Deanna Needell | Professor
Univ. of California, Los Angeles

Contact

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Citizenship

USA

Research Interests

Randomized Algorithms, Computational Mathematics, Machine Learning, Data Science, Applications with community partners.

Education

PhD in **Mathematics**
University of California, Davis, May 2009
Dissertation Title: *Topics in Compressed Sensing.* Adviser: R. Vershynin.

MA in **Mathematics**
University of California, Davis, Sept. 2005

BS in **Mathematics** (valedictorian)
Second major in **Computer Science**
University of Nevada, Reno, Dec. 2003

Academic Experience

Executive Director
Institute for Digital Research and Education, UCLA, 2021 - current

Dunn Family Endowed Chair in Data Theory
Mathematics Dept., University of California, Los Angeles, July 2020 – current

Professor
Mathematics Dept., University of California, Los Angeles, July 2017 – current

Associate Professor
Mathematics Dept., Claremont McKenna College, Jan. 2015–July 2017

Assistant Professor
Mathematics Dept., Claremont McKenna College, July 2011–2015

Academic Mentor
Thurman Ye, Troy Tech Senior Internship Program, Summer 2016

Academic Mentor
Research Experience for Undergraduates (REU), Univ. of California, Los Angeles, Summers 2014-2015

Academic Mentor
Research in Industrial Projects for Students (RIPS), Univ. of California, Los Angeles, Summer 2012

Postdoctoral Fellow
Statistics and Mathematics Depts., Stanford University, Sept. 2009–June 2011

Mentor for VIGRE VPUE Undergraduate Summer Workshop
Statistics Dept., Stanford University, June–Sept. 2010

Instructor
Mathematics Dept., University of California, Davis, 2005–2009

Instructor
Mathematics Dept., Solano Community College, May–Aug. 2009

Explore Math Instructor for Math Circle
Mathematics Dept., University of California, Davis, Jan.–Mar. 2009

Graduate Student Researcher for R. Vershynin
Mathematics Dept., University of California, Davis, 2006– 2009

Instructor
Mathematics Dept., Sacramento City College, 2007–2008

Lead Teaching Assistant
Mathematics Dept., University of California, Davis, 2007–2008

Instructor
Mathematics Dept., University of Nevada, Reno, Jan.–Aug. 2004

Tutor for Math, Physics, Computer Science, Economics
Learning and Skills Center, University of Nevada, Reno, Nov. 1999–Dec. 2003

Courses Taught

Probability, Math 170E, UCLA

Probability, Math 170A, UCLA

Seminar: Applied Mathematics Compressive sensing and large-scale techniques, Math 285J, UCLA

Mathematical Aspects of Scientific Computing: Computational Linear Algebra, Math 270B and 270C, UCLA

Representations of High Dimensional Data, Math 169, Claremont McKenna College, Spring 2016

Discrete Structures, CSCI 55, Claremont McKenna College, Fall 2015 & 2016

Deep Learning, Indep. Study, Claremont Graduate Univ., Fall 2014-2015

Practical Compressive Signal Proc., Indep. Study, UCLA, Fall 2014

Calculus I, Math 30, Claremont McKenna College, Spring 2014 & 2017

Stochastic Greedy Algorithms, Indep. Study, Claremont Graduate Univ., Spring 2014

Iterative Projection Methods, Indep. Study, Claremont Graduate Univ., Spring 2014

Super-resolution, Indep. Study, Claremont Graduate Univ., Spring 2014

Introduction to Statistics, Math 52, Claremont McKenna College, Fall 2011 - Spring 2016

Topics in Compressive Sensing, Indep. Study, Claremont Graduate Univ., Spring 2012 & 2013

Probability, Math 151, Claremont McKenna College, Fall 2011 & 2013

Statistical Inference, Math 152, Claremont McKenna College, Spring 2012 & 2013 & 2015 & 2017

Introduction to Wavelets, Math 168, Claremont McKenna College, Fall 2013

Stochastic Processes (graduate), Stat 317, Stanford, Spring 2010, Spring 2011

Statistical Methods in Engineering & Physical Sciences, Stat 110, Stanford, Fall 2010

Probabilty Theory, Stat 116, Stanford, Fall 2009

Number Theory, Math 115A, UC Davis, Summer 2009

Intermediate Algebra, Math 104, Solano Comm. College, Summer 2009

Abstract Mathematics, Math 108, UC Davis, Summer 2008

Probability and Statistics, Math 300, Sacramento City Coll., Summer 2008

Intermediate Algebra, Math 120, Sacramento City Coll., Fall 2007

Beginning Algebra, Math 100, Sacramento City Coll., Spring 2007

Precalculus, Math 12, UC Davis, Summer 2005

College Algebra, Math 120, Univ. of Nevada Reno, Summer 2004

Survey of Math, Math 100, Univ. of Nevada Reno, Spring 2004

Students

Thesis Advising

Matthew Aven, Claremont McKenna College. Graduation: 2017.
Wei Wu, Scripps College. Graduation: 2017.
Thurman Ye, Troy Technical High School. Graduation: 2017.
Dejun Wan, Claremont McKenna College. Graduation: 2016.
Phillip North, Claremont McKenna College. Graduation: 2015.
Jonathon Briskman, Claremont McKenna College. Graduation: 2014.
Evan Casey, Claremont McKenna College. Graduation: 2014.
Nathan Falk, Claremont McKenna College. Graduation: 2014.
Aparna Sarkar, Pomona College. Graduation: 2014.
Zachary Siegel, Pomona College. Graduation: 2014.
Nathan Lenssen, Claremont McKenna College. Graduation: 2013.
Morgan Mayer-Jochimsen, Scripps College. Graduation: 2013.

Jing Wen, Pomona College. Graduation: 2013.

Graduate Advising

Alex Hue, UCLA, Expected graduation: 2027.
Mark Kong, UCLA, Expected graduation: 2027.
Alex Sietsema, UCLA, Expected graduation: 2027.
Chi-Hao Wu, UCLA, Expected graduation: 2027.
Nicholas Hu, UCLA, Expected graduation: 2026.
Zerrin Vural, UCLA, Expected graduation: 2026.
Joyce Chew, UCLA, Expected graduation: 2025.
Erin George, UCLA, Expected graduation: 2025.
Yotam Yaniv, UCLA, Graduation: 2024.
Ben Jarman, UCLA, Graduation: 2023.
Chris Strohmeier, UCLA, Graduation: 2023.
Will Swartworth, UCLA, Graduation: 2023.
Zehan Chao, UCLA, Graduation: 2022.
Xia Li, UCLA, Graduation: 2022.
Jacob Moorman, UCLA, Graduation: 2021.
Denali Molitor, UCLA, Graduation: 2020.
Anna Ma, Claremont Graduate University. Graduation: 2018.
Tina Woolf, Claremont Graduate University. Graduation: 2017.
Ran Zhao, Claremont Graduate University, Masters. Graduation: 2014.

Postdoctoral Advising

Willem Diepeveen, UCLA Hedrick Postdoc, 2024-current.
Xue Feng, UCLA PIC Postdoc, 2024-current.
Chunyang Liao, UCLA, PIC Postdoc, 2023-current.
Minxin Zhang, UCLA, Hedrick Postdoc, 2023-current.
Lara Kassab, UCLA, CAM Postdoc, 2022-current.
Jocelyn Chi, UCLA, NSF Postdoc, 2021-2024.
Halyun Jeong, UCLA, CAM Postdoc, 2021-2024.
Michael Murray, UCLA, PIC Postdoc, 2021-2024.
Shuang Li, UCLA, CAM Postdoc, 2020-2023.
Michael Perlmutter, UCLA, Hedrick Postdoc, 2020-2023.
Longxiu Huang, UCLA, CAM Postdoc, 2019-2022.
Jamie Haddock, UCLA, CAM Postdoc, 2018-2021.
Hanbaek Lyu, UCLA, Hedrick Postdoc, 2018-2021.
Liza Rebrova, UCLA, CAM Postdoc, 2018-2021.
Palina Salanevich, UCLA, CAM Postdoc, 2017-2020.
Guangliang Chen, Postdoctoral researcher, 2013-2014.

Other doctoral Advising

Tong Wu, visiting graduate researcher, 2018 - 2020.
Le Gao, visiting graduate researcher, 2019-2020.
Tobias Birnbaum, TU Frieberg, visiting graduate researcher, 2015-2016.
Doctoral Committee: Arian Eamaz, Electrical and Computer Engineering, University of Illinois Chicago, 2023-current.
Doctoral Committee: Xinzhe Zuo, Mathematics, UCLA. Adviser: Stan Osher, 2023-current.
Doctoral Committee: Michael Johnson, Mathematics, UCLA. Adviser: Mason Porter, 2023-current.
Doctoral Committee: Theodore Faust, Mathematics, UCLA. Adviser: Mason Porter, 2022-current.
Doctoral Committee: Yurun Ge, Mathematics, UCLA. Adviser: Andrea Bertozzi, 2020-2023.
Doctoral Committee: Ryan Wilkinson, Mathematics, UCLA. Adviser: Marcus Roper, 2020-2022.

Doctoral Committee: Jinghui Chen, Computer Science, UCLA. Adviser: Quanquan Gu, 2020-2023.
Doctoral Committee: Jean Helder Marques Ribeiro, Applied Economics, UCLA. Adviser: Kunihiko Taira, 2020-current.
Doctoral Committee: Abigail Hicock, Mathematics, UCLA. Adviser: Mason Porter, 2020-2023.
Doctoral Committee: Hui Jin, Mathematics, UCLA. Adviser: Guido Montufar, 2020-2022.
Doctoral Committee: Bumsu Kim, Mathematics, UCLA. Adviser: Wotao Yin, 2020-current.
Doctoral Committee: Kaiyan Peng, Mathematics, UCLA. Adviser: Andrea Bertozzi and Mason Porter, 2020-current.
Doctoral Committee: Dominic Yang, Mathematics, UCLA. Adviser: Andrea Bertozzi, 2020-current.
Doctoral Committee: Thomas Merkh, Mathematics, UCLA. Adviser: Guido Montufar, 2019-2022.
Doctoral Committee: Siting Liu, Mathematics, UCLA. Adviser: Stan Osher, 2019-2022.
Doctoral Committee: Thomas Tu, Mathematics, UCLA. Adviser: Andrea Bertozzi, 2019-2022.
Doctoral Committee: Yuejiao Sun, Mathematics, UCLA. Adviser: Wotao Yin, 2018-2021.
Doctoral Committee: Fei Feng, Mathematics, UCLA. Adviser: Wotao Yin, 2018-2021.
Doctoral Committee: Robert Hannah, Mathematics, UCLA. Adviser: Wotao Yin, 2017-2019.
Doctoral Committee: Michelle Hsiao-Chin Feng, Mathematics, UCLA. Adviser: Mason Porter, 2017-2020.
Doctoral Committee: Raman Saravana, Mathematics, Claremont Graduate University. Expected completion: 2016. Adviser: Christopher Druzgalski. *Simulation of Plethysmographic Environment in Pulmonary Function Studies.*
Doctoral Committee: Qian Jane Xu, Mathematics, Claremont Graduate University and San Diego State University. Expected graduation: 2015. Adviser: Jianwei Chen. *Generalized Linear Varying-Coefficient Model with Data Missing at Random.*
Doctoral Committee & Co-adviser: Yanting Ma, Electrical Engineering, North Carolina State University. Expected graduation: 2016. Adviser: Dror Baron.

Honors and Awards

Defense Health Agency CDMRP TB240022 award, *Machine Learning Approach Using Patient Registry Data to Reveal Neurological Manifestations of Persistent Lyme Disease*, 2025-2030

AIM Workshop award, Fairness and foundations in Machine Learning, 2024 (for July 2026)

NSF Computational Mathematics award #2408912, *Equity Beyond the Algorithm: A Mathematical Quest for Fairer-ness in Machine Learning*, 2024-2027

Society for Industrial and Applied Mathematics (SIAM) Fellow, Class of 2024.

Eisenbud Professor, SLMath, Berkeley, Fall 2023.

