LAURA BALZANO

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Professor Balzano is a researcher and educator in machine learning and signal processing algorithm design and analysis. Her research has an emphasis on efficient methods, low-dimensional structures, and messy data. Her expertise is in statistical signal processing, matrix factorization, and optimization. She is interested in mathematical problem formulations motivated by significant open challenges in engineering and science, with applications including computer vision, environmental monitoring, image processing, control systems, power grids, bioinformatics, consumer preference modeling, astronomical data analysis, and computer network analysis. She pursues algorithmic design using principles from optimization theory, as well as mathematical analysis answering questions regarding algorithmic convergence behavior and performance, required sample complexity, algorithmic robustness.

EMPLOYMENT HISTORY

Associate Professor of Electrical Engineering and Computer Science
University of Michigan, September 2019 – present.

Associate Chair for Undergraduate Affairs, Division of Electrical and Computer Engineering, Department of Electrical Engineering and Computer Science
University of Michigan, June 2025 – present.

Associate Professor of Statistics, by courtesy
University of Michigan, September 2021 – present.

Visiting Scholar and Member, School of Mathematics
Institute for Advanced Study, Princeton NJ, September 2019 – July 2020.
Special Year on Optimization, Statistics, and Theoretical Machine Learning

Machine Learning consultant.
March 2015 – present.

Assistant Professor of Electrical Engineering and Computer Science
University of Michigan, January 2013 – August 2019.

Visiting Researcher
University of Wisconsin, Madison and Duke University, June - December 2012.

Graduate Research Assistant
University of Wisconsin, Madison, January 2008 – May 2012.

Visiting Researcher
École Polytechnique Fédérale de Lausanne (EPFL), June – December 2007.

Graduate Research Assistant
University of California, Los Angeles, September 2004 – June 2007.

Software Developer
Applied Signal Technology, Inc, June 2002 – June 2004.

EDUCATION

05/2012 **University of Wisconsin, Madison**

PhD in Electrical and Computer Engineering

Thesis title: “Handling Missing Data in High-Dimensional Subspace Modeling.”
Thesis advisers: Robert Nowak (ECE) and Benjamin Recht (CS)

Major Area: Signal Processing — Minor Area: Mathematics

03/2007 **University of California, Los Angeles**

Master of Science in Electrical Engineering

Major Area: Communications — Minor Areas: Optimization, Statistics

12/2001 **Rice University**

Bachelor of Science in Electrical and Computer Engineering

Major Area: Computer Engineering — Minor Areas: Signal Processing, Networking

RESEARCH FUNDING

Laura Balzano. 3M NTFA: Algorithms for Low-Dimensional Modeling of High-Dimensional Data. $30,000, May 2018-May 2033.

Laura Balzano. Intel Early Career Fellowship. $25,000, September 2015-October 2030.

Laura Balzano and Jeffrey Fessler. National Science Foundation (NSF) CIF: Small: Learning Low-Dimensional Representations with Heteroscedastic Data Sources. $620,000 (my share $452k), January 2024-December 2026.

Laura Balzano. National Science Foundation (NSF) CAREER: Robust, Interpretable, and Efficient Unsupervised Learning with K-set Clustering. $620,792, May 2019-May 2025.

Laura Balzano. University of Michigan Crosby Award. $12,026, January 2022-August 2024.

Laura Balzano and Hessam Mahdavifar. Department of Energy (DoE): Get Non-Real: Randomized Sketching for High-Dimensional Non-Real-Valued Data. $300,000 (my share $154k), September 2021–August 2024.

Laura Balzano. Army Research Office (ARO) YIP: Mathematics for Learning Nonlinear Generalizations of Subspace Models in High Dimensions. $452,561, November 2018-September 2023.

Qing Qu, Laura Balzano, Albert Berahas, Eunshin Byon, and Salar Fattahi. University of Michigan START: Next Generation Data Science: from High Dimensional Statistics to Nonconvex Optimization. $75,000 (my share $15k), May 2022-May 2023.

Laura Balzano. Air Force Office of Scientific Research (AFOSR) YIP: Non-convex Optimization Algorithms and Theory for Matrix Factorization with Dynamic Massive Data. $450,000, January 2019-December 2022.

Clay Scott, Jeff Fessler, Mert Pilanci, and Laura Balzano. NSF BIGDATA: Random and Adaptive Projections for Scalable Optimization and Learning. $1,032,000 (my share $260k), January 2019-Dec 2022.

Laura Balzano, Yuekai Sun, and Sonja Starr. University of Michigan MCubed: Fairness and Legality in Algorithmic Decision Making. $60,000 (my share $20k), January 2019-December 2020.

Jason Corso, Laura Balzano. DARPA D3M: SPIDER: Subspace Primitives that are Interpretable and Diverse. $1,600,000 (my share 680k; project ended after $1.32M / my share $563k received), March 2017-October 2020.

Laura Balzano. Fulbright Commission Portugal: New Regularizers for Low-Dimensional Modeling of High-Dimensional Data. €10,250, May-July 2020. (Canceled due to COVID, encouraged to reapply at a future date.)

Jun Li, Anna Gilbert, Clay Scott, Johann Gagnon-Bartsch, Roman Vershynin, Laura Balzano, Max Wicha, Sue Hammoud, Gil Omenn, Justin Colacino, Ebrahim Azizi, Diane Simone, Dana Dolinoy, Yuanfang Guan. University of Michigan MIDAS: Michigan Center for Single-Cell Genomic Data Analytics. $1,249,233 (my share $177k), March 2017-April 2020.

Johanna Mathieu, Laura Balzano. NSF Energy, Power, and Control Networks: Inferring the behavior of distributed energy resources from incomplete measurements, $399,452 (my share $83k), July 2015-June 2018.

Laura Balzano, Eric Schwartz, Alfred Hero. University of Michigan MCubed: Consumer preference learning from limited feedback. $60,000 (my share $20k), September 2016-December 2017.

Laura Balzano. ARO: Subspace Methods for Massive and Messy Data. $344,959, September 2014-August 2017.

Laura Balzano. NVIDIA hardware award, Titan X GPU $4000 MSRP. October 2016.

Laura Balzano. NSF BRIGE: Simultaneous Modeling and Calibration for Environmental Sensor Data. $174,996, September 2013-August 2016.

Laura Balzano, Branko Kerkez, Don Scavia. University of Michigan MCubed: A mathematical, scientific, and measurement framework for the assessment of water balance and water quality. $60,000 (my share $20k), September 2013-December 2014.

AWARDS

Academic Women's Conference Sarah Goddard Power Award, University of Michigan, February 2025

University of Wisconsin-Madison Department of Electrical and Computer Engineering Early Career Award, May 2024

IEEE Signal Processing Society Outstanding Editorial Board Member Award, IEEE Open Journal of Signal Processing, June 2023

MLK Spirit Award, University of Michigan North Campus Deans, February 2023

Vulcans Education Excellence Award, University of Michigan, January 2020

Fulbright U.S. Scholar Award, awarded February 2019, withdrawn due to COVID travel restrictions

National Science Foundation CAREER Award, February 2019

Air Force Office of Scientific Research Young Investigator Award, October 2018

Army Research Office Young Investigator Award, May 2018

3M Non-Tenured Faculty Award, May 2018.

Intel Early Career Faculty Honor Program Award, August 2015

Transforming Learning for the Third Century – Quick Wins Award, $10,000 teaching-related funding for "Data Collection for Digital Signal Processing", September 2013

University of Wisconsin-Madison, Electrical and Computer Engineering Department, **Best Dissertation Award**, 2012

University of Wisconsin-Madison **Peer Mentor Award**, 2012

3M Fellowship for Graduate Study, 2009-2012

Innovative Signal Analysis Graduate Scholarship, 2008

University of California, Los Angeles, Electrical Engineering Department, **Outstanding Master's Degree Award**, 2007

Rice University AMD VLSI design, implementation, and fabrication contest,
First Place, 2001
for hardware implementation and fabrication of a pipelined algorithm for optimizing received signals in a multi-stage, multi-user WCDMA communications environment.

PUBLICATIONS SUBMITTED OR IN PREPARATION

S.M. Kwon, A.S. Xu, C. Yaras, L. Balzano, Q. Qu. "**Out-of-Distribution Generalization of In-Context Learning: A Low-Dimensional Subspace Perspective**." Submitted to AI Stats. Preprint available at https://arxiv.org/abs/2505.14808.

J. S. Cavazos, J. A. Fessler, and L Balzano. "**ALPCAHUS: Subspace Clustering for Heteroscedastic Data**", submitted to IEEE Transactions on Signal Processing, preprint at https://arxiv.org/abs/2505.18918.

L. Balzano, T. Ding, B. Haeffele, S.M. Kwon, Q. Qu, Qing, P. Wang, A. Wang, C. Yaras, "**An Overview of Low- Rank Structures in the Training and Adaptation of Large Models**", submitted to Signal Processing Magazine, preprint at https://arxiv.org/abs/2503.19859.

Y. Li, L. Balzano, D. Needell, and H. Lyu. "**Convergence and complexity of block majorization-minimization for constrained block-Riemannian optimization**." Submitted to JMLR. Preprint available at https://arxiv.org/abs/2312.10330.

D.A. Tarzanagh, L. Balzano, and A.O. Hero, "**Fair Structure Learning in Heterogeneous Graphical Models**." Submitted to Electronic Journal of Statistics. Preprint at https://arxiv.org/abs/2112.05128v1.

S.M. Lee, C. Blocker, H. Raja, J. Fessler, and L. Balzano, "**Dynamic Subspace Estimation from Undersampled Data using Grassmannian Geodesics**." In preparation.

