

# Mahdi Soltanolkotabi

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## CONTACT INFORMATION

Ming Hsieh Department of Electrical and Computer  
Engineering  
University of Southern California  
Los Angeles, CA 90089-2560

*Phone:* (213)-740-4456  
soltanol@usc.edu  
[www-bcf.usc.edu/~soltanol](http://www-bcf.usc.edu/~soltanol)

## RESEARCH INTERESTS

- Mathematical foundations of data science
- Theory for deep learning
- High-dimensional probability and statistics
- Mathematical optimization, signal processing and machine learning.
- Iterative algorithms and non-convex optimization
- Federated and continual learning
- Artificial intelligence for the basic sciences including computational imaging, microscopy, light-field sensing, and MR/medical imaging
- Theory of algorithms, applied probability, random matrix theory, empirical process theory and chaining, geometric functional analysis.
- Sparse/low-rank recovery, compressive sensing, and phase retrieval.
- Coded computing, edge computing, low-precision computing, and large-scale data analytics over cloud infrastructure
- Machine learning for wireless and internet of things

## ACADEMIC EMPLOYMENT

### **University of Southern California (USC)**, Los Angeles, CA.

- Andrew and Erna Viterbi Early Career Chair  
Ming Hsieh Department of Electrical and Computer Engineering  
August 2019-present.
- Associate Professor  
Ming Hsieh Department of Electrical and Computer Engineering  
May 2021-present.
- Assistant Professor  
Ming Hsieh Department of Electrical and Computer Engineering  
August 2015-April 2021.
- Assistant Professor (by courtesy)  
Department of Computer Science  
January 2017-present.

### **University of California Berkeley (UCB)**, Berkeley, CA.

- Postdoctoral Researcher, Department of Electrical Engineering and Computer Science, August 2014-July 2015.  
Mentors: Benjamin Recht and Martin Wainwright.

## EDUCATION

### **Stanford University**, Stanford, CA.

- PhD in Electrical Engineering, 2009-August 2014.  
Advisor: Emmanuel J. Candès.
- M.Sc. in Electrical Engineering, Sept. 2009-June 2011.

### **Sharif University of Technology**, Tehran, Iran.

- B.Sc. in Electrical Engineering, Sept. 2005-June 2009.

- DISTINCTIONS
- Information Theory Society best paper award
  - Packard Fellowship in Science and Engineering
  - Sloan Fellowship in Mathematics
  - NSF Career Award
  - Air-force Office of Scientific Research 2018 Young Investigator Award.
  - Google 2018 Faculty Research Award.
  - 2021 Viterbi school of engineering junior researcher award
  - Stanford **BENCHMARK** Graduate Fellowship in Science and Eng. (2009-2012).
  - Department and Institute **rank 1/800**, Sharif University of Technology (2009).
- SUMMARY OF RESEARCH SUPPORT AT USC
- ACTIVE RESEARCH SUPPORT
- Total Funding:  $\approx$  \$4 million
- Funding as solo-PI:  $\approx$  \$2.5 million
  - Funding as co-PI:  $\approx$  \$1.5 million
- **Packard Fellowship in Science and Engineering**  
David and Lucile Packard Foundation  
Role: solo-PI. Dates: 11/09/2018 -11/08/2023.  
Amount: \$875,000.
  - **Sloan Fellowship in Mathematics**  
Alfred P. Sloan Foundation  
Role: solo-PI. Dates: 09/15/2019 -09/14/2021.  
Amount: \$70,000.
  - **NSF CAREER Award: “CAREER: Guaranteed Nonconvex Optimization for High-Dimensional Learning”**  
National Science Foundation  
Role: solo-PI. Dates: 02/01/2019-01/31/2024.  
Amount: \$551,596. Percentage of time: %11 academic effort.
  - **AFOSR 2018 Young Investigator Award: “Learning data representations via nonconvex optimization”**  
Air force office of scientific research  
Role: solo-PI. Dates: 01/02/2018-31/01/2021.  
Amount: \$450,000. Percentage of time: %16.5 academic effort.
  - **NSF CIF Small: “Precise Computational and Statistical Tradeoffs for Iterative Signal Estimation and Supervised Learning”**  
National Science Foundation  
Role: solo-PI. Dates: 07/01/2018-06/30/2021.  
Amount: \$450,000. Percentage of time: %11 academic effort.
  - **DARPA LwLL: “ INTEGRAL: A Foundational Approach to Label Complexity via Information Theory and Graph Signal Processing”**  
Role: Co-Investigator (PI: S. Avestimehr, other co-PIs: A. Ortega and I. Diakonikolas). Dates: 09/19/2019-09/18/2022.  
Amount: \$462,000 of \$1,498,146.
  - **DARPA FastNICs: DIAMOND: Distributed Training of Massive Models at Bandwidth Frontiers**  
Role: Co-Investigator (PI: S. Avestimehr, other co-PI: M. Annavaram). Dates: 04/01/2020-03/31/2024.  
Amount: \$512,375 of \$2,200,000.
  - **CIF: Small: Machine Learning for Wireless Propagation Channels**  
Role: Co-Investigator (PI: A. Molisch). Dates: 10/01/2020-09/30/2023.  
Amount: \$250,000 of \$500,000.
- COMPLETED RESEARCH SUPPORT
- **Google Faculty Research Award: “Towards understanding extreme classification”**  
Google Institute  
Role: solo-PI. Dates: 03/05/2018-03/05/2019.