UCLA Racial and Social Justice Seed Grant (co-PIs Erin George and Lara Kassab), 2023-2024.

American Mathematical Society (AMS) Fellow, Class of 2022.

NSF DMS #2136090, *RTG: Geometry and Topology at UCLA*, 2022-2025.

UCLA Initiative to Study Hate grant (co-PI Erin George), 2022-2023.

NSF Applied Mathematics award #2108479, *Collaborative Research: Fast, Low-Memory Embeddings for Tensor Data with Applications*, 2021-2024

NSF Computational Mathematics award #2011140, *Tensors, Topics, Truth, and Time: Methods for Real Tensor Applications*, 2020-2023

MSRI Summer Research for Women in Mathematics (SWiM), 2019

NSF Computer Science Bits and Bytes Research Highlight, *Practical Analysis of Large-Scale Data with*

Lyme Disease Case Study, Oct. 2018

Research Collaboration Workshop for Women in Data Science and Mathematics (WiSDM), ICERM, July 2019

Collaborate@ICERM Group travel grant, August 2018

NSF BIGDATA Collaborative Research award #1740325, *Practical Analysis of Large-Scale Data with Lyme Disease Case Study*, 2017-2020

IMA Prize in Mathematics and its Applications, 2016

MSRI Research Professorship, Geometric Functional Analysis and Applications, Fall 2017

The Sloan Foundation, Grant 2016-7296, *2018 Summer Graduate Workshop: Representations of High Dimensional Data*, co-PI, 2016-2018

MSRI Summer Graduate School Grant, *Representations of High Dimensional Data*, 2018

NSF Career award #1348721, *Practical Compressive Signal Processing*, 2014-2019

2014 Alfred P. Sloan Research Fellowship

ICERM Research Fellowship, Fall 2014

University of Nevada Alumni of the Year Award (2014)

BLAIS Collaboration Grant, 2013-2015

Simons Foundation Collaboration Grant #274305 for Mathematicians, 2013-2018

BLAIS collaboration course grant (Wavelets & their applications), 2013

2012 IEEE Signal Processing Society Young Author Best Paper Award (Signal Recovery from Incomplete and Inaccurate Measurements Via Regularized Orthogonal Matching Pursuit)

AIM SQuaRE Research Group Grant, 2012-2015

AMS Simons Travel Grant, 2012

Challenges in Geometry, Analysis, and Computation: High-Dimensional Synthesis, Yale University Travel Award, 2012

ScienceWatch Fast-Breaking Paper (CoSaMP: Iterative signal recovery from incomplete and inaccurate samples)

Communications of the ACM paper selection (CoSaMP: Iterative signal recovery from incomplete and inaccurate samples)

Workshop on Sparsity and Computation Travel Award, 2010

AT13 International Conference Travel Award, 2010

Henzl-Gabor Travel Award, 2009-2010

SAMPTA'09 Travel Scholarship

VIGRE Graduate Fellowship, 2009

Graduate Council's Gradute Student Travel Award, 2008

Consortium for Women and Research Travel Award, 2008

Alice Leung Scholarship in Mathematics, 2008

UCD & Humanities Graduate Research Award, 2008

UC Davis Mathematics Block Grant, 2008

VIGRE Summer Research Fellowship, 2008

UCD & Humanities Graduate Research Award, 2007

UC Davis Mathematics Block Grant, 2007

Graduate Student Mentorship with mentor Prof. Vershynin, 2006

UCD & Humanities Graduate Research Award, 2006

Graduate Student Mentorship with mentor Prof. Vershynin, 2005

UCD & Humanities Graduate Research Award, 2005

VIGRE Summer Research Fellowship, 2005

VIGRE Graduate Fellowship, 2004

E.W.B. Math and Science Scholarship, 2004

Senior Scholar of the College of Arts and Sciences, Univ. of Nevada, 2003

ACM Northwest Regional Programming Contest 2003, 6th place

ACM Northwest Regional Programming Contest 2002, 28th place

Nevada Women's Fund Academic Scholarship, 2002-2004

Golden Key National and Phi Kappa Phi Honor Societies, 1999

University of Nevada Academic Scholarship, 1998 - 2003

Publications

Available from `www.math.ucla.edu/~deanna`.

Refereed Journal Publications

1. H. Jeong, D. Needell. "Linear Convergence of Reshuffling Kaczmarz Methods With Sparse Constraints." SIAM Journal on Scientific Computing, to appear, 2025.
2. W. Diepeveen, J. Chew, D. Needell. "Curvature corrected tangent space-based approximation of manifold-valued data." Information and Inference, to appear, 2025.
3. H. Jeong, D. Needell, E. Rebrova. "Stochastic gradient descent for streaming linear and rectified linear systems with Massart noise." SIAM Journal on Mathematics of Data Science (SIMODS), to appear, 2025.
4. L. Johnson, M. Shapiro, D. Needell, R. Stricker. "Optimizing Exclusion Criteria for Clinical Trials of Persistent Lyme Disease Using Real-World Data." Healthcare, vol. 13, num. 1, pp.20, 2025.
5. A. Castillo, J. Haddock, I. Hartsock, P. Hoyos, L. Kassab, A. Kryshchenko, K. Larripa, D. Needell, S. Suryanarayanan, K. Yacoubou Djima. "Randomized Iterative Methods for Tensor Regression Under the t-product." WiSDM 2023 Springer Proceedings, to appear, 2024.
6. J. T. Chi, D. Needell. "Sketched Gaussian Model Linear Discriminant Analysis via the Randomized Kaczmarz Method." SIAM Journal on Matrix Analysis and Applications, vol. 46, num.1, pp. 94-120, 2025.
7. A. Eamaz, F. Yeganegi, D. Needell, M. Soltanalian. "Harnessing the Power of Sample Abundance: Theoretical Guarantees and Algorithms for Accelerated One-Bit Sensing." IEEE Transactions on Information Theory, to appear, 2024.
8. L. Kassab, A. Kryshchenko, H. Lyu, D. Molitor, D. Needell, E. Rebrova, J. Yuan. "Sparseness-constrained Nonnegative Tensor Factorization for Detecting Topics at Different Time Scales." Frontiers in Applied Mathematics and Statistics, vol. 10, num. 1287074, 2024.

9. B. Jarman, L. Kassab, D. Needell, A. Sietsema. “Stochastic Iterative Methods for Online Rank Aggregation from Pairwise Comparisons." BIT Numerical Mathematics, to appear, 2024.
10. L. Huang, D. Needell, S. Tang. “Robust recovery of bandlimited graph signals via randomized dynamical sampling." Information and Inference, to appear, 2024.
11. H. Jeong, D. Needell, J. Qin. “Federated Gradient Matching Pursuit." IEEE Trans. Information Theory, to appear, 2024.
12. D. Needell, A. A. Nelson, R. Saab, P. Salanevich, O. P. Schavemaker. “Random Vector Functional Link Networks for Function Approximation on Manifolds." Frontiers in Applied Mathematics and Statistics-Optimization, to appear 2024.
13. X. Li, L. Huang, D. Needell. “Randomized Kaczmarz in adversarial distributed setting." SIAM Journal on Scientific Computing, to appear, 2024.
14. J. Chew, M. Hirn, S. Krishnaswamy, D. Needell, M. Perlmutter, H. Steach, S. Viswanath, H-T. Wu. “Geometric Scattering on Measure Spaces." Applied and Computational Harmonic Analysis, vol. 70, pp. 101635, 2024.
15. R. Grotheer, S. Li, A. Ma, D. Needell, J. Qin. “Iterative Singular Tube Hard Thresholding Algorithms for Tensor Completion." Inverse Problems and Imaging, to appear, 2024.
16. M. Gao, J. Haddock, D. Molitor, D. Needell, E. Sadovnik, T. Will, R. Zhang. “Neural Nonnegative Matrix Factorization for Hierarchical Multilayer Topic Modeling." Sampling Theory, Signal Processing, and Data Analysis, to appear, 2023.
17. H. Cai, Z. Chao, L. Huang, D. Needell. “Robust Tensor CUR: Rapid Low-Tucker-Rank Tensor Recovery with Sparse Corruptions." SIAM Journal on Imaging Sciences, vol. 17, num. 1, pp. 225–247, 2024.
18. M. A. Iwen, D. Needell, M. Perlmutter, E. Rebrova. “Modewise Operators, the Tensor Restricted Isometry Property, and Low-Rank Tensor Recovery." Applied Computational Harmonic Analysis, vol. 66, pp. 161–192, 2023.
19. K. Cheng, S. Inzer, A. Leung, X. Shen, M. Perlmutter, M. Lindstrom, J. Chew, T. Presner, D. Needell. “Multi-scale Hybridized Topic Modeling: A Pipeline for Analyzing Unstructured Text Datasets via Topic Modeling." SIAM Undergraduate Research Online (SIURO), 2023.
20. H. Cai, L. Huang, P. Li, D. Needell. “Matrix Completion with Cross-Concentrated Sampling: Bridging Uniform Sampling and CUR Sampling." IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 45, num. 8, pp. 10100 - 10113, 2023.
21. M. R. Lindstrom, X. Ding, F. Liu, A. Somayajula, D. Needell. “Continuous Semi-Supervised Nonnegative Matrix Factorization." Algorithms, vol. 16, num. 4, pp. 187, 2023.
22. L. Cheng, B. Jarman, D. Needell, E. Rebrova. “On Block Accelerations of Quantile Randomized Kaczmarz for Corrupted Systems of Linear Equations." Inverse Problems, vol. 39, num. 2, pp. 024002, 2022.
23. A. Hicock, D. Needell, M. A. Porter. “Analysis of Spatiotemporal Anomalies Using Persistent Homology: Case Studies with COVID-19 Data." SIAM Journal on Mathematics of Data Science, vol. 4, num. 3, pp. 1116-1144, 2022.
24. R. Budahazy, L. Cheng, Y. Huang, A. Johnson, P. Li, J. Vendrow, Z. Wu, D. Molitor, E. Rebrova, D. Needell. “Analysis of Legal Documents via Non-negative Matrix Factorization Methods." SIAM Undergraduate Research Online, vol. 15, 2022.
25. Y. Yaniv, J. Moorman, W. Swartworth, T. Tu, D. Landis, D. Needell. “Selectable Set Randomized Kaczmarz." Numerical Linear Algebra with Applications, e2458, 2022.
26. R. Yim, J. Haddock, D. Needell. “Statistical Learning for Best Practices in Tattoo Removal." SIAM Undergraduate Research Online, vol. 15, 2022.
27. P. Li , C. Tseng, Y. Zheng, J. A. Chew, L. Huang, B. Jarman, D. Needell. “Guided Semi-Supervised Non-negative Matrix Factorization." Algorithms, vol. 15, num. 5, pp. 136, 2022.
28. C. Strohmeier, H. Lyu, D. Needell. “Online Nonnegative CP-dictionary Learning for Markovian Data." Journal of Machine Learning Research, vol. 23, num. 148, pp. 1-50, 2022.

