor, *Detection of Edges in Spectral Data II: Nonlinear Enhancement*, SIAM Journal on Numerical Analysis, **38**:4 1389–1408 (2000).
77. **A. Gelb** and E. Tadmor, *Detection of Edges in Spectral Data*, Applied and Computational Harmonic Analysis **7**, 101–135 (1999).
78. **A. Gelb**, *The Resolution of Gibbs Phenomenon for Spherical Harmonics*, Mathematics of Computation **66**:218 699–717 (1997).
79. **A. Gelb** and D. Gottlieb, *The Resolution of Gibbs Phenomenon for "Spliced" Functions in One and Two Dimensions*, Computers & Mathematics with Applications **33**:11 35–58 (1997).
80. **A. Gelb**, D. Gottlieb, and N. Paldor, *Wind Set Up Relaxation on a Sloping Beach*, Journal of Computational Physics **138** 644–664 (1997).

Peer Reviewed Conference Proceedings

(* indicates undergraduate coauthor, ** indicates graduate student coauthor)

1. D. Green**, J. Lindbloom** and**A. Gelb**, *Complex-Valued Image Recovery from Multiple Measurements*, Proceedings of the IEEE Conference on Computational Imaging Using Synthetic Apertures, (2024).
2. S. Dayton*, O. Milledge*, J. Nikitovic*, **A. Gelb**, D. Green** and A Viswanathan, *Leveraging structural information for enhanced coherent change detection*, Algorithms for Synthetic Aperture Radar Imagery XXXI **13032** 103-112 (2025).
3. D. Green**, **A. Gelb** and G. Luke, *Compressed Single-Shot Photoacoustic Image Reconstruction of a 3D Pressure Distribution*, 2021 OSA Imaging and Applied Optics Congress (2021).
4. V. Churchill** and **A. Gelb**, *Edge-masked CT image reconstruction from limited data*, Proc. SPIE 11072, 15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine, 110721V (28 May 2019).
5. R. Shang**, R. Archibald, **A. Gelb** and G. Luke, *Computational photoacoustic imaging with sparsity-based optimization of the initial pressure distribution*, SPIE. Photons + Ultrasound: Imaging and Sensing (2018).
6. T. Scarnati** and **A. Gelb**, *Variance Based Joint Sparsity Reconstruction of Synthetic Aperture Radar Data for Speckle Reconstruction*, SPIE Commercial + Sensing and Imaging, (2018).
7. J. McKay**, **A. Gelb**, V. Monga and R. Raj, *Using Frame Theoretic Convolutional Gridding for Robust Synthetic Aperture Sonar Imaging*, MTS IEEE OCEANS 17 - Anchorage, 2017.
8. D. Denker**, R. Archibald and **A. Gelb**, *An Adaptive Fourier Filter for Relaxing Time Stepping Constraints for Explicit Solvers*, Lecture Notes in Computational Science and Engineering (ICOSAHOM Proceedings), Springer, (2014).
9. A. Viswanathan**, D. Cochran, **A. Gelb** and D. Cates**, *Detection of Signal Discontinuities from Noisy Fourier Data,* Signals, Systems and Computers, Conference Record of the Forty-Second Asilomar Conference, (2008).
10. J. P. Gleeson, O. M. Roche, J. West and **A. Gelb**, *Modelling Annular Micromixers,* Technical Proceedings of the 2003 Nanotechnology Conference and Trade Show, **1** 206–209 (2003).
11. R. Archibald** and **A. Gelb**, *Reducing the Effects of Noise in MRI Reconstruction*, IEEE International Symposium on Biomedical Imaging Conference Proceedings, 497–500 (2002).
12. **A. Gelb** and R. Archibald**, *Reducing the Gibbs Ringing Artifact in MRI Scans While Maintaining Tissue Boundary Integrity*, IEEE International Symposium on Biomedical Imaging Conference Proceedings, 923–926 (2002).
13. **A. Gelb** and D. Gottlieb, *The Resolution of Gibbs Phenomenon for "Spliced" Functions in One and Two Dimensions*, Proceedings of the Third IMACS International Symposium on Iterative Methods in Scientific Computation, Computation **4** 275–282 (1997).