C. Blocker, H. Raja, J. Fessler, and L. Balzano, "**Geodesic Dynamic Subspace Estimation**." In preparation. Preprint available at https://arxiv.org/abs/2303.14851.

Y. Sattar, Z. Du, D. Ataee Tarzanagh, L. Balzano, N. Ozay, and S. Oymak. "**Identification and adaptive control of markov jump systems: Sample complexity and regret bounds**." In preparation. Preprint available at https://arxiv.org/abs/2111.07018.

A. Ritchie, L. Balzano, and C. Scott, "**Supervised PCA: A Multiobjective Approach**." In preparation. Preprint available at https://arxiv.org/abs/2011.05309.

JOURNAL PUBLICATIONS

1) P. Wang, X. Li, C. Yaras, Z. Zhu, L. Balzano, W. Hu, and Q. Qu. "**Understanding Deep Representation Learning via Layerwise Feature Compression and Discrimination**." *Journal of Machine Learning Research*. 26, no. 220 (2025): 1–61.

2) K. Gilman, D. Hong, J. Fessler, and L. Balzano, "**Streaming Heteroscedastic Probabilistic PCA with Missing Data**." *Transactions on Machine Learning Research* (2025).

3) D. Hong and L. Balzano. "**Optimal sample acquisition for optimally weighted PCA from heterogeneous quality sources**." *IEEE Signal Processing Letters*, vol. 32 (2025): 1425-1429.

4) J. Salazar Cavazos, J. Fessler, and L. Balzano. "**ALPCAH: Subspace Learning for Sample-wise Heteroscedastic Data**." *IEEE Transactions on Signal Processing,* vol. 73 (2025): 876-886.

5) P. Wang, R. Jiang, Q. Kong, L. Balzano. "**A proximal difference-of-convex algorithm for sample average approximation of chance constrained programming."** *INFORMS Journal on Computing* (2025).

6) K. Gilman, S. Burer, and L. Balzano, "**A Semidefinite Relaxation for Sums of Heterogeneous Quadratics on the Stiefel Manifold**." *SIAM Journal on Matrix Analysis and Applications (SIMAX*) 46, no. 2 (2025): 1091-1116.

7) R. Geelen, L. Balzano, S. Wright, and K. Willcox. "**Learning physics-based reduced-order models from data using nonlinear manifolds.**" *Chaos: An Interdisciplinary Journal of Nonlinear Science,* vol. 34, no. 3 (2024).

8) R. Newton, Z. Du, P. Seiler, and L. Balzano. "**Optimality of POD for Data-Driven LQR with Low-Rank Structures**." *IEEE Control Systems Letters*, vol. 8 (2024): 85-90.

9) D. Hong, L. Balzano, and J. Fessler, "**Optimally Weighted PCA for High-dimensional Heteroscedastic Data**." *SIAM Journal on Mathematics of Data Science* 5, no. 1 (2023): 222-250.

10) Z. Du, L. Balzano, and N. Ozay, "**Mode Reduction for Markov Jump Systems**." *IEEE Open Journal of Control Systems,* vol. 1 (2022): 335-353.

11) K. Gilman, D.A. Tarzanagh, and L. Balzano, "**Grassmannian Optimization for Online Tensor Completion and Tracking with the t-SVD**." *IEEE Transactions on Signal Processing,* vol. 70 (2022): 2152-2167.

12) D. Hong, K. Gilman, L. Balzano, and J. Fessler, "**HePPCAT: Probabilistic PCA for Data with Heteroscedastic Noise.**" *IEEE Transactions on Signal Processing,* vol. 69 (2021): 4819-4834.

13) G. Ongie, D. Pimentel-Alarcon, R. Nowak, R. Willett, and L. Balzano, "**Tensor Methods for Nonlinear Matrix Completion**." *SIAM Journal of the Mathematics of Data Science,* 3, no. 1 (2021): 253-279.

14) John Lipor, David Hong, Yan Shuo Tan, Laura Balzano, "**Subspace clustering using ensembles of K-subspaces**." *Information and Inference: A Journal of the IMA*, 10 no. 1 (2021). https://doi.org/10.1093/imaiai/iaaa031.

15) H. Lyu, D. Needell, and L. Balzano, "**Online Matrix Factorization for Markovian Data and Applications to Network Dictionary Learning**." *Journal of Machine Learning Research,* 21, no. 251 (2020): 1-49.

16) T. Thong, Y. Wang, M.D. Brooks, C. Lee, C. Scott, L. Balzano, M.S. Wicha, J.A. Colacino, "**Hybrid stem cell states: Insights into the relationship between mammary development and breast cancer using single-cell transcriptomics**." *Frontiers in Cell and Developmental Biology* 8 (2020): 288.

17) J. Lipor and L. Balzano, "**Clustering Quality Metrics for Subspace Clustering**." *Pattern Recognition* 104 (2020): 107328.

18) A. Eftekhari, G. Ongie, L. Balzano, and M. Wakin, "**Streaming Principal Component Analysis from Incomplete Data**." *Journal of Machine Learning* Research 20, no. 86

(2019): 1-62.

19) A. Gitlin, B. Tao, L. Balzano, and J. Lipor, "**Improving K-Subspaces via Coherence Pursuit**." *IEEE Journal of Selected Topics in Signal Processing* 12, no. 6 (2018): 1575-1588.

20) L. Balzano, Y. Chi, and Y. Lu, "**Streaming PCA and subspace tracking: The missing data case.**" Proceedings of the IEEE 106, no. 8 (2018): 1293-1310.

21) G.S. Ledva, L. Balzano, and J.L. Mathieu, "**Real-Time Energy Disaggregation of a Distribution Feeder's Demand Using Online Learning**." *IEEE Transactions on Power Systems* 33, no. 5 (2018): 4730-4740.

22) D. Hong, L. Balzano, and J. Fessler, "**Asymptotic performance of PCA for high-dimensional heteroscedastic data**." *Journal of Multivariate Analysis*, 167 (2018): 435-452.

23) J. Lipor, B. Wong, D. Scavia, B. Kerkez, L. Balzano, "**Distance-Penalized Active Learning for Spatial Sampling.**" *IEEE Transactions on Signal Processing* 65, no. 20 (2017): 5453-5465.

24) A. Eftekhari, L. Balzano, and M. Wakin, "**What to Expect when you are Expecting on the Grassmannian.**" *IEEE Signal Processing Letters* 24, no. 6 (2017): 872-876.

25) R. Kennedy, L. Balzano, S.J. Wright, and C.J. Taylor, "**Online Algorithms for Factorization-Based Structure from Motion**," *Journal for Computer Vision and Image Understanding* 150 (2016): 139-152.

26) L. Balzano and S. Wright, "**Local Convergence of an Algorithm for Subspace Identification from Partial Data**,'' *Journal for Foundations on Computational Mathematics (FOCM)* 15, no. 5 (2015): 1279-1314.

27) J. He, D. Zhang, L. Balzano, and T. Tao, "**Iterative Grassmannian Optimization for Robust Image Alignment**," *Journal of Image and Vision Computing* 32, no. 10 (2014): 800-813.

28) V. Tan, L. Balzano, and S. Draper, "**Rank Minimization over Finite Fields: Fundamental Limits and Coding-Theoretic Interpretations**,'' *IEEE Transactions on Information Theory* 58, no. 4 (2012): 2018-2039.

29) K. Ni, N. Ramanathan, M.N. Hajj Chehade, L. Balzano, S. Nair, S. Zahedi, G. Pottie, M. Hansen, and M. Srivastava, "**Sensor Network Data Fault Types**," *ACM Transactions on Sensor Networks* 5, no. 3 (2009): 25.

30) S. Ganeriwal, L. Balzano, and M. Srivastava, "**Reputation-based Framework for High Integrity Sensor Networks**," *ACM Transactions on Sensor Networks* 4, no. 3 (2008): 15.

31) V. Gambiroza, P. Yuan, L. Balzano, Y. Liu, S. Sheafor, and E. Knightly, "**Design, Analysis, and Implementation of DVSR: A Fair, High Performance Protocol for Packet Rings**," *IEEE/ACM Transactions on Networking* 12, no. 1 (2004): 85-102.

CONFERENCE PUBLICATIONS

1) C. Yaras, A.S. Xu, P. Abillama, C. Lee, L. Balzano. "**MonarchAttention: Zero-Shot Conversion to Fast, Hardware-Aware Structured Attention**." Proceedings of Neurips (Spotlight 3% acceptance rate), 2025.

2) S.M. Kwon, A.S. Xu, C. Yaras, L. Balzano, Q. Qu. "**Out-of-Distribution Generalization of In-Context Learning: A Low-Dimensional Subspace Perspective**." Neural Information Processing Systems Workshop on What Can't Transformers Do? (WCTD), 2025.

3) J. Hume, L. Balzano. "**A Spectral Framework for Tracking Communities in Evolving Networks**." Proceedings of the conference on Learning on Graphs, 2024.

4) P. Wang, H. Liu, L Wang, Q. Qu and L. Balzano. "**Symmetric Matrix Completion with ReLU Sampling**." Proceedings of ICML, 2024.

5) Y. Li, L. Balzano, D. Needell, H. Lyu. "**Convergence and Complexity Guarantee for Inexact First-order Riemannian Optimization Algorithms**." Proceedings of ICML, 2024

6) C. Yaras, P. Wang, L. Balzano, and Q. Qu. "**Compressible Dynamics in Deep Overparameterized Low-Rank Learning & Adaptation**." Proceedings of ICML (Oral

presentation 1.5% acceptance rate), 2024.