29. J. Haddock, D. Needell, E. Rebrova, W. Swartworth. “Quantile-based Iterative Methods for Corrupted Systems of Linear Equations." SIAM Journal on Matrix Analysis and Applications, vol. 43, num. 2, pp. 605-637, 2022.
30. H. Adams, L. Kassab, D. Needell.. “An Adaptation for Iterative Structured Matrix Completion." Foundations of Data Science, vol. 3, iss. 4, pp. 769-824, 2021.
31. R. Grotheer, A. Ma, D. Needell, S. Li, J. Qin. “Iterative Hard Thresholding for Low CP-rank Tensor Models." Linear and Multilinear Algebra, pp. 1–17, 2021.
32. H. Cai, K. Hamm, L. Huang, D. Needell. “Robust CUR Decomposition: Theory and Imaging Applications." SIAM Journal on Imaging Sciences, vol. 14, num. 4, pp. 1472-1503, 2021.
33. L. Huang, D. Needell. “HOSVD-Based Algorithm for Weighted Tensor Completion." Journal of Imaging, vol. 7, num. 7, pp. 110, 2021.
34. H. Cai, K. Hamm, L. Huang, D. Needell. “Mode-wise Tensor Decompositions: Multi-dimensional Generalizations of CUR Decompositions." Journal of Machine Learning Research, vol. 22, num. 185, pp.1-36, 2021.
35. R. Gower, D. Molitor, J. Moorman, D. Needell.“On Adaptive sketch-and-project methods for solving linear systems." SIAM Journal on Matrix Analysis and Applications, vol. 22, num. 185, pp.1-36, 2022.
36. J. Vendrow, J. Haddock, D. Needell, L. Johnson. “Feature selection from lyme disease patient survey using machine learning." Algorithms, vol. 13, num. 12, pp. 334, 2020.
37. M. A. Iwen, D. Needell, E. Rebrova, and A. Zare. “Lower Memory Oblivious (Tensor) Subspace Embeddings with Fewer Random Bits: Modewise Methods for Least Squares." SIAM Journal on Matrix Analysis and Applications, vol. 42, no. 1, pp. 376–416, 2021.
38. J. A. De Loera, J. Haddock, A. Ma, D. Needell. “Data-driven Algorithm Selection in Optimization and Signal Processing." Annals of Mathematics and Artificial Intelligence, pp. 1–25, 2020.
39. H. Lyu, D. Needell, L. Balzano. “Online matrix factorization for markovian data and applications to network dictionary learning." Journal of Machine Learning Research, vol. 21, num. 251, pp. 1-49, 2020.
40. S. Foucart, D. Needell, R. Pathak, Y. Plan, M. Wootters. “Weighted matrix completion from non-random, non-uniform sampling patterns." IEEE Transactions on Information Theory, vol. 67, num. 2, pp. 1264-1290, 2020.
41. L. Johnson, M. Shapiro, R. Stricker, J. Vendrow, J. Haddock, D. Needell. “Antibiotic Treatment Response In Persistent Lyme Disease: Why Do Some Patients Improve While Others Do Not?". Healthcare (Basel), vol. 8, num. 4, pp. 383, 2020.
42. J. Qin, S. Li, D. Needell, A. Ma, R. Grotheer, H. Chenxi, N. Durgin. “Stochastic Greedy Algorithms For Multiple Measurement Vectors." Problems and Imaging, to appear, 2020.
43. J. Moorman, T. Tu, D. Molitor, D. Needell. “Randomized Kaczmarz with Averaging." BIT Numerical Mathematics, vol. 61, num. 1, pp. 337–359, 2021.
44. D. Molitor and D. Needell. “An iterative method for classification of binary data." Information and Inference, vol. 10, num. 1, pp. 261-283, 2021.
45. E. Rebrova, D. Needell. “On block Gaussian sketching for the Kaczmarz method." Numerical Algorithms, pp. 1–31, 2020.
46. D. Molitor, D. Needell, and R. Ward. “Bias of Homotopic Gradient Descent for Hinge Loss." Applied Mathematics and Optimization, to appear, pp. 1-27, 2020.
47. D. Needell, S. Nelson and Y. Shi. “Tribracket Modules." Applied Mathematics and Optimization, vol. 31, num.4, 2020.
48. L. Fukshansky, D. Needell, J. Park, Y. Xin. “Lattices from tight frames and vertex transitive graphs." Electronic Journal of Combinatorics, vol. 26, iss. 3, 2019.
49. S. Ravishankar, A. Ma and D. Needell. “Analysis of Fast Structured Dictionary Learning.” Information and Inference, vol. 9, num. 4, pp. 785-811, 2020.
50. T. Wu, Y. Zhou, Y. Xiao, D. Needell, F. Nie. “Modified Fuzzy Clustering with Segregated Cluster

Centroids." Neurocomputing, vol. 361, pp. 10-18, 2019.

51. A. Ma, Y. Zhou, C. Rush, D. Baron and D. Needell. “An Approximate Message Passing Framework for Side Information." IEEE Transactions on Signal Processing, vol. 67, iss. 7, pp 1875–1888, 2019.
52. J. Haddock, D. Needell. “Randomized Projection Methods for Linear Systems with Arbitrarily Large Sparse Corruptions." SIAM Journal on Scientific Computing, vol. 41, iss. 5, pp. S19–S36, 2019.
53. J. Haddock, D. Needell. “On Motzkin’s Method for Inconsistent Linear Systems." BIT Numerical Mathematics, vol. 59, num. 2, pp. 387-401, 2019.
54. D. Needell, R. Saab and T. Woolf. “Simple Classification using Binary Data." Journal of Machine Learning Research, vol. 19, num. 61, pp. 1–30, 2018.
55. W. Wu, D. Needell. “Convergence of the Randomized Block Gauss-Seidel Method." SIAM Undergraduate Research Online (SIURO), Vol. 11, pp. 369–382, 2018.
56. D. Needell. “Large Data Analysis and Lyme Disease." AMS Notices, vol. 66, num. 1, pp. 8–15, Jan. 2019.
57. W. Choi, D. Needell and S. Nelson. “Boltzmann Enhancements of Biquasile Counting Invariants." Journal of Knot Theory and its Ramifications, Vol. 27, Iss. 14, 1850068, 2018.
58. L. Fukshansky, D. Needell, B. Sudakov. “An algebraic perspective on integer sparse recovery." Applied Mathematics and Computation, vol. 340, pp. 31–42, 2019.
59. A. Ma and D. Needell “Stochastic Gradient Descent for Linear Systems with Missing Data." Numerical Mathematics: Theory, Methods and Applications, vol. 12, num. 1, pp. 1–20, 2017.
60. D. Molitor, D. Needell. “Hierarchical Classification using Binary Data.” AAAI Magazine special Issue *Deep Models, Machine Learning and Artificial Intelligence Applications in National and International Security*, June, 2018.
61. X. Gu, S. Tu, H-J.M. Shi, M. Case, D. Needell, and Y. Plan. “Optimizing quantization for Lasso recovery.” IEEE Signal Processing Letters, vol. 25, iss. 1, pp. 45-49, 2018.
62. A. Ma, D. Needell and A. Ramdas. “Iterative methods for solving factorized linear systems." SIAM Journal on Matrix Analysis and Applications, vol. 39, iss. 1, pp. 104–122, 2018.
63. A. Safari, S. Saadat, D. Needell. “RBF-based regional geoid model of Iran.” Studia Geophysica et Geodaetica, vol. 62, iss. 3, pp. 380–407, 2018.
64. R. Baraniuk, S. Foucart, D. Needell, Y. Plan, and M. Wootters. “One-Bit Compressive Sensing of Dictionary-Sparse Signals.” Information and Inference, vol. 7, num. 1, pp. 83–104, 2017.
65. N. Nguyen, D. Needell, and T. Woolf. “Linear Convergence of Stochastic Iterative Greedy Algorithms with Sparse Constraints.” IEEE Transactions on Information Theory, vol. 63, num. 11, pp. 6869–6895, 2017.
66. D. Needell and S. Nelson. “Biquasiles and Dual Graph Diagrams.” Journal of Knot Theory and Its Ramifications, vol. 26, num. 8, 2017.
67. A. Hefny, D. Needell, A. Ramdas. “Rows vs. Columns: Randomized Kaczmarz or Gauss-Seidel for Ridge Regression.” SIAM Journal of Scientific Computing, vol. 39, num. 5, pp. S528-S542, 2017.
68. R. Baraniuk, S. Foucart, D. Needell, Y. Plan, M. Wootters. “Exponential decay of reconstruction error from binary measurements of sparse signals.” IEEE Transactions on Information Theory, vol. 63, num. 6, 3368–3385, 2017.
69. D. Needell, R. Saab, T. Woolf. “Weighted L1-Minimization for Sparse Recovery under Arbitrary Prior Information.” Information and Inference, vol. 6, num. 3, pp. 284–309, 2017.
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Conference Publications

1. A. Ma, D. Needell, A. Xue. “Stochastic Gradient Descent on Tensors with Missing Data." AAAI 2025 Workshop CoLoRAI, To appear, 2025.
2. K. Karhadkar, E. George, M. Murray, G. Montufar, D. Needell. “Benign overfitting in leaky ReLU networks with moderate input dimension." Conference on Neural Information Processing Systems (NeurIPS), Spotlight paper, 2024.
3. L. Johnson, L. Kassab, J. Liu, D. Needell, M. Shapiro. “Towards understanding Neurological manifestations of Lyme disease through a machine learning approach with updated patient registry data." SESUG, 2024.
4. A. Sietsema, Z. Vural, J. Chapman, Y. Yaniv, D. Needell. “Stratified Non-Negative Tensor Factorization." 57th Asilomar Conference on Signals, Systems, and Computers, 2024.
5. Y. Li, L. Balzano, D. Needell, H. Lyu. “Convergence and Complexity Guarantee for Inexact First-order Riemannian Optimization Algorithms." International Conference on Machine Learning (ICML), to appear, 2024.
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7. J. Chapman, Y. Yaniv, D. Needell. “Stratified NMF for Heterogeneous Data." Proc. 55th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, 2023.
8. R. Grotheer, S. Li, A. Ma, D. Needell, J. Qin. “Stochastic Natural Thresholding Algorithms." Proc. 55th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, 2023.
9. J. Chew, D. Needell, M. Perlmutter. “A Convergence Rate for Manifold Neural Networks." Proc. Int. Conf. Sampling Theory and Applications (SAMPTA), 2023.
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15. X. Ding, X. Dong, O. McGough, C. Shen, A. Ulichney, R. Xu, W. Swartworth, J. T. Chi, D. Needell. “Population-Based Hierarchical Non-negative Matrix Factorization for Survey Data." Proc. IEEE/ACM International Conference on Big Data Computing, Applications and Technologies, 2022.

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20. L. Balzano, H. Lyu, D. Needell. “Using matrix factorizations for interpretability." Oberwolfach: Applied Harmonic Analysis and Data Science, 2021.
21. M. Lindstrom, W. Swartworth, D. Needell. “Reconstructing piezoelectric responses over a lattice: adaptive sampling of low dimensional time series representations based on relative isolation and gradient size." Proc. Smoky Mountains Computational Sciences and Engineering Conference, pp. 420-429, 2021. Best Solution paper, runner up.
22. Z. Chao, L. Huang, D. Needell. "Fast Robust Tensor Principal Component Analysis via Fiber CUR Decomposition." Proc. Robust Subspace Learning and Applications in Computer Vision, 2021.
23. B. Jarman, D. Needell. “QuantileRK: Solving Large-Scale Linear Systems with Corrupted, Noisy Data." Proc. 53rd Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2021.
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27. J. Vendrow, J. Haddock. D. Needell. “Neural Nonnegative CP Decomposition for Hierarchical Tensor Analysis." Proc. 53rd Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2021.
28. N. Durgin, R. Grotheer, C. Huang, S. Li, A. Ma, D. Needell, J. Qin. “A Simple Recovery Framework for Signals with Time-Varying Sparse Support." Proc. WiSDM, 2021.
29. “On A Guided Nonnegative Matrix Factorization." J. Vendrow, J. Haddock, E. Rebrova, D. Needell. IEEE International Conf. on Acoustics, Speech, and Signal Proc. (ICASSP), 2021.
30. C. Strohmeier, H. Lyu, D. Needell.. “Online tensor factorization and CP-dictionary learning for Markovian data." NeurIPS Opt+ML Workshop, 2020.
31. R. Grotheer, Y. Huang, P. Li, E. Rebrova, D. Needell, L. Huang, A. Kryshchenko, X. Li, K. Ha, O. Kryshchenko. “COVID-19 Literature Topic-Based Search via Hierarchical NMF." Proc. Empirical Methods in Natural Language Processing, 2020.
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33. H. Adams, L. Kassab, D. Needell. “An Adaptation for Iterative Structured Matrix Completion." Proc. 51st Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2019.
34. J. Haddock, D. Needell, E. Rebrova, W. Swartworth. “Stochastic Gradient Descent Methods for Corrupted Systems of Linear Equations." Proc. 54th Annual Conference on Information Sciences and Systems, 2020.
35. H. Lyu, G. Menz, D. Needell, C. Strohmeier. “Applications of Online Nonnegative Matrix Factorization

to Image and Time-Series Data." Proc. Information Theory and Applications, La Jolla CA, Feb. 2020.