Amount: \$52,190.

- **AFRL FA8650-17-C-9112: “Ptychography based Rapid Imaging of Nano-Structures with Multi-layer Assemblies (PRISMA)”**

Air Force Research Laboratory

Role: Co-Investigator (PI: J. Damoulakis). Dates: 11/2016-2/2018.

Amount: \$221,922 of \$10,287,412. Percentage of time: %20 academic effort.

- **Northrop Grumman contract: “DENO: Distributed Encoded Optimization for Cybersecurity Data Analytics”**

Role: Co-Investigator (PI: S. Avestimehr). Dates: 09/01/2017-08/31/2018.

Amount: \$50,000 of \$100,000. Percentage of time: %8 academic effort.

## PUBLICATIONS

- Dissertation
  - [1] M. Soltanolkotabi. Algorithms and Theory for Clustering and Nonconvex Quadratic Programming. Stanford University Ph.D. Dissertation August 2014.
- Publications
  - [2] D. Stoger and M. Soltanolkotabi. Small random initialization is akin to spectral learning: Optimization and generalization guarantees for overparameterized low-rank matrix reconstruction. Neural Information Processing Systems (NeurIPS 2021).
  - [3] S. Oymak, M. Li, and M. Soltanolkotabi. Generalization Guarantees for Neural Architecture Search with Train-Validation Split. International Conference on Machine Learning Research (ICML 2021).
  - [4] C. He, S. Li, M. Soltanolkotabi, and S. Avestimehr. PipeTransformer: Automated Elastic Pipelining for Distributed Training of Transformers. International Conference on Machine Learning Research (ICML 2021).
  - [5] Z. Fabian, R. Heckel, and M. Soltanolkotabi. Data augmentation for deep learning based accelerated MRI reconstruction. International Conference on Machine Learning (ICML 2021).
  - [6] Yogesh Balaji, Mohammadmahdi Sajedi, Neha Mukund Kalibhat, Mucong Ding, Dominik Stoger, Mahdi Soltanolkotabi, Soheil Feizi. Understanding Overparameterization in Generative Adversarial Networks. International Conference on Learning Representations (ICLR 2021).
  - [7] A field guide to federated optimization. [arXiv:2107.06917](#). Many authors, submitted 2021.
  - [8] Y Cheng, I Diakonikolas, DM Kane, R Ge, S Gupta, M Soltanolkotabi. Outlier-Robust Sparse Estimation via Non-Convex Optimization. [arXiv:2109.11515](#).
  - [9] C He, Z Yang, E Mushtaq, S Lee, M Soltanolkotabi, S Avestimehr. SSFL: Tackling Label Deficiency in Federated Learning via Personalized Self-Supervision [arXiv preprint arXiv:2110.02470](#).
  - [10] C. He, A. D. Shah, Z. Tang, D. Fan, A. N. Sivashunmugam, K. Bhogaraju, M. Shimpi, L. Shen, X. Chu, M. Soltanolkotabi, S. Avestimehr. FedCV: A Federated Learning Framework for Diverse Computer Vision Tasks.
  - [11] A. Javanmard and M. Soltanolkotabi. Precise Statistical Analysis of Classification Accuracies for Adversarial Training. Submitted, preprint available at [arXiv:2010.11213](#).
  - [12] B. Lin, C. He, Z. Zeng, H. Wang, Y. Huang, M. Soltanolkotabi, X. Ren, S. Avestimehr. FedNLP: A Research Platform for Federated Learning in Natural Language Processing. Submitted, preprint available at [arXiv:2104.08815](#).