7) D.A. Tarzanagh, P. Nazari, B. Hou, L. Shen, and L. Balzano, "**Online Bilevel Learning: Dynamic Regret Analysis of Online Alternating Gradient Methods**." Proceedings of AI Stats, 2024.

8) S.M. Kwon, Z. Zhang, D. Song, L. Balzano, and Q. Qu. "**Efficient Low-Dimensional Compression of Overparameterized Models**." Proceedings of AI Stats, 2024.

9) S.M. Kwon, Z. Zhang, D. Song, L. Balzano, and Q. Qu. "**Efficient Low-Dimensional Compression of Overparameterized Networks**." Conference on Parsimony and Learning (Recent Spotlight Track), 2024.

10) C. Yaras, P. Wang, W. Hu, Z. Zhu, L. Balzano, and Q. Qu. "**Invariant Low-Dimensional Subspaces in Gradient Descent for Learning Deep Linear Networks**." Conference on Parsimony and Learning (Recent Spotlight Track), 2024.

11) P. Wang, X. Li, C. Yaras, Z. Zhu, L. Balzano, W. Hu, and Q. Qu. "**Understanding Hierarchical Representations in Deep Networks via Feature Compression and Discrimination**." Conference on Parsimony and Learning (Recent Spotlight Track), 2024.

12) C. Yaras, P. Wang, W. Hu, Z. Zhu, L. Balzano, and Q. Qu. "**Invariant Low-Dimensional Subspaces in Gradient Descent for Learning Deep Matrix Factorizations**." NeurIPS Workshop on Mathematics of Modern Machine Learning, 2023

13) R. Geelen, L. Balzano, and K. Willcox. "**Learning latent representations in high-dimensional state spaces using polynomial manifold constructions**," Proceedings of the Conference on Decision and Control (CDC), 2023.

14) R. Newton, Z. Du, L. Balzano, and P. Seiler. "**Manifold Optimization for Data Driven Reduced-Order Modeling**," Proceedings of the Allerton Conference on Communications, Control, and Computing, 2023.

15) M. Soleymani, Q. Liu, H. Mahdavifar, and L Balzano. "**Matrix Completion over Finite Fields: Bounds and Belief Propagation Algorithms**," IEEE International Symposium on Information Theory (ISIT), 1166–1171, 2023.

16) J. Salazar Cavazos, J. Fessler, and L. Balzano. "**ALPCAH: Sample-wise Heteroscedastic PCA with Tail Singular Value Regularization**," Proceedings of the 14th International conference on Sampling Theory and Applications (SampTA), 2023.

17) A. Xu, L. Balzano, J. Fessler. "**HeMPPCAT: Mixtures of Probabilistic Principal Component Analysers for Data with Heteroscedastic Noise**," Proceedings of ICASSP, 2023.

18) C. Yaras*, P. Wang*, Z. Zhu, L. Balzano, and Q. Qu. "**Neural Collapse with Normalized Features: A Geometric Analysis over the Riemannian Manifold**," Proceedings of Neurips, 2022.

19) R. Naik, N. Trivedi, D.A. Tarzanagh, L. Balzano, "**Truncated Matrix Completion - An Empirical Study**." Proceedings of EUSIPCO, special session on missing data, 2022.

20) P. Wang, H. Liu, A. Man-Cho So, and L. Balzano, "**Convergence and Recovery Guarantee of the K-Subspaces Method for Subspace Clustering**." Proceedings of ICML, 2022.

21) Z. Du, Y. Sattar, D.A. Tarzanagh, L. Balzano, S. Oymak, and N. Ozay. "**Certainty equivalent quadratic control for Markov jump systems**." Proceedings of the American Control Conference (ACC), 2022

22) Y. Sattar, Z. Du, D.A. Tarzanagh, L. Balzano, N. Ozay, and S. Oymak. "**Data-Driven Control of Markov Jump Systems: Sample Complexity and Regret Bounds**." Proceedings of the American Control Conference (ACC), 2022.

23) L. Balzano, "**On the Equivalence of Oja's Algorithm and GROUSE**." Proceedings of Artificial Intelligence and Statistics (AI Stats), March 2022.

24) A. Bower and L. Balzano, "**Preference Modeling with Context-Dependent Salient Features**." Proceedings of the International Conference on Machine Learning (ICML, oral presentation 22% acceptance), July 2020.

25) K. Gilman and L. Balzano, "**Online Tensor Completion and Free Submodule Tracking with the t-SVD**." Proceedings of the International Conference of Conference for Acoustics, Speech, and Signal Processing (ICASSP), May 2020.

26) Z. Du, N. Ozay, and L. Balzano, "**Mode Clustering for Markov Jump Systems**." Proceedings of the IEEE Conference on Computational Advances in Multi-Sensor Array Processing (CAMSAP), December 2019. **Best student paper, 3rd place.**

27) D. Hong, L. Balzano, and J. Fessler, "**Probabilistic PCA for Heteroscedastic Data**." Proceedings of the IEEE Conference on Computational Advances in Multi-Sensor Array Processing (CAMSAP), December 2019.

28) D. Hong, S. Lei, J.L. Mathieu, and L. Balzano, "**Exploration of tensor decomposition applied to commercial building baseline estimation**." Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP), November 2019.

29) K. Gilman and L. Balzano, "**Panoramic Video Separation with Online Grassmannian Robust Subspace Estimation."** International Conference on Computer Vision (ICCV), Workshop on Robust Subspace Learning and Applications in Computer Vision, 2019.

30) A. Ritchie, C. Scott, L. Balzano, D. Kessler, C. Sripada, "**Supervised Principal Component Analysis via Manifold Optimization**." IEEE Data Science Workshop (DSW), June 2019.

31) D. Zhang, T. Zhao, and L. Balzano. "**Information Maximization Auto-Encoding**." Workshop on Bayesian Deep Learning, NeurIPS 2018.

32) J. Lipor and L. Balzano, "**Clustering Quality Metrics for Subspace Clustering**," Proceedings of the Asilomar Conference on Signals, Systems, and Computers, 2018.

33) G.S. Ledva, L. Balzano, and J. Mathieu, "**Exploring Connections between a Multiple Model Kalman Filter and Dynamic Fixed Share with Applications to Demand Response**." Proceedings of the IEEE Conference on Control Technology and Applications (CCTA), 2018.

34) D. Hong, R. Malinas, J. Fessler, and L. Balzano, "**Learning Dictionary-Based Unions of Subspaces for Image Denoising**." Proceedings of the European Signal Processing Conference (EUSIPCO) 2018.

35) Z. Du, L. Balzano, and N. Ozay, "**A Robust Algorithm for Online Switched System Identification**." Proceedings of the Symposium on System Identification (SYSID) 2018.

36) G. Ongie, D. Hong, D. Zhang, and L. Balzano, "**Online Estimation of Coherent Subspaces with Adaptive Sampling**." Proceedings of the SSP Workshop 2018.

37) D. Zhang, J. Katz-Samuels, M. Figueiredo, and L. Balzano, "**Simultaneous Sparsity and Parameter Tying for Deep Learning using Ordered Weighted ℓ_1 Regularization**," Proceedings of the SSP Workshop 2018.

38) G. Ongie, N. Murthy, L. Balzano, and J. Fessler, "**Memory-efficient Splitting Algorithms for Large-Scale Sparsity Regularized Optimization**." Proceedings of the International Conference on Image Formation in X-Ray Computed Tomography (CT Meeting) 2018.

39) A. Bower, L. Jain, and L. Balzano, "**The Landscape of Nonconvex Quadratic Feasibility**." Proceedings of the International Conference for Acoustics, Speech, and Signal Processing (ICASSP) 2018.

40) D. Zhang, H. Wang, M. Figueiredo, and L. Balzano, "**Learning to Share: Simultaneous Parameter Tying and Sparsification for Deep Learning**." Proceedings of the International Conference on Learning Representations (ICLR, 32% acceptance) 2018.

41) G. Ongie, S. Dewangan, J. Fessler, and L. Balzano, "**Online Dynamic MRI Reconstruction via Robust Subspace Tracking**." Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP), November 2017.

42) G. Ongie, D. Hong, D. Zhang, and L. Balzano, "**Enhanced Online Subspace Estimation Via Adaptive Sensing**." Proceedings of the Asilomar Conference on Signals, Systems, and Computers, November 2017.

43) D. Pimentel-Alarcon, G. Ongie, L. Balzano, R. Nowak, and R. Willett, "**Low Algebraic Dimension Matrix Completion**." Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2017.

44) J. Lipor and L. Balzano, "**Leveraging Union of Subspace Structure to Improve Constrained Clustering**." Proceedings of the International Conference on Machine Learning (ICML, oral presentation 26% acceptance), August 2017.

45) G. Ongie, L. Balzano, R. Nowak, and R. Willett, "**Algebraic Variety Models for High-Rank Matrix Completion**." Proceedings of the International Conference on Machine Learning (ICML, oral presentation 26% acceptance), August 2017.

46) D. Pimentel Alarcon, L. Balzano, R. Marcia, R. Nowak, and R. Willett, "**Mixture Regression as Subspace Clustering**." Proceedings of the Sampling Theory and Applications Conference (SampTA), July 2017.

47) D. Zhang and L. Balzano, "**Matched Subspace Detection using Compressively Sampled Data**." Proceedings of the International Conference for Acoustics, Speech, and Signal Processing (ICASSP), March 2017.

48) N. Rao, R. Ganti, L. Balzano, R. Willett, and R. Nowak, "**On Learning High-Dimensional Structured Single Index Models**." Proceedings of the conference of the Association for the Advancement of Artificial Intelligence (AAAI, oral presentation 25% acceptance), February 2017.

49) D. Hong, L. Balzano, and J. Fessler, "**Towards a Theoretical Analysis of PCA for Heteroscedastic Data**." Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2016.