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38. R. Grotheer, A. Ma, D. Needell, S. Li, J. Qin. “Stochastic Iterative Hard Thresholding for Low-Tucker-Rank Tensor Recovery." Proc. Information Theory and Applications, La Jolla CA, Feb. 2020.
39. C. Strohmeier, D. Needell. “Clustering of Nonnegative Subspaces and an Application to Matrix Completion." Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP), to appear, 2020.
40. J.-Y. Jiang, Z. Chao, A. L. Bertozzi, W. Wang, S. Young and D. Needell. “Learning to Predict Human Stress Level with Incomplete Sensor Data from Wearable Devices." Proc. 28th ACM International Conference on Information and Knowledge Management (CIKM), 2019.
41. J. De Loera, J. Haddock, A. Ma and D. Needell, “Data-driven Algorithm Selection and Parameter Tuning: Two Case studies in Optimization and Signal Processing." Proc. International Joint Conferences on Artificial Intelligence Organization, to appear, 2019.
42. E. Rebrova, D. Needell. “Sketching for Motzkin’s iterative method for linear systems." Proc. 50th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2019.
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45. M. Gao, J. Haddock, D. Molitor, D. Needell, E. Sadovnik, T. Will, R. Zhang. “Neural Nonnegative Matrix Factorization for Hierarchical Multilayer Topic Modeling." Proc. IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), 2019.
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50. E. Rebrova, D. Needell. “New bounds for the block Gaussian sketch and project method." Proc. Information Theory and Applications, La Jolla CA, Feb. 2019.
51. J. Moorman, T. Tu, D. Molitor, D. Needell. “Randomized Kaczmarz with Averaging." Proc. Information Theory and Applications, La Jolla CA, Feb. 2019.
52. N. Durgin, R. Grotheer, C. Huang, S. Li, A. Ma, D. Needell, J. Qin. “Compressed Anomaly Detection with Multiple Mixed Observations." Research in Data Science, pp. 211–237, 2019.
53. N. Durgin, R. Grotheer, C. Huang, S. Li, A. Ma, D. Needell, J. Qin. “Randomized Kaczmarz for Support Recovery of Jointly Sparse Corrupted Multiple Measurement Vectors." Research in Data Science, Proc. WiSDM (ICERM), 2018.
54. A. Zaeemzadeh, J. Haddock, N. Rahnavard, D. Needell. “A Bayesian Approach for Asynchronous Parallel Sparse Recovery." Proc. 49th Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2018.
55. A. Ma and D. Needell. “A Gradient Descent Approach for Incomplete Linear Systems.” Proc. 49th

Asilomar Conf. on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2018.

56. D. Molitor and D. Needell. "A simple approach to hierarchical classification." Proc. International Traveling Workshop on Interactions between low-complexity data models and Sensing Techniques (iTwist), Nov. 2018.
57. S. Ravishankar, A. Ma and D. Needell. "Analysis of Fast Alternating Minimization for Structured Dictionary Learning." Proc. Information Theory and Approximation, pp 1–9, La Jolla CA, Feb. 2018.
58. D. Molitor and D. Needell. "Matrix Completion for Structured Observations." Proc. Information Theory and Approximation, pp 1–5, La Jolla CA, Feb. 2018.
59. J. Haddock and D. Needell. "Randomized Projections for Corrupted Linear Systems." Proc. 15th Int. Conf. of Numerical Analysis and Applied Mathematics, Rhodes, Greece, Sept. 2017.
60. D. Needell, R. Saab and T. Woolf. "Simple Object Classification using Binary Data." Proc. AAAI Fall Symposium, Arlington, VA, Nov. 2017.
61. D. Baron, A. Ma, D. Needell, C. Rush, T. Woolf. "Conditional Approximate Message Passing with Side Information." *Proc. 49th Asilomar Conf. on Signals, Systems and Computers*, pp. 430-434, Pacific Grove, CA, Nov. 2017.
62. T. Birnbaum, Y. Eldar and D. Needell. "Tolerant Compressed Sensing With Partially Coherent Sensing Matrices." Proc. SPIE Optics and Photonics, Vol. 10394, p. 1039416, 2017.
63. S. Foucart, D. Needell, Y. Plan and M. Wootters. "De-biasing low-rank projection for matrix completion." Proc. SPIE Optics and Photonics, Vol. 10394, p. 1039417, 2017.
64. D. Needell and R. Ward. "Batched Stochastic Gradient Descent with Weighted Sampling." Chapter in *Approximation Theory XV*, pp. 279-306, Springer, 2017.
65. D. Needell and T. Woolf. "An Asynchronous Parallel Approach to Sparse Recovery." *Proc. Information Theory and Applications*, pp 1–5, San Diego, Feb. 2017.
66. J. A. De Loera, J. Haddock, D. Needell. "A Sampling Kaczmarz-Motzkin Algorithm for Linear Feasibility." *Proc. Copper Mountain Conf. on Iterative Methods*, Mar. 2016.
67. H. M. Shi, M. Case, X. Gu, S. Tu, and D. Needell. "Methods for Quantized Compressed Sensing." *Proc. Information Theory and Applications* (ITA), La Jolla CA, Jan. 2016.
68. P. North and D. Needell. "One-Bit Compressive Sensing with Partial Support." *Proc. IEEE International Workshop on Computational Advances in Multi-sensor Adaptive Processing*, 2015.
69. M. Davenport, A. Massimino, D. Needell and T. Woolf. "Constrained Adaptive Sensing." *Proc. Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, Cambridge, UK, July 2015.
70. F. Krahmer, D. Needell and R. Ward. "Compressive Sensing with Redundant Dictionaries and Structured Measurements." *Proc. 12th International Conf. on Sampling Theory and Applications (SAMPTA)*, May 2015.
71. N. Nguyen, D. Needell, and T. Woolf. "Stochastic Greedy Methods with Sparse Constraints." *Proc. Information Theory and Applications* (ITA), La Jolla CA, Jan. 2015.
72. D. Needell, N. Srebro, R. Ward. "Stochastic Gradient Descent, Weighted Sampling, and the Randomized Kaczmarz algorithm." *Proc. Neural Information Processing Systems* (NIPS), Dec. 2014.
73. C. Garnatz, X. Gu, A. Kingman, J. LaManna, D. Needell, S. Tu. "Practical approximate projection schemes in greedy signal space methods." *Proc. Allerton Conf. on Communication, Control, and Computing*, Allerton, IL, Oct. 2014.
74. A. Ma, A. Flenner, D. Needell, A. Percus. "Improving Image Clustering using Sparse Text and the Wisdom of the Crowds." *Proc. 46th Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, CA, Nov. 2014.
75. R. Zhao, D. Needell, C. Johansen, J. L. Grenard. "A Comparison of Clustering and Missing Data Methods for Health Sciences." *Proc. 46th Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, CA, Nov. 2014.
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77. N. Jamil, D. Needell, J. Muller, C. Lutteroth, and G. Weber. “Kaczmarz Algorithm with Soft Constraints for User Interface Layout.” *IEEE International Conference on Tools with Artificial Intelligence (ICTAI)*, Nov. 2013.
78. L. Demanet, D. Needell, and N. Nguyen, “Super-resolution via superset selection and pruning.” *Proc. 10th International Conf. on Sampling Theory and Applications (SAMPTA)*, July 2013.
79. A. Divekar and D. Needell, “Using Correlated Subset Structure for Compressive Sensing Recovery.” *Proc. 10th International Conf. on Sampling Theory and Applications (SAMPTA)*, July 2013.
80. M. A. Davenport, D. Needell, and M. B. Wakin,“Signal Space CoSaMP for Sparse Recovery with Redundant Dictionaries.” *Signal Processing with Adaptive Sparse Structured Representations (SPARS)*, 2013.
81. M. A. Davenport, D. Needell, and M. B. Wakin, “CoSaMP with redundant dictionaries.” *Proc. 46th Asilomar Conf. on Signals, Systems and Computers*, Pacific Grove, CA, Nov. 2012.
82. M. Herman and D. Needell, “Mixed Operators in Compressed Sensing.” *CISS 2010 (44th Annual Conf. on Info. Sciences and Systems)*, Princeton, NJ, Mar. 2010.
83. D. Needell, “Noisy signal recovery via reweighted ℓ_1-minimization.” *Proc. Asilomar Conf. on Signals, Systems, and Computers*, Pacific Grove, CA, Nov. 2009.
84. D. Needell and R. Vershynin, “Signal Recovery from Inaccurate and Incomplete Measurements via ROMP.” *Proc. 8th International Conf. on Sampling Theory and Applications (SAMPTA)*, May 2009.
85. D. Needell, J. A. Tropp and R. Vershynin, “Greedy Signal Recovery Review.” *Proc. 42nd Asilomar Conf. on Signals, Systems, and Computers*, Pacific Grove, Oct. 2008.
86. D. Needell and R. Vershynin, “Greedy signal recovery and uncertainty principles.” *Proc. SPIE* Vol. 6814, 68140J, San Jose, Jan. 2008.
87. D. Needell, J. Stuart, T. Thiel, M. Dascalu and F. Harris Jr., “Software requirements specification for a university class scheduler.” *Proc. Int. Conf. on SERP*, Las Vegas, June 2003.

Preprints

1. A. Castillo, J. Haddock, I. Hartsock, P. Hoyos, L. Kassab, A. Kryshchenko, K. Larripa, D. Needell, S. Suryanarayanan, K. Yacoubou Djima. “Block Gauss-Seidel methods for t-product tensor regression." Submitted, 2025.
2. A. Castillo, J. Haddock, I. Hartsock, P. Hoyos, L. Kassab, A. Kryshchenko, K. Larripa, D. Needell, S. Suryanarayanan, K. Yacoubou Djima. “Quantile-Based Randomized Kaczmarz for Corrupted Tensor Linear Systems." Submitted, 2025.
3. C. Liao, D. Needell, H. Schaeffer. “Cauchy Random Features for Operator Learning in Sobolev Space." Submitted, 2025.
4. J. Chew, W. Diepeveen, D. Needell. “Curvature Corrected Nonnegative Manifold Data Factorization." Submitted, 2025.
5. M. Dereziński, D. Needell, E. Rebrova, J. Yang. “Randomized Kaczmarz Methods with Beyond-Krylov Convergence." Submitted, 2025.
6. A. Castillo, J. Haddock, I. Hartsock, P. Hoyos, L. Kassab, A. Kryshchenko, K. Larripa, D. Needell, S. Suryanarayanan, K. Yacoubou Djima. “Randomized Kaczmarz methods for t-product tensor linear systems with factorized operators." Submitted, 2024.
7. C. Liao, D. Needell, A. Xue. “Differentially Private Random Feature Model." Submitted, 2024.
8. L. Kassab, E. George, D. Needell, H. Geng, N. Nia, A. Li. “Towards a Fairer Non-negative Matrix Factorization." Submitted, 2024.
9. M. Zhang, J. Haddock, D. Needell. “Block Matrix and Tensor Randomized Kaczmarz Methods for Linear Feasibility Problems." Submitted, 2024.
10. Z. Lin, D. Needell. “Kernel Alignment for Unsupervised Feature Selection via Matrix Factorization." Submitted, 2024.
11. C. Haselby, M. Iwen, D. Needell, E. Rebrova, W. Swartworth. “Fast and Low-Memory Compressive Sensing Algorithms for Low Tucker-Rank Tensor Approximation from Streamed Measurements."

Submitted, 2023.

12. J. Chew, E. De Brouwer, S. Krishnaswamy, D. Needell, M. Perlmutter. “Manifold Filter-Combine Networks." Submitted, 2023.
13. E. George, M. Murray, W. Swartworth, D. Needell. “Training shallow ReLU networks on noisy data using hinge loss: when do we overfit and is it benign?." Submitted, 2023.
14. E. George, J. Chew, D. Needell. “Detecting and Mitigating Indirect Stereotypes in Word Embeddings." Submitted, 2023.
15. Z. Chao, D. Molitor, D. Needell, M. Porter. “Inference of Media Bias and Content Quality Using Natural-Language Processing." Submitted, 2022.