- [13] S. Oymak and M. Soltanolkotabi. End-to-end Learning of a Convolutional Neural Network via Deep Tensor Decomposition. Information and Inference, 2021 [arXiv:1805.06523](https://arxiv.org/abs/1805.06523).
- [14] H Mohammadi, M Soltanolkotabi, MR Jovanović. Model-Free Linear Quadratic Regulator. Handbook of Reinforcement Learning and Control, 173-185. 2021.
- [15] S. Oymak, Christos Thrampoulidis and M. Soltanolkotabi. Theoretical Insights Into Multiclass Classification: A High-dimensional Asymptotic View. *To appear in Proceedings of Neural Information Processing Systems (NeurIPS 2020)*.
- [16] M. Mousavi Kalan, Z. Fabian, A. S. Avestimehr and M. Soltanolkotabi. Minimax Lower Bounds for Transfer Learning with Linear and One-hidden Layer Neural Networks. *To appear in Proceedings of Neural Information Processing Systems (NeurIPS 2020)*.
- [17] R. Heckel and M. Soltanolkotabi. Compressive sensing with un-trained neural networks: Gradient descent finds the smoothest approximation. In proceedings of International Conference on Machine Learning (ICML 2020).
- [18] Y. Cheng, I. Diakonikolas, R. Ge, and M. Soltanolkotabi. High-dimensional Robust Mean Estimation via Gradient Descent. To Appear in proceedings of International Conference on Machine Learning (ICML 2020).
- [19] A. Javanmard, M. Soltanolkotabi, and H. Hassani. Precise Tradeoffs in Adversarial Training for Linear Regression. Proceeding of international Conference on Learning Theory (COLT 2020). Preprint available at [arXiv:2002.10477](https://arxiv.org/abs/2002.10477).
- [20] I. Diakonikolas, S. Goel, S. Karmalkar, A. Klivans, and M. Soltanolkotabi. Approximation Schemes for ReLU Regression. Proceeding of international Conference on Learning Theory (COLT 2020). Preprint available at [arxiv.org/abs/2005.12844](https://arxiv.org/abs/2005.12844).
- [21] S. Oymak and M. Soltanolkotabi. Towards moderate overparameterization: global convergence guarantees for training shallow neural networks. Journal on Selected Areas of Information Theory, Deep Learning: Mathematical Foundations and Applications to Information Science, 2020. Preprint available at [arXiv:1902.04674](https://arxiv.org/abs/1902.04674).
- [22] R. Heckel and M. Soltanolkotabi. Denoising and Regularization via Exploiting the Structural Bias of Convolutional Generators. To appear in International Conference on Learning Representations (ICLR 2020). Preprint available at [arXiv:1910.14634](https://arxiv.org/abs/1910.14634).
- [23] M. Li, M. Soltanolkotabi, and S. Oymak. Gradient Descent with Early Stopping is Provably Robust to Label Noise for Overparameterized Neural Networks. To appear in International Conference on Artificial Intelligence and Statistics (AISTATS 2020). Preprint available at [arXiv:1903.11680](https://arxiv.org/abs/1903.11680).
- [24] Z. Fabian, J. Haldar, R. Leahy, M. Soltanolkotabi. 3D Phase Retrieval at Nano-Scale via Accelerated Wirtinger Flow. Proceedings of EUSIPCO 2020. Preprint available at [arXiv:2002.11785](https://arxiv.org/abs/2002.11785).
- [25] H. Mohammadi, A. Zare, M. Soltanolkotabi, M. R. Jovanovic. Convergence and sample complexity of gradient methods for the model-free linear quadratic regulator problem. IEEE Transactions on Automatic Control, 2020. Preprint available at [arXiv:1912.11899](https://arxiv.org/abs/1912.11899).