50) P. Xiao and L. Balzano, "**Online Sparse and Orthogonal Subspace Estimation from Partial Information**." Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2016.

51) D. Pimentel Alarcon, L. Balzano, and R. Nowak, "**Necessary and Sufficient Conditions for Sketched Subspace Clustering**." Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2016.

52) D. Pimentel Alarcon, L. Balzano, R. Marcia, R. Nowak, and R. Willett, "**Group-Sparse Subspace Clustering with Missing Data**." Proceedings of the IEEE Statistical Signal Processing (SSP) Workshop, July 2016.

53) N. Rao, R. Ganti, L. Balzano, R. Willett, and R. Nowak, "**On Learning High-Dimensional Structured Single Index Models**." Workshop on Advances in non-convex analysis and optimization at the International Conference on Machine Learning (ICML), June 2016.

54) D. Zhang and L. Balzano, "**Global Convergence of a Grassmannian Gradient Descent Algorithm for Subspace Estimation.**" Proceedings of Artificial Intelligence and Statistics (AI Stats, poster presentation 31% acceptance), May 2016.

55) R. Ganti, L. Balzano, and R. Willett, "**Matrix Completion under Monotonic Single Index Models**," Proceedings of the conference for Neural Information Processing Systems (NeurIPS, Poster presentation 22% acceptance), December 2015.

56) J. Lipor and L. Balzano, "**Margin-Based Active Subspace Clustering**," Proceedings of the IEEE Conference on Computational Advances in Multi-Sensor Array Processing (CAMSAP), December 2015.

57) J. Lipor, L. Balzano, B. Kerkez, and D. Scavia, "**Quantile search: A Distance-Penalized Active Learning Algorithm for Spatial Sampling**," Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2015.

58) G.S. Ledva, L. Balzano, and J.L. Mathieu, "**Inferring the Behavior of Distributed Energy Resources with Online Learning**," Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2015.

59) R. Kennedy, C.J. Taylor, and L. Balzano, "**Online Completion of Ill-Conditioned Low-Rank Matrices**,'' IEEE Global Conference on Signal and Information Processing (GlobalSIP), December 2014.

60) J. Lipor and L. Balzano, "**Robust Blind Calibration via Least Squares**,'' IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), May 2014.

61) R. Kennedy, L. Balzano, S.J. Wright, and C.J. Taylor, "**Online Algorithms for Factorization-Based Structure from Motion**," IEEE Winter Conference on Applications of Computer Vision (WACV), March 2014.

62) D. Pimentel, R. Nowak, and L. Balzano, "**On the Sample Complexity of Subspace Clustering with Missing Data,**'' Proceedings of the Statistical Signal Processing Workshop (SSP), June 2014.

63) L. Balzano and S. Wright, “**On GROUSE and the ISVD**,’’ Proceedings of the IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), special session on New Sensing and Inference Methods for Large-Scale Data, December 2013.

64) J. He, D. Zhang, L. Balzano, and T. Tao, “**Iterative Online Subspace Learning for Robust Image Alignment**,” IEEE Automatic Face and Gesture Recognition conference, April 2013.

65) L. Balzano, A. Szlam, B. Recht, and R. Nowak, “**k-Subspaces with Missing Data**,’’ Proceedings of the Statistical Signal Processing Workshop (SSP), August 2012.

66) J. He, L. Balzano, and A. Szlam, “**Incremental Gradient on the Grassmannian for Online Foreground and Background Separation in Subsampled Video,**’’ Proceedings of the conference on Computer Vision and Pattern Recognition (CVPR, oral presentation 5% acceptance), June 2012.

67) L. Balzano, B. Eriksson, and R. Nowak, “**High-Rank Matrix Completion**,’’ Proceedings of the conference on Artificial Intelligence and Statistics (AI STATS, poster presentation 35% acceptance), April 2012.

68) V. Tan, L. Balzano, and S. Draper, “**Rank Minimization in Finite Fields**,’’ Proceedings of the International Symposium on Information Theory (ISIT), August 2011.

69) L. Balzano, R. Nowak, and M. Roughan, “**On the Success of Network Inference using a Markov Random Walk Model**,” Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP), May 2011.

70) L. Balzano, W. Bajwa, and R. Nowak, “**Column Subset Selection with Missing Data**,” In the NIPS workshop on Low-Rank Methods for Large-Scale Machine Learning, December 2010.

71) L. Balzano, B. Recht, and R. Nowak, “**Online and Adaptive Tracking of Subspaces from Highly Incomplete Information**,” In the NIPS workshop on Low-Rank Methods for Large-Scale Machine Learning, December 2010.

72) L. Balzano, R. Nowak, and B. Recht, “**Online Identification and Tracking of Subspaces from Highly Incomplete Information**,” Proceedings of the Allerton Conference on Communications, Control, and Computing, September 2010.

73) L. Balzano, B. Recht, and R. Nowak, “**High-Dimensional Matched Subspace Detection when Data are Missing**,” Proceedings of the International Symposium on Information Theory (ISIT), June 2010.

74) L. Balzano and R. Nowak, “**Blind Calibration in Sensor Networks**,” Proceedings of the Conference on Information Processing in Sensor Networks (IPSN, oral presentation 15% acceptance), April 2007.

75) N. Ramanathan, L. Balzano, D. Estrin, T. Harmon, M. Hansen, J. Jay, B. Kaiser, and G. Sukhatme. “**Designing Wireless Sensor Networks as a Shared Resource for Sustainable Development**,” Proceedings of the 1st International Conference on Information and Communication Technologies and Development, April 2006.

ABSTRACTS, BOOK CHAPTERS, AND OTHER PUBLICATIONS

1) S.M. Kwon, A.S. Xu, C. Yaras, L. Balzano, Q. Qu. “**Understanding In-Context Learning's Out-of-Distribution Generalization Abilities via Low-Dimensional Subspaces**.” Conference on the Mathematical Theory of Deep Neural Networks (DeepMath) (selected for Contributed Oral presentation). 2025.

2) Y. Wang, T. Thong, V. Saligrama, J. Colacino, L. Balzano, and C. Scott. “**A Gene Filter for Comparative Analysis of Single-Cell RNA-Sequencing Trajectory Datasets**.” (2019) Technical Report available at https://www.biorxiv.org/content/10.1101/637488v1.

3) D. Zhang and L. Balzano, “**Convergence of a Grassmannian Gradient Descent Algorithm for Subspace Estimation from Undersampled Data**.” (2018) University of Michigan Technical Report available at https://hdl.handle.net/2027.42/171760.

4) G.S. Ledva, Z. Du, L. Balzano, and J. Mathieu, “**Disaggregating Load by Type from Distribution System Measurements in Real-Time**.” Energy Markets and Responsive Grids: Modeling, Control, and Optimization, Sean Meyn, Tariq Samad, Sonja Glavaski, Ian Hiskens, and Jakob Stoustrup, editors. pp. 413-437. Springer, New York, NY, 2018.

5) D. Zhang, Y. Sun, B. Eriksson, and L. Balzano, “**Deep Unsupervised Clustering Using a Mixture of Autoencoders**.” 2017. University of Michigan Technical Report at

http://hdl.handle.net/2027.42/145190.

6) D. Zhang and L. Balzano, "**Convergence results of GROUSE**,'' Presented at Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2017.

7) J. Lipor and L. Balzano, "**Leveraging Union of Subspace Structure to Improve Constrained Clustering**,'' Presented at Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2017.

8) A. Eftekhari, L. Balzano, D. Yang, M. Wakin, "**SNIPE for Memory-Limited PCA From Incomplete Data: From Failure to Success**,'' Presented at Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2017.

9) D. Hong, L. Balzano, and J. Fessler, "**Theoretical Analysis of PCA with Heteroscedastic Data**,'' Presented at Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2017.

10) N. Farouk, M. Zhang, and L. Balzano, "**Ordinal Embedding with a Latent Factor Model**," University of Michigan Tech Report CSPL-420, March 2017.

11) B. Wong, B. Kerkez, J. Lipor, L. Balzano, and D. Scavia, "**Measuring the water quality of lakes using an internet-enabled robot**,'' Presented at the International Conference on Hydroinformatics, August 2016.

12) R. Kennedy, C.J. Taylor, and L. Balzano, "**Online Completion of Ill-Conditioned Low-Rank Matrices**,'' Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2015.

13) J. Lipor and L. Balzano, "**Quantile Search**," Signal Processing with Adaptive Sparse Structured Representations (SPARS), June 2015.

14) A. Russell-Graham, P. Xiao, S. Brown, and L. Balzano, "**Determination of Trends in Ozone in the Mid-Atlantic Using Non-Negative Matrix Factorization**," American Geophysical Union (AGU) Fall meeting, December 2014.

15) J. He, L. Balzano, and A. Szlam, "**Online Robust Background Modeling via Alternating Grassmannian Optimization**.'' Background Modeling and Foreground Detection for Video Surveillance, Thierry Bouwmans, editor. Chapman and Hall. July 2014.

16) L. Balzano, "**Handling Missing Data in High-Dimensional Subspace Modeling**," Ph.D. Thesis under the supervision of Professors Rob Nowak, Ben Recht, Barry Van Veen, Stark Draper, and Jordan Ellenberg. University of Wisconsin, Madison, May 2012.

17) L. Balzano, R. Nowak, A. Szlam and B. Recht, "**K-Subspaces with Missing Data**," University of Wisconsin Tech Report ECE-11-02, February 2011.

18) He, L. Balzano, A. Szlam, and J. C.S. Lui, "**Online Robust Subspace Tracking from Partial Information,**'' Tech report; Arxiv version available at http://arxiv.org/abs/1109.3827

19) L. Balzano and J. Ellenberg, "**Understanding Persistent Homology and Plex using a Networking Dataset**," University of Wisconsin Tech Report, October 2010.