Other Publications

1. E. George, L. Kassab, D. Needell. “On Fairness and Foundations in Machine Learning." *SIAM News*, May 1, 2025.
2. D. Needell. “Large scale stochastic optimization through pictures." Article in *Girls Angle Bulletin*, Feb. 2021.
3. H. Lyu, C. Strohmeier, G. Menz and D. Needell. “COVID-19 Time-series Prediction by Joint Dictionary Learning and Online NMF." Preprint, 2020.
4. D. Needell. “Questions, Lyme disease data, and more questions!." Article in *Girls Angle Bulletin*, Oct. 2020.
5. D. Needell. “Bias is everywhere." Article in *Girls Angle Bulletin*, June 2020.
6. D. Needell. “In this together." Article in *Girls Angle Bulletin*, Apr. 2020.
7. D. Needell. “Are computers artists?" Article in *Girls Angle Bulletin*, Feb. 2020.
8. Y. Guo, N. Haonian, Z. Lin, N. Liskij, H. Lyu, D. Needell, J. Qu, H. Sojico, Y. Wang, Z. Xiong, Z. Zou. “Topic-aware chatbot using Recurrent Neural Networks and Nonnegative Matrix Factorization." Preprint, 2019.
9. D. Needell. “How smart are computers?" Article in *Girls Angle Bulletin*, Dec. 2019.
10. D. Needell. “Math is all fun and games." Article in *Girls Angle Bulletin*, Aug. 2019.
11. D. Needell. “Colors and perfect matches." Article in *Girls Angle Bulletin*, June 2019.
12. D. Needell. “George the traveler." Article in *Girls Angle Bulletin*, Apr. 2019.
13. D. Needell. "AMS Spring Southeastern Sectional Sampler," AMS Notices, Mar. 2019.
14. D. Needell. “Hats and papers: Probability is probably surprising." Article in *Girls Angle Bulletin*, Dec. 2018.
15. D. Molitor, D. Needell, A. Nelson, R. Saab, and P. Salanevich.“Classification scheme for binary data with extensions." Chapter in *Compressed Sensing and its Applications*, Springer, 2018.
16. D. Needell. “Why it’s hot in high dimensions." Article in *Girls Angle Bulletin*, Aug. 2018.
17. D. Needell. “Who am I? : Machine Learning Classification." Article in *Girls Angle Bulletin*, June 2018.
18. D. Needell. “How to fill in the blanks." Article in *Girls Angle Bulletin*, Apr. 2018.
19. D. Needell. “Tackling large-scale data analysis." Article in *Girls Angle Bulletin*, Jan. 2018.
20. S. Shoemaker, A. Asadoorian, C. Ayala, R. McCarthy, J. Nadalin, W. T. Kerr, D. Needell, A. Bertozzi, S. J. Osher, M. Cohen. “Impact of Compressed Sensing on Statistical Inferences Made from Image Time Series: Application to functional MRI.” UCLA CAM Repository, 2016.
21. G. Chen and D. Needell. “Compressed sensing and dictionary learning.” Chapter in *Finite Frame Theory, Proceedings of Symposia in Applied Mathematics*, vol. 73, Amer. Math. Soc., Providence, RI, 2016, pp. 201-241.
22. D. Needell and R. Ward. “Near-optimal compressed sensing guarantees for anisotropic and isotropic total variation minimization.” CMC Faculty Publications and Research Technical Report, Paper 318, 2013.
23. D. Needell and R. Ward. “Two-subspace Projection Method for Coherent Overdetermined Systems.” CMC Faculty Publications and Research Technical Report, Paper 35, 2012. DOI: 10.5642/tspm-cos.2012.01.

24. D. Needell and J. A. Tropp. “CoSaMP: Iterative signal recovery from incomplete and inaccurate samples.” Communications of the ACM, *Research Highlights* section, Dec. 2010.
25. D. Needell. “Topics in Compressed Sensing.” PhD Dissertation, Mathematics, Univ. of California, Davis, May 2009.
26. D. Needell and J. A. Tropp. “CoSaMP: Iterative signal recovery from incomplete and inaccurate samples.” Technical Report, Mar. 2008. Revised July 2008.

Oral Presentations

Plenary and Keynote Presentations

1. “Fairness and Foundations in Machine Learning." SIAM Meeting on Mathematical Data Science, Plenary talk, Atlanta GA, Oct. 21, 2024.
2. “Towards Fairer-ness in Machine Learning." Falconer Lecture, MAA Mathfest, Indianapolis, Aug. 8, 2024.
3. “Towards Trasparency, Fairness and Efficiency in Machine Learning." Keynote, Atul Vyas Memorial Lecture, Claremont McKenna College, Nov. 9, 2023.
4. “Towards Trasparency, Fairness and Efficiency in Machine Learning." Plenary, Southern California Applied Mathematics Symposium (SoCAMS), UC Irvine, Apr 22, 2023.
5. “Using Algebraic Factorizations for Interpretable Learning." Keynote, UCLA QCBio Retreat , Sept. 16, 2022.
6. “Using Algebraic Factorizations for Interpretable Learning." Keynote, Merck Corning Data Science Symposium, June 15, 2022.
7. “Simple yet Efficient Iterative Methods." Data Science, Approximation Theory, and Harmonic Analysis, Fields Institute, May 12, 2022.
8. “On the topic of topic modeling: enhancing machine learning approaches for big data." Keynote, UC Tech, Aug. 10, 2021.
9. “On the Topic of Topic Modeling: Enhancing Machine Learning Approaches with Topic Features." Plenary, Midwest Grad Student conference on Geometry, Topology, and Data Analysis, July 30, 2021.
10. “On the Topic of Topic Modeling: Enhancing Machine Learning Approaches with Topic Features." Plenary, SIAM Conference on Applied Linear Algebra, May 17, 2021.
11. “Online Nonnegative Matrix Factorization." MINDS Conference, Johns Hopkins University (virtual), Oct. 23, 2020.
12. “Deep Models for Improved Topic Recovery." Plenary talk. Applied Mathematics, Modeling and Computational Science (AMMCS) 5th International Conference, Waterloo, ON, Canada, Aug. 19, 2019.
13. “Simple Approaches to Complicated Data." Plenary address, Approximation Theory, Nashville TN, May 20, 2019.
14. “Simple Approaches to Complicated Data." Plenary address, AMS Western Sectional Meeting, Honolulu HI, Mar. 23, 2019.
15. “A simple approach to hierarchical classification," (with D. Molitor). iTWIST: international Traveling Workshop on Interactions between low-complexity data models and Sensing Techniques, Plenary talk, Marseille, France, Nov. 23, 2018.
16. “Simple classification schemes using binary data." Keynote talk, Quantitative and Computational Biosciences Annual Retreat, Santa Barbara CA, Sept. 25, 2018.
17. “Iterative projective approaches to large-scale linear systems", plenary talk, 7th International Conference on Computational Harmonic Analysis, Vanderbilt University, Nashville TN, May 14, 2018.
18. “Less is more: Big data and compressed sensing.” MSRI Sponsors Banquet, keynote speaker, Mar. 3, 2017.
19. “SGD and Randomized Projections methods for linear systems.” Plenary talk, Southern California

Applied Mathematics Symposium (SOCAMS), Claremont, CA, June 4, 2016.

20. “Why it’s hot in high dimensions: applications to the data crisis.” Johns Hopkins University Center for Talented Youth (CTY) Program, host and keynote speaker, Claremont McKenna College, Oct. 24, 2015.
21. “Recovering overcomplete sparse representations.” Plenary talk. February Fourier Talks (FFT), University of Maryland, Feb. 20, 2015.
22. “Things we know and don’t know about practical compressive sensing.” Plenary talk. French-German Conference on Mathematical Image Analysis, Jan. 13, 2014.
23. “Less is more: Compressed sensing for imaging and big data.” Keynote address, Claremont Graduate University Conference on Big Data, Claremont CA, Nov. 21, 2014.

Conference Presentations

1. “A perspective on fairness in machine learning." LatMath Conference, IPAM, UCLA, Mar. 6, 2025.
2. “Towards Fairness and Transparency in Machine Learning." Traces of Intelligence Workshop, IPAM, UCLA, Sept. 24, 2024.
3. “Towards Transparency in Machine Learning." NSF PI Meeting, Univ. of Washington, July 16, 2024.
4. Data Science and Machine Learning Panel, NSF PI Meeting, Univ. of Washington, July 15, 2024.
5. “Natural Thresholding Pursuit." Asilomar Conf. on Systems, Signals and Computers, Pacific Grove, CA, Oct. 31, 2023.
6. “Sketching and projecting." Sketching and Algorithm Design, Simons Institute, Berkeley, CA, Oct. 10, 2023.
7. “Using Algebraic Factorizations for Interpretable Learning." IPAM Long Workshop on Computational Microscopy, Sept. 13, 2022.
8. “Towards Explainable AI through factorizations." Conference on Random Matrix Theory and Numerical Linear Algebra, June 23, 2022.
9. “Simple yet Efficient Iterative Methods." Hausdorff Research Institute for Mathematics, Mathematics of Data Science Follow-up Workshop, Apr. 28, 2022.
10. “Simple yet Efficient Iterative Methods." Hausdorff Research Institute for Mathematics, Mathematics of Data Science Follow-up Workshop, Apr. 28, 2022.
11. “Using matrix factorizations for interpretability." Oberwolfach: Applied Harmonic Analysis and Data Science, Virtual, Dec. 1, 2021.
12. “Online Nonnegative Matrix Factorization." NeurIPS Optimization and Machine Learning Workshop, Virtual, Dec. 12, 2020.
13. “Stochastic Iterative Hard Thresholding for Low-Tucker-Rank Tensor Recovery." Information Theory and Approximation, La Jolla CA, Feb. 4, 2020.
14. “Simple Approaches to Complicated Data." Data Science Down Under, Sydney, Australia, (remote), Dec. 9, 2019.
15. “Deep Models for Improved Topic Recovery." SAMSI Workshop on Deep Learning, Duke University, Aug. 14, 2019.
16. “On Comparing Adaptive Kaczmarz Methods." 5th Annual Loma Linda Workshop in Particle Imaging and Treatment Planning, July 22, 2019.
17. “Large-scale data techniques for Lyme disease." Data Institute Conference, Univ. San Francisco, Mar. 2019.
18. “New bounds for the block Gaussian sketch and project method." Information Theory and Approximation, La Jolla CA, Feb. 12, 2019.
19. “Iterative Projection Methods with a link to Deep Learning," Rough Landscapes: From Physics to Algorithms, Kavli Institute for Theoretical Physics, UC Santa Barbara, Jan. 10, 2019.
20. “Simple classification with binary data and hierarchical structure." Theoretical Foundation of Deep Learning (FDL 2018), Georgia Tech, Oct. 10, 2018.
21. “Simple classification using binary data." SUMIRFAS Workshop on Analysis and Probability, Texas

A&M, Aug. 19, 2018.