- [26] D. V. Veen, A. Jalal, M. Soltanolkotabi, E. Price, S. Vishwanath, and A. G. Dimakis. Compressed Sensing with Deep Image Prior and Learned Regularization. Submitted, preprint available at [arXiv:1806.06438](https://arxiv.org/abs/1806.06438).
- [27] S. Oymak, Z. Fabian, M. Li, and M. Soltanolkotabi. Generalization Guarantees for Neural Networks via Harnessing the Low-rank Structure of the Jacobian. Submitted, preprint available at [arXiv:1906.05392](https://arxiv.org/abs/1906.05392).
- [28] Z. Fabian, R. Xu, M. Soltanolkotabi, J. P. Haldar, W. Unglaub, J. Zusman, A. F. Levi, R. Leahy. Accelerated Wirtinger Flow: A fast algorithm for ptychography. Under revision optics express. Preprint available at [arXiv:1806.05546](https://arxiv.org/abs/1806.05546).
- [29] S. Avestimehr, M. Mousavi Kalan, and M. Soltanolkotabi. Fundamental Resource Trade-offs for Encoded Distributed Optimization. Information and Inference. Preprint available at [arXiv:1804.00217](https://arxiv.org/abs/1804.00217).
- [30] S. Oymak and M. Soltanolkotabi. Overparameterized Nonlinear Learning: Gradient Descent Takes the Shortest Path? International Conference on Machine Learning (ICML 2019)
- [31] Q. Yu, S. Li, N. Raviv, M. Mousavi Kalan, M. Soltanolkotabi, and S. Avestimehr. Lagrange Coded Computing: Optimal Design for Resiliency, Security and Privacy. International Conference on Artificial Intelligence and Statistics (AISTATS 2019).
- [32] H. Mohammadi, A. Zare, M. Soltanolkotabi, and M. Jovanovic. Global Exponential Convergence of Gradient Methods Over the Nonconvex Landscape of the Linear Quadratic Regulator. 58th IEEE Conference on Decision and Control (CDC 2019)
- [33] M. Soltanolkotabi. Structured signal recovery from quadratic measurements: Breaking sample complexity barriers via nonconvex optimization. IEEE Transactions on Information Theory, Volume: 65 , Issue: 4 , April 2019.
- [34] M. Soltanolkotabi, A. Javanmard and J. D. Lee. Theoretical insights into the optimization landscape of over-parameterized neural networks. IEEE Transactions of Information Theory, Volume: 65 , Issue: 2 , Feb. 2019.
- [35] M. Mousavi Kalan, M. Soltanolkotabi, and S. Avestimehr. Fitting ReLUs via SGD and Quantized SGD. International Symposium on Information Theory (ISIT 2019)
- [36] M. Soltanolkotabi. Phaseless Imaging at Nano-scale: Challenges and Possible Solutions. International Conference on Sampling Theory and Applications (SAMPTA 2019).
- [37] E. Bostan, M. Soltanolkotabi, D. Ren, and L. Waller. Accelerated Wirtinger Flow for Multiplexed Fourier Ptychographic Microscopy. IEEE International Conference on Image Processing (ICIP 2018).
- [38] S. Li, M. Mousavi Kalan\*, S. Avestimehr, and M. Soltanolkotabi. Near-Optimal Straggler Mitigation for Distributed Gradient Methods. 2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)
- [39] M. Soltanolkotabi. Learning ReLUs via gradient descent. *Proceedings of Neural Information Processing Systems (NeuRIPS 2017)*.
- [40] H. Hassani, M. Soltanolkotabi, and A. Karbasi. Gradient methods for submodular maximization. *Proceedings of Neural Information Processing Systems (NeuRIPS 2017)*.