Invited Talks since 2020

1. November 2024. *Image recovery for linear inverse problems given multiple measurements: from point estimates to uncertainty quantification,* Applied Mathematics Colloquium, Rice University.
2. May 2024. *Complex-Valued Image Recovery from Multiple Fourier Measurements*, Key Note Speaker, 2024 NIST/IEEE Conference on Computational Imaging Using Synthetic Apertures (CISA), National Institute of Standards and Technology, Boulder, CO.
3. October 2023. *Image recovery for linear inverse problems given multiple measurements: from point estimates to uncertainty quantification,* Anne and Peter Costa Distinguished Lecture in Applied Mathematics, University of Massachusetts, Amherst, Department of Mathematics and Statistics.
4. April 2023. *Image Recovery for Linear Inverse Problems from Multiple Measurements: From Point Estimate to Uncertainty Quantification,* Department of Aerospace Engineering Seminar, San Diego State University.
5. February 2023. *The World Needs More Applied Mathematicians*, First Year Seminar, Mathematics Department, Spelman College.
6. November 2022. *Image Recovery for Linear Inverse Problems from Multiple Measurements: From Point Estimate to Uncertainty Quantification,* Applied Mathematics Seminar, Arizona State University.
7. July 2022. *Empirical Bayesian Inference Using a Support Informed Prior*, Invited Speaker, North American High Order Methods Conference, San Diego, CA.
8. December 2021. *Empirical Bayesian Inference Using Joint Sparsity*, Invited Speaker, Women in Inverse Problems Virtual Workshop, Banff International Research Station (BIRS) (ZOOM).
9. June 2021. *Empirical Bayesian Inference Using Joint Sparsity* Keynote Speaker, International Conference on Computational Science Krawkow, Poland (virtual).
10. April 2021. *Empirical Bayesian Inference Using Joint Sparsity*, University of Minnesota, Applied Mathematics Colloquium (ZOOM), Minneapolis, MN.
11. April 2021. *Empirical Bayesian Inference Using Joint Sparsity*, One World Mathematics of Information, Data, and Signals (1W-MINDS) Seminar (ZOOM).
12. January 2021. *Empirical Bayesian Inference Using Joint Sparsity*, AFOSR EM Program Review Meeting, Arlington, VA (ZOOM), January 5, 2021.
13. October 2020. *Empirical Bayesian Inference Using Joint Sparsity* Center for Computational Mathematics, Flatiron Institute (ZOOM), New York, NY.
14. October 2020. *Empirical Bayesian Inference Using Joint Sparsity*, Numerical Analysis & Scientific Computing, Courant Institute (ZOOM), NYU, New York, NY.

Supervised PhD Students

2024	**Dylan Green**, *Advances in Computational and Statistical Inverse Problems*	*Dartmouth*
2022	**Yao Xiao**, *Sequential Image Recovery from Noisy and Under-Sampled Fourier Data*	*Dartmouth*
2021	**James Ronan**, *New Techniques in Optimal Transport*	*Dartmouth*
2020	**Victor Churchill**, *Synthetic Aperture Radar Image Formation with Uncertainty Quantification*	*Dartmouth*
2018	**Theresa Scarnati**, *Recent Techniques for Regularization in Partial Differential Equations and Imaging*	*ASU*
2016	**Denny Denker**, *High Order Sparsity Exploiting Methods with Applications in Imaging and PDEs*	*ASU*
2015	**Utku Ilkturk**, *Observability Methods in Sensor Scheduling*	*ASU*
2010	**Adityavikram Viswanathan**, *Problems in Non-harmonic Fourier Reconstruction, Discontinuity Detection, and Point-Spread Function Estimation*	*ASU Electrical Engineering*
2008	**Rishu Saxena**, *High Order Methods for Edge Detection and Applications*	*ASU*
2007	**Dennis Cates**, *Edge Detection Using Fourier Data and Applications*	*ASU*
2004	**Rochus Boerner**, *Construction of MRAs and Wavelets with Arbitrary Integer Dilation Factor* $a = 2, 3 \cdots$	*ASU*
2002	**Richard Archibald**, *BoundaryDetection and Reconstruction in Magnetic Resonance Imaging*	*ASU*