20) L. Balzano and R. Nowak, "**Blind Calibration of Networks of Sensors: Theory and Applications**," Networked sensing information and control, Venkatesh Saligrama, editor. Springer 2008.

21) L. Balzano, "**Addressing Fault and Calibration in Sensor Networks**," Masters Thesis under the guidance of Professors Mani Srivastava, Mark Hansen, Greg Pottie and Steven Margulis. University of California, Los Angeles, March 2007.

22) N. Ramanathan, L. Balzano, M. Burt, D. Estrin, E. Kohler, T. Harmon, C. Harvey, J. Jay, S. Rothenberg, and M. Srivastava, "**Rapid Deployment with Confidence: Calibration and Fault Detection in Environmental Sensor Networks**," Center for Embedded Networked Sensing (CENS) Technical Report #62, April 2006.

PATENT AND TECH TRANSFER

1) L. Balzano, C. Yaras, P. Abillama. "**Systems and Methods for Structured Matrix Approximation of Neural Network Activation Layers**." United States provisional patent filed December 1, 2025.

TEACHING EXPERIENCE

Courses Taught

Term	Course number		Enrollment	Q1	Q2	Q4	Q217 /216*	Q230
WN 2013	EECS/IOE 600	Functional Analysis for Optimization	16	4.33	4.75	4.75	4.92*	4.67
FA 2013	EECS 451	Digital Signal Processing and Analysis	74	4.37	4.73	4.33	4.93	4.73
WN 2014	EECS 564	Estimation, Filtering, and Detection	40	4.25	4.50	4.50	4.75*	4.64
FA 2014	EECS 451	Digital Signal Processing and Analysis	91	4.11	4.24	4.17	4.82	4.34
FA 2014	EECS/IOE 600	Functional Analysis for Optimization	17	4.50	4.50	4.50	4.80*	4.30
FA 2015	EECS 351	Digital Signal Processing and Analysis	40	4.44	4.72	4.46	4.90	4.83
WN 2016	EECS 564	Estimation, Filtering, and Detection	37	4.64	4.83	4.59	4.83*	4.88
FA 2016	EECS 351	Digital Signal Processing and Analysis	49	4.74	4.92	4.39	4.95	4.90
FA 2016	EECS/IOE 600	Functional Analysis for Optimization	24	4.17	4.40	4.58	4.81	4.40
FA 2018	EECS/IOE 600	Functional Analysis for Optimization	21	4.8	4.7	4.6	5.0	4.8
WN 2019	EECS 351	Digital Signal Processing and Analysis	59	4.5	4.7	4.1	4.9	4.9
FA 2020	EECS 351	Digital Signal Processing and Analysis	45	4.2	4.7	4.4	4.9	4.8
WN 2021	EECS/IOE 600	Functional Analysis for Optimization	20	4.7	4.7	4.3	5.0	4.8
FA 2021	EECS598-005	Randomized Numerical Linear Algebra for Machine Learning	28	4.7	4.8	4.0	5.0	4.8
WN 2022	EECS 351	Digital Signal Processing and Analysis	71	4.4	4.7	4.3	4.8	4.7
FA 2022	EECS 553	Machine Learning	86	4.4	4.6	4.6	4.9	4.8
WN 2023	EECS 351	Digital Signal Processing and Analysis	39	4.8	4.8	4.2	5.0	5.0
FA 2024	EECS 351	Digital Signal Processing and Analysis	59	4.7	4.9	4.2	4.9	4.9
WN 2025	ECE 598-004	Randomized Numerical Linear Algebra for Machine Learning	36	4.9	5.0	4.8	5.0	4.9
WN 2026	EECS 553	Machine Learning	77					

Scores out of 5:
Q1: Overall, this is an excellent course.
Q2: Overall, Laura Balzano is an excellent teacher.
Q4: I had a strong desire to take this course.
Q216: The instructor acknowledged all questions insofar as possible.
Q217: Laura Balzano treated students with respect.
Q230: Laura Balzano seemed well prepared for class meetings.

Advisees

Ph.D. Advisees

Alex Ritchie, co-advised by Clay Scott, joined September 2018. Family leave 2023-2025.
Rachel Newton, co-advised by Peter Seiler, joined September 2020.
Javier Salazar Cavazos, co-advised by Jeff Fessler, joined September 2021.
Can Yaras, co-advised by Qing Qu, joined September 2021.
Soo Min Kwon, co-advised by Qing Qu, joined September 2022.
Students potentially joining the lab:
Nicholas Simafranca, began January 2025.
Elvin Tseng, began May 2025.
Laya Pullela, co-advised by Minji Kim, began September 2025.
Gavin Kunesh, co-advised by Alfred Hero, began September 2025.
Jessica Jiang, co-advised by Clayton Scott, began September 2025.

Kyle Gilman, joined September 2018, proposal May 2021, Ph.D. defense October 2022.
"Scalable Algorithms Using Optimization on Orthogonal Matrix Manifolds"
Next position: Applied AI/ML Senior Associate at JP Morgan Chase Bank, followed by Member of Technical Staff at MIT Lincoln Laboratory

Zhe Du, co-advised by Necmiye Ozay, joined July 2016, proposal December 2021, Ph.D. defense November 2022. "Learning, Control, and Reduction for Markov Jump Systems"
Next position: Postdoctoral scholar at UC Riverside

Amanda Bower, AIM student co-advised by Martin Strauss joined January 2017, proposal December 2017, Ph.D. defense October 2020. "Dealing with Intransitivity, Non-Convexity, and Algorithmic Bias in Preference Modeling"
Next position: Twitter Machine Learning Ethics, Transparency, and Accountability (META) group, Seattle, WA, followed by independent Fintech consultant

Dejiao Zhang, joined September 2013, proposal January 2018, Ph.D. defense May 2019.
"Extracting Compact Knowledge from Massive Data"
Next position: Applied research scientist at Amazon Web Services, New York, followed by Senior staff research scientist at Figma

David Hong, co-advised by Jeffrey Fessler joined January 2015, proposal March 2017, Ph.D. defense March 2019.
"Learning Low-Dimensional Models for Heterogeneous Data"
Next position: Postdoctoral scholar at Penn – Wharton Statistics Department, followed by Assistant Professor, University of Delaware Electrical Engineering

John Lipor, joined September 2013, proposal November 2016, Ph.D. defense September 2017.
"*Sensing Structured Signals with Active and Ensemble Methods"*
Next position: Assistant Professor, Portland State University Electrical and Computer Engineering, followed by Associate Professor with tenure

Postdoctoral Researchers

Peng Wang December 2021 – July 2025.
Following position: Assistant Professor at the University of Macau
Davoud Ataee Tarzanagh September 2020 – August 2022.
Following position: Postdoctoral Researcher at UPenn, then Samsung Research
Haroon Raja August 2019 – February 2021.
Following position: AI Research Scientist at Eli Lilly
Ali Soltani-Tehrani, co-advised by Jason Corso May 2018 – May 2019.
Following position: Associate Principal Data Scientist at AstraZeneca, followed by Associate Director of Data Science at Evinova, followed by Director of Applied AI and ML at Evinova
John Lipor September 2017 – December 2017
See above (also PhD advisee)
Gregory Ongie, co-advised by Jeffrey Fessler September 2016 – July 2018.
Following position: Assistant Professor, Marquette University Mathematics

Supervised MS student projects with fellowship or RA tuition support:
Nisarg Trivedi, joined September 2020, M.S. completion May 2021.
Next position: Senior engineer ML, Qualcomm.
Geoffrey Fortman, 2021-2022. "Constrained Rank-One Symmetric Matrix Approximation."
Next position: Research Engineer at Michigan Tech Research Institute.
Jenna King (first as undergrad and then MS student), 2020-2021. MS capstone project "Active learning with ordered weighted margin."
Next position: Senior data scientist, OneMagnify.
Yutong Wang, co-advised by Clay Scott joined January 2017. Switched to be solely advised by Clayton Scott in March 2020.
Next position: Assistant professor computer science, Illinois Tech.
Pengyu Xiao, joined January 2014, M.S. completion May 2016.
Next position: Algorithm engineer at Jing Dong.

Supervised MS student projects:
Pengrun Huang, "Binary valued matrix completion", 2022.
Risshabh Naik, "Truncated matrix completion," 2021-2022.
Wei Hu (with Davoud Ataee Tarzanagh), "Federated Sparse Learning", 2021.
Ransheng Guan (with Amanda Bower and Alex Ritchie), "Fairness in Ranking," 2020.
Jiangyan Feng (with Yutong Wang and Haroon Raja), "RNA-seq data analysis," 2020.
Yuxin Wang (with Yutong Wang and Haroon Raja), "A fast deconvolution algorithm for RNA-seq data," 2020.
Sijun Zhang (with Zhe Du), "Robust Online Switched System Identification," 2020.
Shanthakumar Venkatraman, "Subspace primitives for automated ML," 2018.
Zeyu Sun, "Subspace primitives for automated ML," 2018.
Akash Rastogi, "Subspace primitives for automated ML," 2017.
Chenlan Wang, "Comparison of gradient descent algorithms for subspace learning," 2016-2017.
Saket Dewangan, "Low-rank regularized machine learning methods for image reconstruction in medical imaging," 2016-2017.
Xueru Zhang, "Comparison of gradient descent algorithms for subspace learning," 2016.
Pragya Agrawal, "Addressing missing voltage Phasor Measurement Unit data in Voltage Stability Margin calculations," 2014.