22. “Iterative projective approaches for noisy corrupted systems", 4th Annual Loma Linda Imaging and IMRT/IMPT Algorithm Workshop, Aug. 7 2018.
23. “Iterative projective approaches to large-scale linear systems", Sublinear Algorithms Workshop, MIT, Cambridge MA, June 12, 2018.
24. “Iterative projective approach for highly corrupted linear systems." Copper Mountain Conference on Iterative Methods, Copper Mountain CO, Mar 26, 2018.
25. “Matrix Completion from Structured Observations." Information Theory and Applications (ITA), San Diego CA, Feb. 12, 2018.
26. “Simple Object Classification using Binary Data." AAAI Deep Models and Artificial Intelligence for Military Applications, Arlington, VA, Nov. 10, 2017.
27. “Tolerant compressed sensing with partially coherent sensing matrices." IEEE SPIE Wavelets and Sparsity XVII, San Diego CA, Aug. 8, 2017.
28. “Compressed Sensing and Dimension Reduction.” Mini-tutorial, SIAM Annual Meeting, Pittsburgh, PA, July 14, 2017.
29. “Lattices from equiangular tight frames with applications to lattice sparse recovery.” CBMS Conference on Sparse Approximation and Signal Recovery Algorithms, Las Cruces, New Mexico, May 22, 2017.
30. “An Asynchronous Parallel Approach to Sparse Recovery.” Information Theory and Applications (ITA), San Diego CA, Feb. 14, 2017.
31. “Batched SGD and weighted sampling.” Recent advances in stochastic processes and stochastic computation, Fall Southeastern Sectional Meeting of the AMS, Raleigh, NC, Nov. 12, 2016.
32. “Batched SGD and weighted sampling.” Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Processing, BIRS, Oaxaca, Mexico, Oct. 20, 2016.
33. “Constrained Adaptive Sensing.” 15th Annual Int. Conf. Approximation Theory (AT), San Antonio TX, May 25, 2016.
34. “Quantized Compressed Sensing.” 2016 Information Theory and Applications (ITA), La Jolla CA, Feb. 4, 2016.
35. “Constrained Adaptive Sensing.” 2015 International Symposium on Mathematical Programming (ISMP), speaker and session organizer, Pittsburgh, PA, July 17, 2015.
36. “Recovering overcomplete sparse representations from structured sensing.” GAMM 86th Annual Scientific Conference, Lecce Italy (remote), Mar. 23, 2015.
37. “Stochastic Iterative Greedy Algorithms for Sparse Reconstruction.” Information Theory and Applications (ITA), La Jolla CA, Feb. 5, 2015.
38. “Greedy methods for generalized sparse approximation.” Allerton Conference on Communication, Control, and Computing, Allerton IL, Oct. 3, 2014.
39. “Adaptively Sensing in Compressive Sensing Applications.” SIAM Annual Meeting, speaker and session organizer, Chicago IL, July 11, 2014.
40. “Greedy Algorithms in Super-Resolution.” Imaging and Modeling in Electron Microscopy - Recent Advances, Banff, Canada, May 19, 2014.
41. “SGD and Randomized Projections methods for linear systems.” Stochastic Gradient Methods, IPAM, UCLA, Feb. 25, 2014.
42. “Iterative methods for super-resolution.” Duke Workshop on Sensing and Analysis of High-Dimensional Data, Duke University, July 24, 2013.
43. “Using Correlated Subset Structure for Compressive Sensing Recovery.” Sampling Theory and Applications (SAMPTA), Bremen, Germany, July 2, 2013.
44. “Synthesis and analysis type methods for signal reconstruction from random observations.” Structure and Randomness in System Identification and Learning, IPAM, UCLA, Jan. 18, 2012.
45. “Robust image recovery via total variation minimization.” 5th Annual Women in Mathematics

Symposium, Univ. of Southern California, Oct. 2012.
46. “Randomized projection algorithms for overdetermined linear systems.” Int. Symp. on Mathematical Programming, Berlin, Aug. 2012.
47. “Robust image recovery via total variation minimization.” Probabilistic Techniques and Algorithms, Univ. of Texas, Apr. 2012.
48. “How many measurements: the gap between tractability and intractability.” Wavelets and Sparsity, SPIE 2011, San Diego, Aug. 2011.
49. “Acceleration of Randomized Kaczmarz Method via the JL Lemma.” Sparse and Low Rank Approximation, Banff, Canada, Mar. 2011.
50. “Compressed sensing with coherent and redundant dictionaries.” International Conf. on Numerical Analysis and Applied Mathematics, Rhodes, Greece, Sept. 2010.
51. “Mixed operators in compressed sensing.” 13th International Conf.: Approximation Theory, San Antonio, TX, Mar. 2010.
52. “Noisy signal recovery via iterative reweighted L1-minimization.” 43rd Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, Nov. 2009.
53. “Signal recovery from incomplete and inaccurate measurements via ROMP”, SAMPTA’09, Marseilles, France, May 2009.
54. “Greedy signal recovery review.” 42nd Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, Oct. 2008.
55. “Greedy signal recovery and uniform uncertainty principles.” SIAM Imaging Science: Alternatives to ell-1 minimization for compressed sensing, San Diego, July 2008.
56. “CoSaMP: Greedy signal recovery and uniform uncertainty principles.” Davis SIAM Student Research Conf., May 2008.
57. “Greedy signal recovery and uniform uncertainty principles.” SPIE’s 20th Annual Symposium: Computational Imaging VI, San Jose, Jan. 2008.

Colloquia

1. “Fairness and Foundations in Machine Learning." Colloquium, Barbara J. Beechler special lecture, CCMS Colloquium, Claremont Colleges, Apr. 30, 2025.
2. “Fairness and Foundations in Machine Learning." Colloquium, Center for Data Science for Society & Enterprise, Mathematics, Cornell Univ., Apr. 17, 2025.
3. “Fairness and Foundations in Machine Learning." Operations Research & Financial Engineering Colloquium, Princeton Univ., Apr. 15, 2024.
4. “Fairness and Foundations in Machine Learning." Applied Math Colloquium, Rice Univ., Mar 31, 2025.
5. “Fairness and Foundations in Machine Learning." Math Colloquium, Univ. of British Columbia, Feb. 7, 2025.
6. “Fairness and Foundations in Machine Learning." Annual AWM Colloquium in Applied Mathematics, Univ. of Colorado Boulder, Dec. 5 2024.
7. “Towards Transparency, Fairness and Efficiency in Machine Learning." Math Colloquium, Michigan State Univ., Oct. 2, 2023.
8. “Towards Transparency, Fairness and Efficiency in Machine Learning." Math Colloquium, Johns Hopkins, Baltimore MD, Mar. 17, 2023.
9. “Towards Transparency, Fairness and Efficiency in Machine Learning." Math Colloquium, Univ. of Minnesota, Minneapolis MN, Mar. 15, 2023.
10. “Online Neonnegative Matrix Factorization and Applications." Math Colloquium, Univ. of Nevada, Reno, Dec. 1, 2022.
11. “Online Neonnegative Matrix Factorization and Applications." Keller Colloquium, Cal Tech, Jan. 31, 2022.
12. “On the topic of topic modeling." Mathematics Colloquium, Univ. of Utah, Oct. 26, 2021.

13. “Complicated data analysis with applications to Lyme data." Institute of Applied Mathematics, colloquium, Univ. British Columbia, Jan. 20, 2020.
14. “Simple approaches to complicated data." Mathematics Colloquium, Colorado State Univ. Fort Collins, Dec. 2, 2019.
15. “Simple approaches to complicated data." Center for Communications Research, La Jolla, CA, Oct. 7, 2019.
16. “Simple classification with binary data and hierarchical structure." Mathematics Colloquium, Univ. of Southern California, Oct. 24, 2018.
17. “Simple classification with binary data and hierarchical structure." Mathematics Colloquium, Michigan State University, Oct. 11, 2018.
18. “Simple Classification from Binary data." Cal Poly Pomona Distinguished Lecture, Mathematics, May 24, 2018.
19. “Simple Classification using Binary Data." Mathematics Colloquium, Ohio State Univ., Nov. 9, 2017.
20. “Simple Classification using Binary Data." Mathematics Colloquium, Brown University, Nov. 7, 2017.
21. “Simple Classification using Binary Data." Mathematics Colloquium, San Jose State Univ., Sept. 20, 2017.
22. “Batched SGD and weighted sampling.” Mathematics Colloquium, Cal. State Fullerton, Oct. 27, 2016.
23. “Less is More: Compressed sensing and imaging.” Colloquium, Dept. of Mathematics and Statistics, Univ. of Nevada, Aug. 2014.
24. “Analysis and synthesis methods in sparse approximation.” Colloquium, Dept. of Electrical and Systems Engineering, Univ. of Pennsylvania, Jan. 2014.
25. “Analysis and synthesis methods in sparse approximation.” Colloquium, Dept. of Mathematics, Rensselaer Polytechnic Institute, Dec. 2013.
26. “Analysis and synthesis methods in sparse approximation.” Colloquium, Dept. of Mathematics, Fordham University, Dec. 2013.
27. “Analysis and synthesis methods in sparse approximation.” Colloquium, Dept. of Mathematics, University of Minnesota, Dec. 2013.
28. “Less is more: Robust image recovery via total variation minimization.” Colloquium, Dept. of Statistics, Univ. of California, Riverside, Nov. 2012.
29. “Less is more: Robust image recovery via total variation minimization.” Colloquium, Claremont McKenna College, Mar. 2012.
30. “Robust image recovery via total variation minimization.” Colloquium, California Institute of Technology, Mar. 2012.
31. “Compressed sensing and redundancy.” Colloquium, Massachusetts Institute of Technology, Mar. 2011.
32. “Why it’s hot in high dimensions and other phenomena.” Colloquium, St. Mary’s College of California, Feb. 2011.
33. “Why it’s hot in high dimensions and other phenomena.” Colloquium, California Lutheran College, Feb. 2011.
34. “Why it’s hot in high dimensions and other phenomena.” Colloquium, Amherst College, Feb. 2011.
35. “Compressive Sampling and Redundancy.” Colloquium, Claremont McKenna College, Jan. 2011.
36. “Why it’s hot in high dimensions and other phenomena.” Colloquium, Union College, Jan. 2011.
37. “Compressed sensing and redundancy.” Colloquium, University of California, Irvine, Jan. 2011.
38. “Compressed sensing and redundancy.” Colloquium, North Carolina State University, Jan. 2011.
39. “Compressed sensing and redundancy.” Colloquium, Kansas State University, Dec. 2010.
40. “Compressed sensing.”, Colloquium, University of Nevada, Apr. 2009.

Invited Seminars

1. “Journey through STEM and large data." UCLA Undergraduate Math Council Speaker Series, Feb.

13, 2025.

2. “Randomized Kaczmarz methods with beyond-Krylov convergence." Applied Math Seminar, Univ. British Columbia, Feb. 6, 2025.
3. “On Fairness and Foundations in Machine Learning." Probability Seminar, UC Irvine, Nov. 14, 2024.
4. “Towards Fairness, Transparency, and Fairness in Machine Learning." PIMS Seminar, Univ. Victoria, July 22, 2024.
5. “Towards Fairness, Transparency, and Fairness in Machine Learning." PIMS Seminar, Univ. British Columbia, July 3, 2024.
6. “Towards Fairness, Transparency, and Fairness in Machine Learning." Applied Math Seminar, Univ. Washington, Feb. 29, 2024.
7. “Towards Fairness, Transparency, and Fairness in Machine Learning." Mathematics of Data & Decision at Davis Seminar, UC Davis, Nov. 28, 2023.
8. “Towards Fairness, Transparency, and Fairness in Machine Learning." Statistics Seminar, Stanford Univ., Nov. 14, 2023.
9. “Big data and its big problems: From geometric surprises to the need for transparent learning." Women in Math Seminar, USC, Oct. 17, 2023.
10. “Towards explainable AI." One World Seminar, Mar. 1, 2023.
11. “Towards explainable AI." REU program, Univ. of Michigan Dearborne, July 11, 2022.
12. “Online Nonnegative Matrix Factorization and Applications." CodEx Seminar, Apr. 19, 2022.
13. “Online Nonnegative Matrix Factorization and Applications." Institute of Data Science Seminar (TAMIDS), Texas A & M Univ., Apr. 18, 2022.
14. “Online Nonnegative Matrix Factorization and Applications." Faraway Fourier Talks Online Seminar, Univ. of Maryland, Mar. 28, 2022.
15. “Online Nonnegative Matrix Factorization and Applications." Mathematical Data Science Seminar, Purdue University, Feb. 7, 2022.
16. “On the topic of topic modeling: enhancing machine learning approaches with topic features." Applied Math Seminar, Yale University, Oct. 13, 2021.
17. “Online Nonnegative Matrix Factorization for Markovian Data." Applied Math Seminar, UC Irvine, Feb. 22, 2021.
18. “Online Nonnegative Matrix Factorization." EE Seminar, Michigan State Univ., (virtual), Jan. 29, 2021.
19. “Online Nonnegative Matrix Factorization." Mathematics Seminar, UC Merced, (virtual), Nov. 13, 2020.
20. “Online Nonnegative Matrix Factorization." Oden Institute Seminar, University of Texas, Austin, Oct. 27, 2020.
21. “Simple Approaches to Complicated Data Analysis." Probability Seminar, Mathematics, Univ. of Southern California, Nov. 15, 2019.
22. “Simple Approaches to Complicated Data Analysis." Data Science Seminar, Mathematics, Univ. of Minnesota, Oct. 15, 2019.
23. “Iterative projective approaches for inconsistent and massively corrupted systems." BLISS Seminar, Mathematics, UC Berkeley, Oct 29, 2018.
24. “Large-scale data and compressed sensing." Learning Seminar, Microsoft, Aug. 2, 2018.
25. “Simple Classification and extensions using Binary Data.” Statistics Seminar, Stanford University, July 17, 2018.
26. “Simple Classification using Binary Data.” Probability Seminar, Univ. of Washington, Feb. 5, 2018.
27. “Simple Classification using Binary Data.” Probability Seminar, UC Irvine, Nov. 21, 2017.
28. “Simple Classification using Binary Data.” Geometric Functional Analysis Seminar, MSRI, Berkeley CA, Oct. 11, 2017.
29. “Lattices from equiangular tight frames with applications to lattice sparse recovery.” Applied Math

Seminar, UC Davis, Apr. 19, 2017.