- [41] S. Oymak and M. Soltanolkotabi. Fast and Reliable Parameter Estimation from Nonlinear Observations. *SIAM Journal on Optimization*, 27(4), 2276-2300, 2017.
- [42] R. Heckel and M. Soltanolkotabi. Generalized Line Spectral Estimation. *IEEE Transactions on Information Theory*, vol. PP, no. 99, pp. 1-1, 2017.
- [43] S. Oymak, B. Recht, and M. Soltanolkotabi. Sharp Time-data tradeoffs for linear inverse problems. *IEEE Transactions on Information Theory*, vol. PP, no. 99, pp. 1-1, 2017.
- [44] S. Oymak, B. Recht, and M. Soltanolkotabi. Isometric sketching of any set via the Restricted Isometry Property. *Information and Inference*, 2017.
- [45] S. Tu, R. Boczar, Max Simchowitz, M. Soltanolkotabi, and B. Recht. Low-rank Solutions of Linear Matrix Equations via Procrustes Flow. *Proceedings of International Conference on Machine Learning, (ICML 2016)*.
- [46] R. Heckel, V. I. Morghenstern, and M. Soltanolkotabi. Super-Resolution Radar. *Information and Inference* 5 (1): 22-75, 2016.
- [47] Experimental robustness of Fourier Ptychography phase retrieval algorithms L. Yeh, J. Dong, J. Zhong, L. Tian, M. Chen, G. Tang, M. Soltanolkotabi, L. Waller. *Optics Express Vol. 23, Issue 26, pp. 33214-33240, 2015.*
- [48] E. J. Candés, X. Li, and M. Soltanolkotabi. Phase Retrieval via Wirtinger Flow: Theory and Algorithms. *IEEE Transactions on Information Theory*, Vol.61, No.4, pp.1985-2007, April 2015.
- [49] E. J. Candés, X. Li, and M. Soltanolkotabi. Phase Retrieval from coded diffraction patterns. *Applied and Computational Harmonic Analysis* 39(2), 2015.
- [50] M. Soltanolkotabi, E. Elhamifar, and E. J. Candés. Robust subspace clustering. *Annals of Statistics* 42(2), 669-699, 2014.
- [51] M. Soltanolkotabi and E. J. Candés. A geometric analysis of subspace clustering with outliers. *Annals of Statistics* 40(4), 2195-2238, 2012.
- [52] E. J. Candés and M. Soltanolkotabi. Discussion of “Latent Variable Graphical Model Selection via Convex Optimization”, *Annals of Statistics* 40(2), 1997-2004, 2012.
- [53] F. Marvasti, A. Amini, F. Haddadi, M. Soltanolkotabi, B. Khalaj, A. Aldroubi, S. Sanei and J. Chambers. A Unified Approach to Sparse Signal Processing. *EURASIP Journal on Advances in Signal Processing* 44, 2012.

INVITED TALKS

- Overparameterized learning beyond the lazy regime  
TU Munich, November 2021.
- Learning via early stopping and untrained neural networks  
KU Eichstätt-Ingolstadt, November 2021.
- Overparameterized learning beyond the lazy regime  
University of Maryland, October 2021.

- Overcoming the data bottleneck in AI for the sciences  
USC physics informed AI symposium, October 2021.
- Learning via early stopping and untrained neural networks  
University of Michigan, November 2020.
- Learning via early stopping and untrained neural networks  
MAD+Seminar, Courant Institute of Mathematical Sciences, July 2020.
- Denoising via Early Stopping. TRIPODS Summer School and Workshop on the Foundations Graph and Deep Learning  
SIAM Conference on Data Science 2020.
- Denoising via Early Stopping. Workshop on Solving inverse problems with deep networks: New architectures, theoretical foundations, and applications  
*Neural Information Processing Systems (Neurips 2019) workshop, Vancouver, Canada, December 2019.*
- Towards demystifying neural networks: Optimization, robustness and denoising  
*Conference on Optimization, Fields Institute for Research in Mathematical Sciences, Toronto, Canada, November 2019.*
- Theoretical Foundations for Nonconvex Learning and Optimization  
*Packard Foundation, Monterey, CA, September 2019.*
- Demystifying Generalization and Early Stopping in Deep Learning via Harnessing the Low-rank Structure of the Jacobian  
AI Institute Geometry of Deep Learning, Microsoft Research, Seattle, WA, August 2019.
- Towards demystifying over-parameterization and early stopping in deep learning  
*International Conference on Continuous Optimization (ICCOPT 2019), Berlin, Germany, August 2019.*
- Over-parameterized nonlinear learning - Gradient descent follows the shortest path?  
*International Conference on Stochastic Programming, Trondheim, Norway, July 2019.*
- Towards demystifying over-parameterization and early stopping in deep learning  
*Joint Statistical Meeting (JSM 2019), Denver, CO, July 2019.*
- 3D Phaseless Imaging at Nano-scale: Challenges and Possible Solutions  
*International Conference on Sampling Theory and Applications (SAMPTA 2019), Bordeaux, France, July 2019.*
- Overparameterization without Overfitting: Jacobian-based Generalization Guarantees for Neural Networks  
*Understanding and Improving Generalization in Deep Learning, International Conference on Machine Learning (ICML 2019), Long Beach, CA, June 2019.*
- Towards demystifying over-parameterization and early stopping in deep learning  
*WNGC Seminar, University of Texas, Austin, May 2019.*
- Towards demystifying over-parameterization in deep learning  
*Geometry of Big Data, Institute for Pure and Applied Mathematics (IPAM), Los Angeles, CA, May 2019.*
- Towards demystifying over-parameterization in deep learning  
*Imaging and Machine Learning Workshop, Henri Poincare Institute, Paris, France, April 2019.*
- Over-parameterized nonlinear learning - Gradient descent follows the shortest path?  
*Data Science Institute, San Francisco, CA, March, 2019.*
- Over-parameterized nonlinear learning - Gradient descent follows the shortest path?  
*Theory and Practice in Machine Learning and Computer Vision, Institute for Computational and Experimental Research in Mathematics (ICERM), Providence, Rhode*