Supervised undergraduate student projects:
Matthew Asato, "Compressed Nonlinear Deep Learning models," 2025-2026.
Linglong Meng, "Subspace clustering in diffusion models," 2025-2026.
Ian Steele, "Dictionary learning from data with non-uniform noise," 2025.
Jacob Hume, "Spectral methods for dynamic community detection," 2023-2024.
Jacob Block, "Heteroscedastic subspace clustering," 2023.
Iman Malik, "Matrix completion with heteroscedastic noise," 2022-2023.
Jasmine Spencer, "Fairness in machine learning," 2022-2023.
Eli Smith, "Sketching methods for solving matrix equations," 2022.
Jonathan Smith, "Sketching methods for solving matrix equations," 2022.
Debrini Sarkar, "The effect of mixed data types on t-sne," 2022.
Avi Tachna-Fram, "Deterministic matrix completion," 2021.
Anya Martin, "Deterministic matrix completion", 2021.
Rodrigo Cespedes, "Robust streaming matrix completion," 2021.
Daphney Cajuste, "Clustering public bike usage statistics in Dublin," 2020.
Veronica Alfaro, "Using Clustering and Dimensionality Reduction to Classify Countries and U.S. Counties by COVID-19 Impact." 2020.
Jacqueline Schafer, "How dimensionality reduction algorithms change the clustering of US counties by confirmed COVID-19 cases," 2020.
Frank Seidl, "Subspace Clustering on Aggregated scRNA-seq Datasets," 2020.
Morgan Ruffner, "Clustering for the Diagnosis, Progression, and Treatment of Alzheimer's Disease," 2020.
Naicheng Wu (with Amanda Bower and Alex Ritchie), "Fairness in Ranking," 2020.
Eric Chen (with Amanda Bower and Alex Ritchie), "Fairness in Ranking," 2020.
Neil Meehan (with Amanda Bower and Alex Ritchie), "Fairness in Ranking," 2020.
Austin Xu, "Learning Judgement Weights for Preference Learning," 2019.
Justin Malin, "Subspace primitives for automated ML," 2017-2018.
Andrew Gitlin, "Improving K-Subspaces via Coherence Pursuit," 2017.
Robert Malinas, "Learning dictionary-based unions of subspaces for image denoising," 2017.
Alex Ying and Christopher Shih, "Instructional aide: Incorporating sensing into EECS 351 Digital Signal Processing," 2016.
Steven Roudebush, "Aquatic spatial sampling system development," 2015.
Junjie Dong, "Kinect background subtraction," 2015.
Hana Baker, "Kinect background subtraction," 2015.
Mostafa Shuva, "Lightfield low-rank approximation," 2015.
Richard Kim, "Lightfield low-rank approximation," 2015.
Mingyuan (William) Zhang, "Low-dimensional modeling for Preference Learning," 2015-2016.
Nora Farouk, "Low-dimensional modeling for Preference Learning," 2015-2016.
Richard Ortman, "Aquatic spatial sampling system development," 2014.

Ph.D. Committees

(All students in Electrical and Computer Engineering, unless otherwise specified.)
Nick Asendorf, proposal April 2013, defense May 2015, Chair: Raj Rao Nadakuditi
Donghwan Kim, proposal August 2013, defense May 2014. Chair: Jeffrey Fessler
Ko-Jen Hsiao, proposal June 2013, defense April 2014. Chair: Alfred Hero
Hung Nien, proposal July 2013, defense May 2014. Chair: Jeffrey Fessler
Jang Hwan Cho, proposal August 2013, defense September 2014. Chair: Jeffrey Fessler
Zhaoshi Meng, proposal September 2013, defense August 2014. Chair: Alfred Hero
Chih-Chun Chia, defense April 2014. Chair: Zeeshan Syed
Hao Sun, proposal April 2014, defense April 2015. Chair: Jeffrey Fessler
Pradeep Ranganathan, Computer Science and Engineering, proposal May 2014, defense November 2015. Chair: Edwin Olson
Madison McGaffin, proposal October 2014, defense April 2015. Chair: Jeffrey Fessler
Hamed Firouzi, proposal October 2014, defense February 2015. Chair: Alfred Hero
Dae Yon Jung, proposal December 2014, defense May 2015. Chair: Alfred Hero

Kam Chung Wong, Statistics, proposal January 2015, defense May 2017. Chair: Ambuj Tewari
Maruthi Ravichandran, proposal April 2015, defense June 2015. Chair: Semyon Meerkov
Ilbin Lee, Industrial and Operations Engineering, defense May 2015. Chair: Marina Epelman
Yu-Hui Chen, proposal May 2015, defense November 2015. Chair: Alfred Hero
Tianpei Xie, proposal August 2015, defense May 2017. Chair: Alfred Hero
Mai Le, proposal December 2015, defense May 2017. Chair: Jeffrey Fessler
Matthew Muckley, defense April 2015. Chair: Doug Noll and Jeffrey Fessler
Efren Cruz Cortez, proposal July 2016, defense April 2017. Chair: Clayton Scott
Brandon Wong, Civil and Environmental Engineering, proposal September 2016, defense September 2017. Chair: Branko Kerkez
Gregory Ledva, proposal September 2017, defense November 2018. Chair: Johanna Mathieu
Julian Katz-Samuels, proposal May 2018, defense May 2019. Chair: Clayton Scott
Elizabeth Hou, proposal May 2018, defense July 2019. Chair: Alfred Hero
Victor Fuentes, Industrial and Operations Engineering, defense March 2019. Chair: Jon Lee
Yitong Sun, Mathematics, defense June 2019. Chair: Anna Gilbert
Ciara Witt, Chemistry, proposal May 2019. Removed for defense due to removal of ML from her thesis. Chair: Aaron Frank
Wonhui Kim, proposal July 2020, defense May 2021. Chair: Matthew Johnson-Roberson
Cameron Blocker, proposal July 2020, defense July 2022. Chair: Jeffrey Fessler
Shouchang Guo, proposal July 2021, defense April 2022. Chair: Jeffrey Fessler
Yutong Wang, proposal November 2021, defense August 2022. Chair: Clayton Scott
Alex Hoffman, Climate and Space Sciences, proposal May 2023, defense February 2024. Chair: Mark Moldwin
Jianhao Ma, Industrial and Operations Engineering, proposal November 2022. Removed from defense due to change in research direction. Chair: Salar Fattahi
Allison King, Mechanical Engineering, proposal October 2024, defense March 2025. Chair: David Dowling
Jiahao Shi, Industrial and Operations Engineering, defense March 2025. Chair: Albert Berahas
Doruk Aksoy, Aerospace Engineering and Scientific Computing, research exam May 2022, defense July 2025. Chair: Alex Gorodetsky
Yilun Zhu, proposal February 2025, defense expected December 2025. Chair: Clayton Scott
Xiao Li, proposal March 2025, defense January 2026. Chair: Qing Qu
Sara Shoouri, proposal September 2025, defense expected May 2026. Chair: Hun-Seok Kim
Jiaming Yang, Computer Science and Engineering, proposal 2026, defense expected April 2027. Chair: Michał Dereziński

Outreach and extra-curricular

Program for Undergraduate Research in ECE (PURE-ECE) mentor, 2025 – present.
Recruiting and mentoring undergraduate EE and CE students for long-term research experiences starting in their sophomore year with the goal of extending research into at least one summer and two academic years.

Research Experience for Undergraduates (REU) mentor, 2014 – present.
Recruiting undergraduate students for research experiences. I have supported more than 30 undergraduate students in research – some independent study students, and others with a stipend and mentoring time – 10 of whom were female (Nora, Hana, Daphney, Jacqueline, Morgan, Veronica, Jenna, Debrini, Jasmine, Iman); see full list above.

Optimaize Day, 2024 – present
Optimaize Day is a twice-yearly one-day workshop with high school students who are part of the Detroit Educational Takeover program. It was created by Albert Berahas, and I have participated since Spring 2024 and co-organized since Fall 2024. We spend one day introducing the students to the interesting problems one can solve with optimization as well as exposing them to opportunities at the College of Engineering at the U-M.

Faculty Advisor for Michigan IEEE student branch (2015-present) and MIDAS MSAIL artificial intelligence reading group (2017-present).
Supporting students in finding useful resources and helping maintain continuity across student officers.

Engineering OnRamp, 2019 - 2025
Engineering OnRamp was (until 2025) the umbrella term for UM College of Engineering efforts to support underrepresented high school students in their engineering exposure and education. Two of the programs, Engineering Pathways and the SHARP program, in part followed the example of Wolverine Pathways (see below), and I have given lectures to these students. I was also on the Faculty Advisory Board of the Engineering OnRamp program from 2021-2025.

University of Michigan Pipeline Initiative, Wolverine Pathways, 2015 - 2019
The UM Pipeline Initiative is working with school districts and community stakeholders to recruit students from low-resource schools to participate in a research-based learning experience. The university offers these students a portfolio of programs and supports them through college admission. The first Wolverine Pathways program was in spring 2016 involved programming and understanding media, including my lectures on Machine Learning.

Michigan Institute for Data Science (MIDAS) certificate student program mentor,

September 2016 – December 2018
Monthly meetings with the data science certificate students, working to build a community and culture of data science leadership at Michigan.

Michigan MSTEM Academies mentor, June 2013
Visit with students in the MSTEM program as the transition from high school to STEM fields at the University of Michigan.

Undergraduate Research Opportunity Program, June 2014 – May 2016
Mentor undergraduate students on research activities.

Delta Certificate Program for Research, Teaching and Learning in STEM fields, University of Wisconsin, June 2010 – June 2012.
Studied research for teaching in the college classroom, for teaching international and diverse communities, and for motivating high school students' interest in STEM careers. Taught units of the college classroom course and taught to high school students at Madison La Follette HS.