30. "A hybrid sampling Motzkin method for linear feasibility." Algebra Seminar, Claremont Colleges, Sept. 9, 2016.
31. "SGD and POCS-type methods." Applied Math Seminar, UC Riverside, May 18, 2016.
32. "SGD and POCS-type methods." Applied Math and ECE Seminar, Arizona State University, Apr. 8, 2016.
33. "Optimal guarantees for methods in sparse reconstruction." Mathematics and Statistics, UCLA, Mar. 4, 2016.
34. "Recovering overcomplete sparse representations from structured sensing." Probability and Analysis Seminar, Univ. of Michigan, Sept. 16, 2015.
35. "Compressed sensing and imaging." Applied Math Seminar, UCLA, July 1, 2015.
36. "Recovering overcomplete sparse representations from structured sensing." Applied Math Group Seminar, Univ. of Heidelberg (remote), Mar. 19, 2015.
37. "Recovering overcomplete sparse representations from structured sensing." Applied Math Seminar, UC San Diego, Feb. 3, 2015.
38. "Compressed sensing and imaging." Student-run seminar, UC Davis, Dec. 12, 2014.
39. "Stochastic iterative algorithms." Applied Math Seminar, UC Davis, Dec. 11, 2014.
40. "Stochastic gradient pursuit methods and the Kaczmarz Method." Mathematics of Information Seminar, Univ. of British Columbia, Nov. 16, 2014.
41. "Exponential decay of reconstruction error from binary measurements of sparse signals." Applied Math Seminar, San Jose State Univ., Nov. 10, 2014.
42. "Exponential decay of reconstruction error from binary measurements of sparse signals." EE group seminar, North Carolina State University, Oct. 23, 2014.
43. "Exponential decay of reconstruction error from binary measurements of sparse signals." ECE Group Seminar, Georgia Tech, Oct. 21, 2014.
44. "SGD and the Kaczmarz method." Applied Math Seminar, UC Irvine, June 2, 2014.
45. "Analysis and synthesis methods for compressed sensing." Applied Math Seminar, Georgia Tech, Apr. 28, 2014.
46. "Analysis and synthesis methods for compressed sensing." SEAS Seminar, Harvard University, 2014.
47. "Analysis and synthesis methods for compressed sensing." Keck Seminar, Univ. of California, Los Angeles, Jan. 21, 2014.
48. "Analysis and synthesis methods for compressed sensing." Center for Signal and Information Processing (CSIP), Georgia Tech, Oct. 21, 2013.
49. "Analysis and synthesis methods in compressed sensing." Center for Computational Intractability, Princeton University, Apr.2013.
50. "Less is more: Robust image recovery via total variation minimization." Center for Automation, Robotics, and Distributed Intelligence Seminar, Colorado School of Mines, Oct. 2012.
51. "Robust image recovery via total variation minimization." Level Set Seminar, Univ. of California, Los Angeles, July 2012.
52. "Randomized projection method for linear inverse problems." Mathematical Physics Seminar, Univ. of Texas, Austin, Apr. 2012.
53. "Bridging Matrix Recovery Gaps using Manifolds." Algebra, Number Theory, and Combinatorics Seminar, Claremont McKenna College, Feb. 2012.
54. "Why it's hot in high dimensions and other phenomena." Women in Math Seminar, University of Southern California, Nov. 2011.
55. "Randomized Kaczmarz solver for noisy linear systems", Probability Seminar, UC Berkeley, Nov. 2009.
56. "Randomized Kaczmarz solver for noisy linear systems", Probability Seminar, Stanford University, Nov. 2009.

57. “Greedy algorithms in compressed sensing.”, Computational Analysis Seminar, Vanderbilt University, Apr. 2009.
58. “Greedy signal recovery in compressed sensing.”, Applied Math Seminar, Stanford University, Sept. 2008.
59. “Sparse reconstruction via Regularized Orthogonal Matching Pursuit.” UC Davis Student-Run Seminar, Nov. 2007.
60. “Isoperimetric inequalites and concentration of measure phenomenon.” UC Davis Student-Run Seminar, Nov. 2006.
61. “Improving your game skills with probability.” UC Davis Math Club: Graduate talks for Undergraduates, Nov. 2006.

Other Presentations

1. DataX Generative AI and Creativity Panel, Nov. 17, 2023.
2. “DataX Salon with Deanna Needell." DataX Salon Series, UCLA, May 12, 2023.
3. “Panel Discussion: What Did You Do? What Will You Keep? Reflections on Mentoring Undergraduate Researchers During and Post-Pandemic”, Panelist, Joint Mathematics Meetings, Apr. 7, 2022.
4. “Transforming Post-Secondary Education (TPSE) Panel Exploring the Future of Mathematics Education - what should we be teaching?”, Panelist, Joint Mathematics Meetings, Apr. 6, 2022.
5. “On my journey through STEM." Assoc. for Women in Mathematics (AWM), Univ. of Utah, Oct. 27, 2021.
6. “High dimensional surprises." InteGIRLS Lecture Series, Los Angeles Chapter, Nov. 21, 2020.
7. “Why it’s Hot in High Dimensions." Sharp Minds Lecture Series, Fleet Science Center, San Diego, CA, Aug. 3, 2020.
8. “New Results in Machine Learning with MyLymeData." Lymedisease.org Board Meeting, Los Angeles, CA, Mar. 30, 2019.
9. “Large-scale data analysis of Lyme Disease data." Lymedisease.org Board Meeting, Los Angeles, CA, Oct. 13, 2018.
10. “Studying high dimensions for big data", PIMS Summer School and Workshop on the Mathematical Foundations of Data Science, Univ. of British Columbia, July 30, 2018.
11. “Studying high dimensions for big data", MSRI Summer School on Representations of High Dimensional Data, MSRI Berkeley CA, July 9-20, 2018.
12. “Large-scale data analysis with Lyme disease case study", NSF BIGDATA PI meeting, Washington DC, June 20, 2018.
13. “Simple Classification using Binary Data." Image Processing guest lecture, Computer Science, UCLA, May 8 2018.
14. “Large-scale data analysis of Lyme Disease data." Lymedisease.org Board Meeting, Los Angeles, CA, Feb. 24, 2018.
15. “Stochastic signal processing for high dimensional data." Women in Data Science and Mathematics Research Collaboration Workshop (WiSDM), ICERM, Brown University, Providence RI, July 17-21, 2017.
16. “Sparsity in optimization." Gene Golub SIAM Summer School, Berlin, Germany, May 29 - June 2, 2017.
17. “Women in STEM research.” IChicas program, West Adams School, Los Angeles, Apr. 6, 2017.
18. “Using technology in the classroom.” CPET Tech Summit, Claremont Consortium, Feb. 19, 2016.
19. “Why it’s hot in high dimensions.” Claremont Math Weekend, Pomona College, Jan. 30, 2016.
20. “Women in STEM.” Alumni Weekend ContinuED talks, Claremont McKenna College, May 2, 2015.
21. “Project Next: Obtaining research funding.” Project Next panel, AMS Joint Math. Meeting, San Antonio TX, Jan. 10, 2015.
22. “AMS Short Course on Finite Frame Theory: A Complete Introduction to Overcompleteness: Compressed sensing and dictionary learning.” AMS Joint Math. Meeting, San Antonio TX, Jan. 9,

2015.

23. "Mini-course: Compressive signal processing." Enhancing Diversity in Graduate Education (EDGE) program, Claremont, June 2014.
24. "Millenium problems in Mathematics." (Joint talk), Claremont McKenna Athenaeum, Apr. 2013.
25. "Why it's hot in high dimensions and other phenomena." Claremont McKenna Math Club, Feb. 2013.
26. "Less is more: Robust image recovery via total variation minimization." Institute for Pure and Applied Mathematics, UCLA, July 2012.
27. "Stable image reconstruction using total variation minimization." Poster, Challenges in Geometry, Analysis, and Computation, Yale University, June 2012.
28. "Noise stability of functions with low influences: invariance and optimality" Summer School in Geometry and Analysis in the Theory of Computation, Bloomington, Indiana, Aug. 2009.
29. "ROMP and CoSaMP in compressed sensing" Guest Lecture, Compressive Sensing course, Vanderbilt University, Apr. 2008.
30. "Compressed sensing." UC Davis Recruitment Student Talks, Apr. 2008.
31. "Error correction and sparse reconstruction." Qualifying Examination, UC Davis, Dec. 2006.
32. Various topics, VIGRE Study Group in Geometric Functional Analysis, UC Davis, Apr. 2005.
33. "Correlation inequalities and applications, especially to monotone properties (Kleitman's lemma)." The Probabilistic Method in Combinatorics Reading Group, UC Davis, Nov. 2004.

Professional Activities

Journal Reviewing:

1. ACS Central Science
2. Acta Applicandae Mathematicae
3. The American Mathematical Monthly
4. AMS Mathematical Reviews
5. Annals of Statistics
6. Applied and Computational Harmonic Analysis
7. Applied Mathematics in Science and Engineering
8. Applied Mathematics Letters
9. Applied and Numerical Harmonic Analysis
10. Applied Mathematics and Computation
11. BIT Numerical Mathematics
12. Communications on Pure and Applied Mathematics
13. Constructive Approximation
14. Digital Signal Processing
15. Electronics Letters
16. ETRI Journal
17. EURASIP Journal on Advances in Signal Processing
18. European Journal of Applied Mathematics
19. Foundations of Computational Mathamatics
20. IEEE Geoscience and Remote Sensing Letters
21. IEEE Journal of Selected Topics in Signal Processing
22. IEEE Signal Processing Letters
23. IEEE Transactions on Aerospace and Electronic Systems
24. IEEE Transactions on Communications
25. IEEE Transactions on Computational Imaging
26. IEEE Transactions on Cybernetics
27. IEEE Transactions on Information Theory
28. IEEE Transactions on Microwave Theory and Techniques
29. IEEE Transactions on Network Science and Engineering
30. IEEE Transactions on Signal Processing
31. IEEE Transactions on Systems, Man, and Cybernetics
32. IET Image Processing
33. IET Signal Processing
34. Information Processing Letters
35. International Journal of Computer Science
36. International Journal of Electronics and Communications