*Island, February 2019.*

- Towards demystifying over-parameterization in deep learning  
*Information Theory and Applications Workshop (ITA), San Diego, CA, February 2019.*
- Overparameterized Nonlinear Learning: Gradient Descent Takes the Shortest Path?  
*CMStatistics, Pisa, Italy, December 2018.*
- Overparameterized Nonlinear Learning: Gradient Descent Takes the Shortest Path?  
*Canadian Mathematical Society winter meeting, Vancouver, Canada, December 2018.*
- From shallow to deep: learning neural networks via gradient descent. *Department of Electrical Engineering, University of Pennsylvania, Philadelphia, PA, October 2018.*
- From shallow to deep: learning neural networks via gradient descent. *International Symposium on Mathematical Programming (ISMP), Bordeaux, France, July 2018.*
- Nonconvex optimization meets suprema of stochastic process: From phase retrieval to deep learning. *IPAM culminating workshop on Quantitative Linear Algebra, Lake Arrowhead, CA, June 2018.*
- From shallow to deep: Learning neural networks via gradient descent. *Simons Foundations of Machine Learning Reunion Workshop, Berkeley, CA, June 2018.*
- Nonconvex optimization for high-dimensional learning: ReLUs, neural nets and beyond, *Workshop on Applied Harmonic Analysis and Data Processing, Oberwolfach Research Institute for Mathematics, German Black Forest, March 2018.*
- Nonconvex optimization for high-dimensional learning: ReLUs, neural nets and beyond, *Courant Institute of Mathematical Sciences, Math and Data Seminar, New York, NY, March 2018.*
- Nonconvex optimization for high-dimensional learning: ReLUs, neural nets and beyond, *Program in Applied and Computational Mathematics (PACM) colloquium, Princeton, NJ, March 2018.*
- Learning from signals and data via nonconvex optimization: ReLUs, neural nets and beyond, *ARO Workshop on data science, a unified vision towards structured and unstructured data analysis, Raleigh, NC, November 2017.*
- Directions and open problems in elements of non-convex optimization, *Workshop on Beyond Convexity: Emerging Challenges in Data Science, Banff International Research Station, Oaxaca, Mexico, October 2017.*
- Nonconvex optimization meets supremum of stochastic processes, *Probability Seminar, UC Irvine, CA, October 2017.*
- Discrete submodular optimization via continuous nonconvex optimization, *Asilomar invited session, Asilomar, CA, October 2017.*
- Nonconvex optimization for high-dimensional Learning: from neural networks to submodular maximization, *Workshop on Fast Iterative Methods in Optimization, Simons Institute, Berkeley, CA, October 2017.*
- Leveraging prior knowledge in phase retrieval: From theory to practice, *Workshop on Phaseless Imaging in Theory and Practice: Realistic Models, Fast Algorithms, and Recovery Guarantees, Institute for Mathematics and its Applications, Minneapolis, MN, August 2017.*
- Nonconvex optimization for high-dimensional learning: from phase retrieval to submodular maximization, *EE Systems Seminar, California Institute of Technology, Pasadena, CA, May 2017.*
- Nonconvex optimization for high-dimensional learning: From phase retrieval to submodular maximization, *EE Systems Seminar, North Carolina State, Durham, CA, June 2017.*
- Breaking sample complexity barriers via non-convex optimization, *Conference on Nonconvex Statistical Learning, USC, Los Angeles, CA, 2017.*
- Breaking sample complexity barriers via non-convex optimization, *SIAM conference on Optimization, Vancouver, Canada, May 2017.*
- *Information Theory and Applications workshop, San Diego, CA, February 2017 .*