PROFESSIONAL ACTIVITIES AND SERVICE

Service Highlights 2026:

- Lead Guest Editor, Signal Processing Magazine Special Issue on the Mathematics of Deep Learning. 2024-2026.
- Department of Electrical Engineering Associate Chair of Undergraduate Education, June 2025 – August 2028.

Organizer
- Conference for Learning for Dynamics and Control (L4DC), June 2025, Ann Arbor, MI. Program chair.
- SIAM Optimization – Minisymposium on "Tractable Non-Convex Problems in Low-Dimensional Learning" 2023.
- Institute for Advanced Study Workshop on Missing Data Challenges in Statistics, Computation, and Applications, September 2020.
- IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) - Special session on The Intersection of Optimization Theory and Information Processing, December 2019.
- Sampling Theory and Applications (SampTA) – conference session on Missing Data Imputation, July 2019.
- Midwest Machine Learning Symposium – Organizing committee 2019; Advisory Board 2018-present; Organizing committee 2017
- Michigan Statistical Machine Learning Reading Group (SMLRG) Workshop - Organizer 2014-2018
- Asilomar - Special Session Chair for the session on Structured Matrix and Covariance Recovery within the track on Signal Processing and Adaptive Systems 2017
- Pulsar Information Processing Workshop – Lead organizer (concurrent with SPARS) 2017
- SIAM Optimization - Minisymposium on Non-convex Methods Organizer 2017
- IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) - Special session on Optimization and Adaptivity in Big Data Organizer 2015
- IEEE Conference on Global Signal and Information Processing (Global SIP) - Symposium on Information Processing and Big Data Organizer 2014; Technical program committee 2013
- Institute for Pure and Applied Mathematics – Workshop on Adaptive Data Sparsity and Analysis Organizer 2013

Departmental and University Service
- Department of Electrical Engineering Associate Chair of Undergraduate Education, June 2025 – August 2028.
- Elected member of the Electrical and Computer Engineering Executive Committee, August 2024 – May 2025.
- Member of the committee for an Inclusive Department, September 2020-August 2022 and August 2023 – August 2024. Lead author of the department's code of conduct, adopted April 2023.
- MSAIL Michigan Undergraduate Artificial Intelligence Reading Group Advisor, September 2017-present.
- University of Michigan IEEE Student Branch Counselor, September 2015-present.
- Dean's advisory committee of female faculty, September 2021-May 2024.
- Signal and Image Processing and Machine Learning area chair, September 2022-August 2023.
- Signal and Image Processing and Machine Learning graduate advisor, September 2022-August 2023.
- PhD Admissions Committee, January 2013-August 2019.
- Computer Engineering Undergraduate Program Advisor January 2016-December 2020.
- Girls in EECS (GEECS) Student Group Faculty Advisor, September 2013-September 2015.

Professional Development

- "Next Generation Graduate Student Advising" training by Angela Farrehi at the ECE Faculty meeting, November 2023.
- "Change It Up - Anti Black Racism" training by UM CoE, March 2021.

Contributor / Panelist

- Midwest Machine Learning workshop panel, 2017, 2018, and 2024.
- ICASSP 2024 Tutorial on "Understanding Deep Representation Learning via Neural Collapse."
- Contributed modules for the Massive Open Online Course "Problem Solving using Computational Thinking," 2018. https://online.umich.edu/courses/problem-solving-using-computational-thinking
- Information Theory Summer School at the University of Toronto, June 2014.
- Girls in EECS (GEECS) panel for high school workshop for Girls Who Code, Nov 2013.
- Matrix Computations (Golub and Van Loan) version 4. Contributed problem 6.4.8. 2012.
- Volunteer for the UW Oral History project series on Women in Science and Engineering. 2008-2012.
- Institute for Pure and Applied Mathematics (IPAM) 2011 Newsletter.
- NPR All Tech Considered, The path from syphilis to faster MRIs by Art Silverman. Contributed audio demo, see details at http://sunbeam.ece.wisc.edu/csaudio. 2010

Editorial Roles

- Signal Processing Magazine Lead Guest Editor of a Special Issue on Mathematics of Deep Learning 2024-2026
- SIAM Journal on the Mathematics of Data Science 2021-2027
- IEEE Open Journal of Signal Processing 2020-2025

Program Committee Roles

- AI Stats - Senior program committee 2019-2023.
- Neural Information Processing Systems (NeurIPS) – Senior program committee 2019.
- International Conference on Machine Learning (ICML) – Senior program committee 2019.
- Neural Information Processing Systems (NeurIPS) – Technical program committee 2016.
- SPARS - Technical Program Committee 2015, 2017, 2019.
- IEEE Workshop on Statistical Signal Processing (SSP) – Technical program committee 2018.

Technical Paper Reviewer

- 2019-Present Annals of Statistics
- 2014-Present Journal of Machine Learning Research (JMLR)
- 2010-Present IEEE Transactions on Signal Processing
- 2018-2021 IMA Journal of Information and Inference
- 2018 Proceedings of the IEEE
- 2015-2018 IEEE Transactions on Information Theory
- 2015-2022 IEEE Transactions on Pattern Analysis and Machine Intelligence
- 2012-2018 Journal of Selected Topics in Signal Processing
- 2021 Foundations and Trends in Machine Learning
- 2021 Artificial Intelligence in Medicine
- 2020 Journal of Computational and Graphical Statistics
- 2020 IEEE Internet of Things Journal
- 2017 Journal of the American Statistical Association
- 2017 SIAM Journal on Matrix Analysis and Applications
- 2015-2017 SIAM Journal on Scientific Computing
- 2011-2017 Signal Processing Letters
- 2015 Journal of Mathematical Imaging and Vision
- 2014 Constructive Approximation (Journal)
- 2011-2012 ACM Transactions on Sensor Networks
- 2013-2017 Conference on Signal Processing with Adaptive Sparse Structured Representations (SPARS)
- 2012-Present IEEE Statistical Signal Processing Workshop (SSP)
- 2015-2018 Artificial Intelligence and Statistics (AI Stats)
- 2017 International Conference on Machine Learning (ICML)
- 2016-2017 Conference on Learning Theory (COLT)
- 2016 Neural Information Processing Systems (NeurIPS)
- 2015 IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)
- 2013-2014 IEEE Global Conference on Signal and Information Processing (GlobalSIP)
- 2009 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)

Society Memberships

Senior Member, IEEE, Signal Processing Society 2018 – present
Member, IEEE, Signal Processing Society 2012-2018
Student member, IEEE, Signal Processing Society 2005-2012
Member, SIAM, Optimization Society 2017 - present
Member, INFORMS, Optimization Society 2021-2022

TALKS AND SEMINARS

Keynote or Plenary Seminars

- University of Wisconsin ECE Distinguished Seminar Speaker for Early Career Award, November 2024.
- Environmental Protection Agency (EPA) Air Sensors Meeting, March 2013.

Invited Seminars

- Wisconsin Applied Algebra Seminar, November 2024.
- Priberam Machine Learning seminar at Instituto Superior Técnico, June 2024.
- 1 World MINDS seminar (virtual), April 2024.
- Yale Applied Math Seminar (virtual), April 2022.
- Arizona State University LIONS Seminar (virtual), March 2022.
- Johns Hopkins MINDS & CIS Seminar (virtual), October 2021.
- Rutgers University Signal and Information Processing Seminar (virtual), March 2021.
- UT Austin Oden Institute lecture (virtual), November 2020.
- Priberam Machine Learning seminar at Instituto Superior Técnico (virtual), June 2020.
- Institute for Advanced Study Special Year Seminar, February 2020.
- Princeton Colloquium Series for the Program in Applied and Computational Mathematics, February 2020.
- Princeton Colloquium of the Operations Research and Financial Engineering, December 2019.
- Berkeley Laboratory for Information Systems and Sciences (BLISS) Seminar, November 2018.
- Toyota Technical Institute of Chicago Seminar, March 2017.
- Institute for Mathematics and its Applications (IMA) summer school on Mathematical Optimization, August 2016.
- Air Force Research Lab seminar, June 2016.
- Johns Hopkins Center for Imaging Science, May 2015.
- Annual Workshop on Data Science, Tennessee State University, April 2015.
- University of Chicago Computation Seminar, April 2015.
- University of Wisconsin Advanced Signal Processing Class, March 2015.
- Claremont McKenna Math department, February 2015.
- Colorado School of Mines Center for Automation, Robotics, and Distributed Intelligence (CARDI) and the EECS department, August 2014.
- University of Pennsylvania (interview), March 2012.
- The Ohio State University (interview), March 2012.
- Duke University, February 2012.
- Notre Dame University (interview), February 2012.
- University of Michigan (interview), February 2012.
- University of Wisconsin, Madison SILO (Systems Information Learning and Optimization) seminar.
- Rice University invited seminar, November 2011.
- University of Minnesota invited seminar, April 2011.
- University of Illinois, Urbana-Champaign, invited seminar, April 2011.