Supervised Undergraduate Honors Theses

2023	**Ivy Yan**, Pre-processing Methods for Change Detection on Under-sampled and Noisy Fourier Data	*Dartmouth*
2020	**Sriram Bapatla**, Using Bayes Error Rate Estimation to Analyze Feature Spaces	*Dartmouth*
2020	**Jiahui Zhang**, Exploration into Reducing Uncertainty in Inverse Problems Using Markov Chain Monte Carlo Methods	*Dartmouth*
2016	**Alexandar Reynolds**, Edge Detection from Spectral Phase Data	*ASU*
2015	**Jingjing Fan**, An l_1 Regularization Algorithm for Reconstructing Piecewise Smooth Functions from Fourier Data Using Wavelet Projection	*ASU*
2015	**Shane Lubold**, A Statistical Framework for Detecting Edges from Noisy Fourier Data Using Multiple Concentration Factors	*ASU*
2015	**Ryan Mead**, An l_1 Regularization Algorithm for Reconstructing Piecewise Smooth Functions from Fourier Data Using Wavelet Projection	*ASU*
2015	**Rachael Moore**, Designing Concentration Factors to Detect Jump Discontinuities from Non-uniform Fourier Data	*ASU*
2014	**Gabriel Wasserman**, Incorporating the Sparsity of Edges into the Fourier Reconstruction of a Piecewise Smooth Function	*ASU*
2013	**Adam Martinez**, Edge Detection from Non-Uniform Fourier Data via a Modified Method of Convolutional Gridding	*ASU*
2007	**W. Steven Rosenthal**, Discrete Orthogonal Polynomial Least Squares Approximation for Image Reconstruction and Solving Partial Differential Equations	*ASU*
2007	**Miguel Sanchez**, A Study on the Accuracy and Competitiveness of the Mapped Chebyshev Method	*ASU*

Sponsored Postdoctoral Fellows

- Keenan Eikenberry (2023–), Lizuo Luo (2023 –), Jihun Han (2022-2024), Tongtong Li (2021-2024), Zhen Chen (2021-2023), Jan Glaubitz (2020-2023), Donghwan Kim (2017-2018), Toby Sanders (2015-2016), Jacqueline Davis (2015-2016), Rodrigo Platte (2006), James Gleeson (1999-2000).

Courses Taught at Dartmouth College

Graduate: Introduction to Numerical Analysis; Numerical Linear Algebra; Numerical Methods for Hyperbolic Partial Differential Equations; Mathematics of Machine Learning (student run seminar course); Computational Inverse Problems (student run seminar).

Undergraduate: Calculus (Math 8), Differential Equations (Math 23), Computational Methods (Math 56) and Topics in Applied Mathematics (Math 76).

Courses Taught at Arizona State University

Graduate: Finite Difference Methods for Hyperbolic Partial Differential Equations, Spectral Methods for Partial Differential equations and Computational Methods for Problems in Biology and Epidemiology.

Undergraduate: Numerical Analysis and Scientific Computing, Calculus I, II, III, Business Calculus, Differential Equations and Linear Algebra.

Service to the Profession

Committees, Boards, an Conferences Organized Since 2020

- Scientific Advisory Board for the Institute for Computational and Experimental Research in Mathematics [ICERM] (2019 – 2022)
- Society for Industrial and Applied Mathematics [SIAM] Vice President for Science Policy (2019 – 2022); Member of SIAM Committee on Science Policy (2014 – 2018)
- Chair of Organizing Committee for the North American High Order Methods Conference, Dartmouth College, June 17-19, 2024.
- Scientific Committee Member for the North American High Order Methods Conference (2024 –).

Editorial Boards Since 2020

- Applied Mathematics for Modern Challenges (2023 – current)
- Journal of Computational Mathematics (2017 – current)
- Journal of Scientific Computing (2006 – current)
- Mathematical Modelling and Numerical Analysis (2023 – current)
- SIAM/ASA Journal on Uncertainty Quantification (2023 – current)

Service to Dartmouth College

- Department of Mathematics: Faculty Recruitment Committee (2016-2017, 2024-2025), Chair (2017-2018, 2018-2019, 2020-2021); Graduate Admissions Committee (2016-2018, 2021-2022, 2024–); Graduate Program Committee (2017–), Chair (2018–2019); Advisor to Graduate Students (2022–).
- Thayer School of Engineering: Faculty Search Committee (2017-2018), (2018–2019); Dean Search Committee (2018-2019).
- Department of Computer Science Faculty Search Committee (2024-2025).
- Department of Physics Review Committee (2018).
- Department of Computer Science Review Committee (2024).
- University Senior Fellowship Committee (2017-2019).
- Committee of Advisory to the President (2019-2022).
- Co-lead University Faculty Seminar Series (2023-2024).
- Faculty Advisor to Men's Basketball (2017–).