- Breaking sample complexity barriers via non-convex optimization, *Joint Mathematical Meeting, Special Session on Mathematics of Signal processing, Atlanta, GA, January 2017.*
- Breaking sample complexity barriers via non-convex optimization, *BIRS Workshop on Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Processing, Oaxaca, Mexico, October 2016.*
- Structured signal recovery without the shackles of convexity. Claremont Mckenna College, Math department September, 2016.
- Breaking sample complexity barriers via non-convex optimization, *International Conference on Continuous Optimization (ICCOPT), Tokyo, August 2016.*
- *NII Shonan Meeting on “Recent Advances in Randomized Numerical Linear Algebra”, NII Shonan Meeting, Tokyo, July 2016.*
- Generic Chaining meets (non)convex optimization, *Chaining Methods and their Applications to Computer Science, Harvard University, June 2016.*
- Structured signal recovery without the shackles of convexity, *Statistics Seminar, University of California, Los Angeles(UCLA), May 2016.*
- Phase Retrieval: Theory, Algorithms, and Applications, *tutorial presentation at International Conference on Acoustics, Speech and Signal Processing (ICASSP), Shanghai, China, March 2016.*
- Finding Low-complexity models without the shackles of convexity, *Workshop on Low complexity models in signal processing, Hausdorff research institute for mathematics (HIM), Bonn, Germany, Feb. 2016.*
- Structured signal recovery without the shackles of convexity, *Statistics Seminar, University of California, Los Angeles(UCLA), May 2016.*
- Structured signal recovery without the shackles of convexity, *International Matheon Conference on Compressed Sensing and its Applications, Berlin, Dec 2015.*
- Structured signal recovery without the shackles of convexity, *SIAM Conference on Applied Linear Algebra, Atlanta, October 2015.*
- Structured signal recovery without the shackles of convexity, *Sharif University of Technology, Department of Electrical Engineering, Tehran, Iran, December 2015.*
- Sharp time–data tradeoffs for linear inverse problems, *International Symposium on Optimization, Pittsburg, July 2015.*
- Phase Retrieval via non-convex optimization: Theory and Algorithms, *INFORMS, San Francisco, November 2014.*
- Phase Retrieval via non-convex optimization: Theory and Algorithms, *John Hopkins Center for Imaging Science, October 2014.*
- Phase Retrieval via non-convex optimization: Theory and Algorithms, *UC Berkeley, Networking, Communications, and DSP seminar, September 2014.*
- Robust Subspace Clustering, *Stanford Biostatistics seminar, Feb. 2014.*
- Robust Subspace Clustering, *Asilomar Conference on Signals, Systems and Computers, Oct. 2013.*
- Robust Subspace Clustering, *ICML workshop on spectral learning, June 2013.*
- Robust Subspace Clustering, *Information Theory and Applications workshop, Feb. 2013.*
- Robust Subspace Clustering, *Princeton: MURI annual meeting, October 2012.*
- A geometric analysis of subspace clustering with outliers, *Georgia Tech.: High-Dimensional Phenomena in Statistics and Machine Learning Seminar, July 2012.*
- A geometric analysis of subspace clustering with outliers, *Stanford: Workshop on Modern Massive Data Sets (MMDS), July 2012.*
- A geometric analysis of subspace clustering with outliers, *UC Berkeley: Berkeley robotics lab, Feb 2012.*

AREA  
CHAIR/TECHNICAL  
PROGRAM  
COMMITTEE  
SERVICE

- Area chair for Conference on Learning Theory (COLT 2021, 2022).
- Area chair for International Conference on Machine Learning (ICML 2021).
- Area chair for the Neural Information Processing Systems (NeurIPS 2020, 2021).
- Area chair for the International Conference on Learning Representations (ICLR 2020, 2021, 2022).
- Technical program committee member for the IEEE international conference on Sampling Theory and Applications (SAMPTA 2019).