Invited Workshop and Conference Presentations

- Institute for Mathematical and Statistical Innovation workshop on Reduced Order and Surrogate Modeling for Digital Twins, November 2025.
- Conference on the Mathematical Theory of Deep Neural Networks (Deep Math), November 2025.
- Institute for Mathematical and Statistical Innovation workshop on Data Assimilation and Inverse Problems for Digital Twins, October 2025.
- International Conference on Continuous Optimization session on Manifolds, samples, and learning, July 2025.
- SIAM Computational Science and Engineering Minisymposium on Nonlinear Dimensionality Reduction and Model Reduction Methods for Physical Sciences and Engineering, March 2025.
- SIAM Mathematics of Data Science Minisymposium on Efficient and Robust Optimization Techniques for Structured Data Learning, October 2024.
- INFORMS track for Dynamic Data Driven Applications Systems, October 2021.
- University of Toronto Fields Institute Symposium on Low-Rank Models and Applications, June 2021.
- Institute for Advanced Study, Workshop on Missing Data Challenges in Statistics, Computation, and Applications (virtual), September 2020.
- Institute for Advanced Study, Workshop on New Directions in Reinforcement Learning and Control, Lightning talk, November 2019.
- Simons Workshop on Robust High-Dimensional Statistics, November 2018.
- Simons Workshop on Randomized Numerical Linear Algebra and Applications, September 2018.
- Pulsar Information Processing Workshop, June 2017.

- SIAM Optimization Minisymposium on Non-Convex Optimization, May 2017
- Simons Interactive Learning Workshop, February 2017.
- Workshop for Geometry in Machine Learning at the International Conference on Machine Learning (ICML), June 2016.
- The Institute for Mathematics and its Applications (IMA) Workshop on Resource Tradeoffs: Computation, Communication, and Information, May 2016.
- Conference on Information Sciences and Systems (CISS), March 2016
- Information Theory and its Applications (ITA) Workshop, February 2016
- IMA Workshop on Optimization and Parsimonious Modeling, January 2016
- International Symposium for Mathematical Programming (ISMP), July 2015.
- Information Theory and its Applications (ITA) Workshop, February 2015.
- Workshop for Sparse Representations, Numerical Linear Algebra, and Optimization at the Banff International Research Station (BIRS), October 2014.
- INFORMS Optimization society meeting, March 2014.
- Asilomar Conference, session on Blind Source Separation and Deconvolution, November 2013.
- Workshop on Algorithms for Synthetic Aperture Radar Imagery at the SPIE Conference for Defense, Security and Sensing, May 2013.
- Adaptive Data Analysis and Sparsity workshop at the Institute for Pure and Applied Mathematics (IPAM), January 2013.
- Society for Industrial and Applied Mathematics (SIAM) Imaging workshop, May 2012.
- Internet Multi-Resolution Analysis second reunion workshop at IPAM, June 2011.
- Internet Multi-Resolution Analysis first reunion workshop at IPAM, June 2010.

Invited Seminars at Michigan

- University of Michigan Artificial Intelligence Seminar, November 2025.
- University of Michigan Applied Interdisciplinary Math seminar, April 2025.
- University of Michigan IEEE Student Branch Prof Talk, March 2025.
- University of Michigan IOE Seminar, December 2021.
- University of Michigan Statistics Colloquium, February 2021.
- MiCHAMP Michigan Integrated Center for Health Analytics and Medical Prediction Seminar, February 2019.
- ARO Workshop on Geometry of Information and Computation for Machine Learning, May 2018.
- University of Michigan Communications and Signal Processing seminar, March 2018.
- Michigan Institute for Computational Discovery & Engineering (MICDE) Symposium speaker, April 2017.
- Michigan UROP (Undergraduate Research Opportunities Program) seminar, March 2017.
- Michigan Institute for Data Science (MIDAS) seminar, March 2017.
- University of Michigan Communications Signal Processing Seminar, February 2017.
- University of Michigan Communications and Signal Processing seminar, May 2016.
- University of Michigan Communications and Signal Processing seminar, May 2015.
- University of Michigan Theoretical Computer Science Seminar, April 2015.
- Agilent visit to University of Michigan, April 2015.
- University of Michigan IEEE Student chapter seminar, April 2015.
- University of Michigan EECS 500 seminar, September 2014.
- University of Michigan Applied Interdisciplinary Mathematics Seminar, March 2014.
- University of Michigan Statistics Colloquium, November 2013.
- Toyota Artificial Intelligence Seminar at Michigan, October 2013.
- University of Michigan EECS 500 seminar, October 2013.
- University of Michigan lunchtime staff Seminar, March 2013.
- University of Michigan Communications and Signal Processing seminar, February 2013.

Selected Conference Oral Presentations (by me, my collaborators, and my students)

- Conference on the Mathematical Theory of Deep Learning (Deep Math) (abstract presentation by PhD student Alec S. Xu), November 2025.
- International Conference on Machine Learning (ICML), (publication oral presentation; 1.5% of conference papers), July 2024.
- SIAM Mathematics of Data Science (MDS) (presentation by PhD student Kyle Gilman), Interface of Statistics, Optimization and Learning in Data Science, September 2022.
- International Conference on Machine Learning (ICML) (publication presentation by postdoc Peng Wang), July 2022.
- International Conference on Machine Learning (ICML) (publication presentation by student Amanda Bower), July 2020.
- SIAM Mathematics of Data Science (MDS), June 2020.
- IEEE conference on Acoustics, Speech, and Signal Processing (ICASSP) (publication presentation by student Kyle Gilman), May 2020
- IEEE Conference on Advances in Multi-Sensor Adaptive Processing (CAMSAP) (publication presentation by David Hong, Zhe Du), December 2019
- International Conference on Computer Vision (ICCV) (workshop publication presentation by student Kyle Gilman), October 2019.
- IEEE Data Science Workshop (DSW) (publication presentation by Alex Ritchie), June 2019.
- International Symposium of Mathematical Programming (ISMP), July 2018.
- IEEE conference on Acoustics, Speech, and Signal Processing (ICASSP) (publication

presentation by student Amanda Bower), April 2018
- Global Conference on Signal and Information Processing (publication presentation by postdoc Greg Ongie), November 2017.
- Asilomar Conference on Signals and Systems (publication presentation by postdoc Greg Ongie), November 2017.
- Allerton Conference (publication presentation by co-author Rebecca Willett), September 2017.
- International Conference on Machine Learning (publication presentations by student John Lipor and postdoc Greg Ongie), August 2017.
- AAAI (publication presentation by co-author Ravi Ganti), February 2017.
- Allerton conference (publication presentation), September 2016.
- Signal Processing with Adaptive Sparse Structured Representations (SPARS), July 2015.
- IEEE Conference on Advances in Multi-Sensor Adaptive Processing (publication presentation), December 2013.
- Computer Vision and Pattern Recognition conference (publication presentation), June 2012.
- Allerton Conference (publication presentation), September 2010.
- IEEE International Symposium on Information Theory (publication presentation), June 2010.
- Conference on Information Processing in Sensor Networks (publication presentation), April 2007.

Selected Conference and Workshop Posters

- Neural Information Processing Systems (publication poster), December 2025.
- International Conference on Machine Learning (publication posters), July 2024.
- NSF Workshop on The Convergence of Smart Sensing Systems, Applications, Analytic and Decision Making, December 2023.
- Artificial Intelligence and Statistics (AI Stats) (publication poster), October 2021.
- International Conference on Computer Vision (publication poster), October 2019.
- International Conference on Learning Representations (publication poster), April 2018.
- IEEE conference on Acoustics, Speech, and Signal Processing (ICASSP) (publication poster), March 2017.
- Workshop on Advances in non-convex analysis and optimization at ICML, June 2016.
- Artificial Intelligence and Statistics (publication poster), May 2016.
- IEEE Conference on Advances in Multi-Sensor Adaptive Processing (CAMSAP) (publication poster), December 2015.
- Signal Processing with Adaptive Sparse Structured Representations (SPARS), July 2015.
- Foundations on Computational Mathematics (FOCM) Workshop on Computational Harmonic Analysis, December 2014.
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) (publication poster), May 2014.
- Sensing and High-Dimensional Data Analysis Workshop at Duke University, June 2013.
- Information Theory and its Applications (ITA) Workshop, Graduation Day 2012
- Sensing and High-Dimensional Data Analysis Workshop at Duke University, June 2011.

Selected Non-refereed Conference Presentations

- John Lipor, David Hong, Yan Shuo Tan, and Laura Balzano. "Ensemble K-Subspaces." Allerton Conference, 2018.
- Laura Balzano, Greg Ongie, Daniel Pimentel-Alarcon, Robert Nowak, Rebecca Willett. "Low Algebraic Dimension Matrix Completion." International Symposium on Mathematical Programming, 2018.
- Greg Ongie, Laura Balzano, Dejiao Zhang, and David Hong. "Adaptive Sampling for Online Subspace Estimation." International Symposium on Mathematical Programming, 2018.
- Laura Balzano and Dejiao Zhang. "Guarantees for Subspace Learning by Incremental Gradient Descent on the Grassmannian." SIAM Conference on Optimization, 2017.
- Laura Balzano, Ravi Ganti and Rebecca Willett. "Low-rank matrix completion under an unknown monotonic transformation of the data." Information Theory and its Applications, 2016.
- Laura Balzano, Dejiao Zhang and Stephen Wright. "Convergence Theory for Subspace Estimation from Undersampled Data." International Symposium on Mathematical Programming, 2015.
- Laura Balzano and Stephen Wright. "Local convergence of an algorithm for subspace identification with missing data." Information Theory and its Applications, 2015.
- Laura Balzano and Stephen Wright. "Local Convergence of an Algorithm for Subspace Identification from Partial Data." INFORMS Optimization Society Conference, 2014.
- Laura Balzano, Daniel Pimentel-Alarcon and Robert Nowak. "Union of Subspace Estimation with Missing Data." Asilomar Conference on Signals, Systems, and Computers. 2013.
- Laura Balzano. "Low-rank covariance estimation with missing data." SPIE Conference on Defense, Security, and Sensing, 2013.
- Laura Balzano, Brian Eriksson and Robert Nowak. "High Rank Matrix Completion." Information Theory and its Applications, 2012.