37. International Journal of Remote Sensing
38. Inverse Problems
39. Inverse Problems in Science and Engineering
40. Journal of Approximation Theory
41. Journal of Computational and Applied Mathematics
42. Journal of Machine Learning Research
43. Journal of the Optical Society of America A
44. Journal of Optimization Theory and Applications
45. Journal of Scientific Computing
46. Journal of Sensor and Actuator Networks
47. Linear Algebra and its Applications
48. Linear and Multilinear Algebra
49. Machine Learning
50. Machine Vision and Applications
51. Mathematical Methods in the Applied Sciences
52. Mathematical Problems in Engineering
53. Mathematical Programming Series A and B
54. Mathematics and Mechanics of Complex Systems
55. Mathematics of Computation
56. Neural Networks
57. New Journal of Physics
58. Numerical Algorithms
59. Numerische Mathematik
60. Probability Theory and Related Fields
61. Proceedings of the National Academy of Sciences
62. SIAM Journal on Applied Algebra and Geometry
63. SIAM Journal on Mathematical Analysis
64. SIAM Journal on Matrix Analysis and Applications
65. SIAM Journal on Optimization
66. SIAM Journal on Scientific Computing
67. SIAM Undergraduate Research Online
68. Signal Processing

Conference Reviewing:

1. 2025 Conference on Neural Information Processing Systems (Neurips)
2. 2024 Asilomar Conference on Signals, Systems, and Computers
3. 2023 Conference on Neural Information Processing Systems (Neurips)
4. 2020 AAAI Conference on Artificial Intelligence Program Committee
5. 2019 SPARSE Technical Program Committee
6. 2018 iTWIST: international Traveling Workshop on Interactions between low-complexity data models and Sensing Techniques, Technical Program Committee
7. 2017 Sampling Theory and Applications (SAMPTA), Technical Program Committee
8. 2017 15th International Conf. Approximation Theory (AT15)
9. 2016 IEEE International Conf. on Acoustics, Speech, and Signal Proc. (ICASSP)
10. 2016 Conference on Uncertainty in Artificial Intelligence (UAI)
11. 2016 Neural Information Processing Systems (NIPS)
12. 2015 IEEE International Symposium on Information Theory (ISIT)
13. 2015 Sampling Theory and Applications (SAMPTA)
14. 2014 IEEE Global Conference on Signal and Information Processing (GlobalSIP)
15. 2010 - 2014 IEEE International Symposium on Information Theory (ISIT)
16. 2014 Military Communications Conference (MILCOM)
17. 2013 International Conference on Sampling Theory and Applications (SAMPTA)
18. 2013 Signal Processing with Adaptive Sparse Structured Representations (SPARS)
19. 2012 ACM Symposium on Theory of Computing (STOC)
20. 2015 IEEE Computational Advances In Multi-Sensor Adaptive Processing (CAMSAP)
21. 2010 IEEE International Conf. on Acoustics, Speech, and Signal Proc. (ICASSP)
22. 2009 International Conference on Sampling Theory and Applications (SAMPTA)

Other Reviewing:

UC Irvine Degree Proposal reviewer, 2025.

European Research Council (ERC), Reviewer, 2025.

Cambridge Univ. Press review, “A Second Course in Linear Algebra", 2023

Cambridge Univ. Press review, “Mathematical Pictures at a Data Science Exhibition”, 2021
Army Research Office, 2018
National Science Foundation (NSF) Panels, 2015, 2017, 2018, 2020, 2021, 2022, 2023, 2024, 2025
National Science Foundation (NSF) Reviewer, 2012, 2014, 2017, 2018, 2019

Birkhäuser/Springer book series “Applied and Numerical Harmonic Analysis”, 2014
Hawkes Learning Statistical Textbooks, 2012
JASA Book Review, 2012

Editorial:

Associate Editor, AMS Bulletin, 2024- current.
Associate Editor, SIAM Journal on Imaging Sciences, 2018 - current.
Associate Editor, Linear Algebra and its Applications, 2018 - 2024.
Associate Editor,Transactions in Mathematics and its Applications, 2016 - 2018.
Associate Editor, IEEE Signal Processing Letters, 2015 - 2019.

Press:

ABC7 News, Probabilities and playing Powerball, Oct. 11, 2023.
CBS News, Odds of winning the Powerball, July 20, 2023
Girls’ Angle Bulletin, columnist, 2018 - 2022
FINCH Productions, “Digital Women," documentary, 2019.
CBS Radio - the A2A Alliance, “UCLA Professor Deanna Needell Uses Her Math Skills To Help Battle Lyme Disease." July 2018, Mar. 2019.
Vogue Magazine, “Lyme Disease is Spreading at an Alarming Rate – and this is why." May, 2018.
The Lyme Times, “Trailblazers in Lyme disease research." Mar. 2018.
Brotopia: Breaking Up the Boys’ Club of Silicon Valley, by Emily Chang, 2018.
The Atlantic, “The Playboy Centerfold That Helped Create the JPEG." Feb. 2016.
Niche Nerd Stuff, “(Re)creating a HAAR cascade visualizer." Oct. 2015.
Beta Pleated Chic, “Meet Lena – the Playboy Centerfold that Took Over Image Processing." April, 2015.
New York Times, “The Overwhelming Maleness of ’Silicon Valley’." July, 2014.
CMC Newsroom, “Every picture tells a story." May, 2013.

Membership:

American Mathematical Society (AMS)
Association for Women in Mathematics (AWM)
Institute of Electrical and Electronics Engineers (IEEE)
National Association of Mathematicians (NAM)
Society for Industrial and Applied Mathematics (SIAM)

Institutional Service:

UCLA Research in the Age of AI Symposium, Founder, Organizer, Moderator, IDRE and DataX, Feb. 16, 2024.
UCLA Cyber Risk and Data Privacy Governance Committee, 2023 - current.
UCLA ITS Hiring Committee, 2023.
UCLA Data Theory Advisory representative, 2023 - current.
UCLA Mathematics Undergraduate Advising Committee, 2023 - current.
UCLA Mathematics Graduate Advising Committee, 2023 - current.
UCLA Mathematics Data Theory major adviser, 2023 - current.
UCLA Eugene V. Cota-Robles & Graduate Opp. Fellowship Program (CR-GOFP) Committee, 2023-2024.
UCLA Sustainability Plan Advisory Committee, 2022 - current.
UCLA IT Governance Subcommittee, 2022 - current.
UCLA Cybersecurity Subcommittee (IDRE), 2022 - current.
IDRE Leadership Committee, 2021 - current.
UCLA Research Data Working Group, 2021 - current.
DataX Executive Committee, UCLA 2021 - current.
UCLA Transdisciplinary Research Acceleration Grants review panel, 2021.
UCLA Inclusiveness in Education Summit, Feb. 2020.
UCLA Physical Sciences Discovery Award Committee, 2020.
Lab Fees Research Program UC Committee, Fall 2018
UCLA Dissertation Year Fellowship (DYF) Review Committee, Spring 2018
Claremont McKenna College Athenaeum Advisory committee, 2015-2016
Claremont McKenna College Quantitative Studies committee, 2015
Claremont McKenna College Student Recruitment, 2014-2015
Claremont McKenna College Buildings & Grounds committee, 2014-2015
Claremont McKenna College Teaching Resources Center Committee, 2012-2013

Departmental Service:

UCLA Math Development Committee, 2024-current.
UCLA Math Graduate Advisors Committee, 2022-current.

Data Theory major Advisory Committee, 2021 - current.
Equity, Diversity and Inclusion (EDI) Committee, UCLA, 2021-current.
ONLA Qualifying Exam Committee member and chair, UCLA, 2020-current.
UCLA Mathematics Data Theory major adviser, 2020 - current.
Full Professors Elected Committee, UCLA, 2019-2022.
Full and Tenured Professors Elected Committees, UCLA, 2019-current.
Computing Committee, UCLA, 2020-2021.
Basic Qualifying Exam Committee, UCLA, 2019-2020.
Teaching co-coordinator for UCLA Mathematics 168, 170AB, 171, 170ES, 182, 2018-2019
UCLA Mathematics Computing Committee, 2018-2021
UCLA Mathematics Staff Search Committee, 2018-2020
Numerical Analysis Qual Committee, Mathematics, UCLA, Fall 2018
Graduate Studies Committee, Mathematics, UCLA, 2017-2018
Appointment, Promotion and Tenure (APT) Executive Committee, Claremont McKenna College, 2016-2018
Claremont Center for Mathematical Sciences (CCMS) Colloquium co-chair, 2015-2017
Claremont McKenna College Math Club co-organizer, 2013-2015
UC Davis Mathematics Graduate Program Committee Representative, 2008-2009
UC Davis Math Cafe Tutor, 2008
UC Davis Galois Group Lead Organizer, 2008
UC Davis Student-Run Pure and Applied Math Seminar Organizer, 2007-2008
Univ. of Nevada Mathematics Representative of the Student Advisory Board, 2002

Other Service:

Organizer, AIM Workshop “Fairness and foundations in Machine Learning", July 2026.

Organizer, AAAI CoLoRAI - Connecting Low-Rank Representations in AI Workshop, March 2025.

Organizer, IPAM Long Program on Mathematics of Intelligence, Fall 2024.

Organizer, IPAM Workshop on Analyzing High-dimensional Traces of Intelligent Behavior, Fall 2024.

Fairness in Machine Learning Seminar organizer, SLMath, Fall 2023.
OpenAI Red Team member, 2023 - current.
SIAM Journals Committee, SIMODS subcommittee, 2023.
Ludwig-Maximilians-Universitat Munchen Hiring Committee, External member, 2022.
Organizer, IPAM Long Program on Computational Microscopy, Fall 2022.
RISE Digital Pedagogy, United Kingdom, 2022.
SIAM Annual 2021 Organizing committee (AN21), 2020-2021.
Sampling Theory and Applications (SampTA) Technical Program chair, 2020-2024.
San Diego Refugee Tutoring Center volunteer, tutor, lead tutor, 2020 - 2023
Stanford Covid Data Forum panelist, May 2020.
AWM WISDM Steering Committee, 2019-2020.
NeurIPS Workshop organizer, “Solving inverse problems with deep networks: New architectures, theoretical foundations, and applications," 2019.
Asilomar Conference on Signals Systems and Computers session organizer, 2019.
Program Committee, Signal Processing with Adaptive Sparse Structured Representations (SPARS), 2019
AMS Mathematics Research Communities Advisory Board, 2019 - 2022
Association for Women in Mathematics (AWM) Meetings Committee, 2017 - current
Women in Data Science and Mathematics Network committee, 2017 - current
Organizer, SIAM 2020 Conference on Imaging Science
Session organizer, Frames at ILAS 2019: Linear Algebra without Borders, 2019
2019 Workshop in Analysis and Probability, Texas A & M, co-organizer
Session organizer, SIAM Conference on Computational Science and Engineering (CSE19), Feb. 2019
Organizer, AWM Workshop Panel: Perspectives and Advice from Women in Research, July 2018.
Organizer, Women in Data Science and Mathematics Research Collaboration Workshop (WiSDM), ICERM, Brown University, Providence RI, Summer 2019.
Compressed Sensing session chair, Information Theory and Applications (ITA), San Diego CA, Feb. 12, 2018.
2019 SIAM Annual Meeting session organizer, Women in Data Science and Mathematics
Panelist, Summer@ICERM Women in Math, ICERM, Brown University, Providence RI, July 22, 2017.
Panelist, Women in Data Science, ICERM, Brown University, Providence RI, July 20, 2017.
Organizer, Women in Data Science and Mathematics Research Collaboration Workshop (WiSDM), ICERM, Brown University, Providence RI, July 17-21, 2017.
Organizer, Mathematical data processing with optimization session, Sampling Theory and Applications (SAMPTA), July 2017

Organizer and co-chair, Dimension reduction session, Data Institute Conference, Univ. San Francisco, Oct. 2017.
Program Committee, Signal Processing with Adaptive Sparse Structured Representations (SPARS), 2017
Session organizer, 22nd International Symposium on Mathematical Programming, Pittsburgh PA, July 12-17, 2015.
Volunteer, MAPS4College outreach program, 2014-2015
SIAM Annual Meeting 2014, *Mathematics of Information and Low Dimensional Models* Session co-organizer
Mentor, Women In Technology Sharing Online (WitsOn) program, 2013-current

Skills

Computation: C, C++, Java, Perl, Python, Maple, Matlab, R

Languages: English, Spanish (semi-fluent), American Sign Language (semi-fluent)