Meisam Razaviyayn

CONTACT INFORMATION	E-mail: razaviya@usc.edu	Homepage
	Phone: (213) 821-0777	Google scholar profile
	3715 McClintock Avenue, Los Angeles, California 90089-0193	

APPOINTMENTS

▷ **Associate Professor (February 2023 - Now)**
Andrew and Erna Viterbi Early Career Chair
Daniel J. Epstein Department of Industrial and Systems Engineering, USC
Computer Science Department, USC (Courtesy Appointment)
Electrical and Computer Engineering Department (Courtesy Appointment)
Quantitative And Computational Biology Department (Courtesy Appointment)
USC Machine Learning Center
USC Center for Systems and Control
Optimization for Data-Driven Science (ODDS) Research Group

▷ **Associate Director of the USC-Meta Center for Research and Education in AI and Learning (2021-Present)**. The center, funded by Meta Platforms, Inc., will support research in modern AI challenges and increase accessibility to AI education.

▷ **Assistant Professor (August 2016 - February 2023)**
Daniel J. Epstein Department of Industrial and Systems Engineering, USC
Computer Science Department, USC (Courtesy Appointment)
Electrical and Computer Engineering Department (Courtesy Appointment)
Quantitative And Computational Biology Department (Courtesy Appointment)
USC Machine Learning Center
USC Center for Systems and Control
Optimization for Data-Driven Science (ODDS) Research Group

PROFESSIONAL PREPARATION

▷ **Postdoctoral Research Fellow, Electrical Engineering Department** and Stanford Data Science Institute, Stanford University, 2014–2016

▷ **Visiting Scientist, Simons Institute for the Theory of Computing**, University of California, Berkeley, Spring 2015

▷ **Ph.D. in Electrical Engineering (Minor in Computer Science),** University of Minnesota, 2014

▷ **M.S. in Electrical Engineering**, University of Minnesota, 2013

▷ **M.S. in Mathematics**, University of Minnesota, 2013

▷ **B.S. in Electrical Engineering**, Isfahan University of Technology, 2008

HONORS AND AWARDS

▷ National Academy of Engineering German-American Frontiers of Engineering Symposium Attendee (only 40 engineers from the US were selected by the NAE), March 2023

▷ Northrop Grumman Excellence in Teaching Award, April 2022

▷ NSF CAREER Award, March 2022

▷ AFOSR Young Investigator Prize Award, November 2021

▷ 3M's Non-Tenured Faculty Award (NTFA), February 2021

▷ ICCM Best Paper Award in Mathematics, August 2020

▷ Best Paper Award in IEEE Data Science Workshop, June 2019

▷ Finalist of the Best Paper Prize for Young Researcher in Continuous Optimization, International Conference on Continuous Optimization (ICCOPT) 2016.

▷ IEEE Signal Processing Society Young Author Best Paper Award, December 2014.

▷ Finalist of the Best Paper Prize for Young Researcher in Continuous Optimization, International Conference on Continuous Optimization (ICCOPT) 2013.

▷ Doctoral Dissertation Fellowship, University of Minnesota, Twin Cities, 2013.

▷ Paper Shortlisted for Best Student Paper Award, SPAWC 2010.

▷ ECE Department Fellowship, University of Minnesota, 2008–2009.

▷ University Scholarship for B.Sc. Programs, Awarded by Isfahan University of Technology, 2004, 2005, 2006, 2007

▷ Fifth Place in ACM International Collegiate Programming Contest (ICPC), Asia Regional Contest, Tehran, Iran, 2004

▷ Silver Medal Recipient in 20th National Mathematics Olympiad, Iran, 2003.

PUBLICATIONS

Book Chapters:

▷ J.-S. Pang and M. Razaviyayn, "A Unified Distributed Algorithms for Non-Cooperative Games," in Big Data over Networks, S. Cui, A. Hero, Z.-Q. Luo, and J. M. F. Moura, Editors, *Cambridge Univ. Press*, 2015.

Journals:

Under Review:

▷ Y. Han, M. Razaviyayn, and R. Xu, "Policy Gradient Converges to the Globally Optimal Policy for Nearly Linear-Quadratic Regulators," arXiv preprint arXiv:2303.08431, 2023.

▷ D. Lundstrom and M. Razaviyayn, "Four Axiomatic Characterizations of the Integrated Gradients Attribution Method." arXiv preprint arXiv:2306.13753 (2023).

▷ H. Mohammadi*, M. Razaviyayn, M. R. Jovanović. "Tradeoffs between convergence rate and noise amplification for momentum-based accelerated optimization algorithms." arXiv preprint arXiv:2209.11920.

▷ D. Ostrovskii*, B. Barazandeh*, and M. Razaviyayn. "Nonconvex-Nonconcave Min-Max Optimization with a Small Maximization Domain." Submitted to Mathematical Programming Series B, available at arXiv:2110.03950 (2021).

▷ A. Lowy* and Meisam Razaviyayn. "Output Perturbation for Differentially Private Convex Optimization with Improved Population Loss Bounds, Runtimes and Applications to Private Adversarial Training," available at arXiv:2102.04704. A shorter version is published at The Second AAAI Workshop on Privacy-Preserving Artificial Intelligence, 2021.

▷ D. M. Ostrovskii*, M. Ndaoud, A. Javanmard, and M. Razaviyayn. "Near-Optimal Model Discrimination with Non-Disclosure", available at arXiv:2012.02901, 2022.

Published/Accepted:

▷ S. Baharlouei*, S.-Z Suen, and M. Razaviyayn. "RIFLE: Imputation and Robust Inference from Low Order Marginals," Transactions on Machine Learning Research, 2023. A shorter version was **selected for oral presentation** in the ICML 2023 workshop on Duality Principles for Modern Machine Learning, 2023.

▷ Z. Wang, K. Balasubramanian, S. Ma, and M. Razaviyayn. "Zeroth-Order Algorithms for Stochastic Nonconvex Minimax Problems with Improved Complexities," *Journal of Global Optimization*, 2023.

▷ A. Ghafelebashi*, M. Razaviyayn, and M. Dessouky. "Congestion Reduction via Personalized Incentives," *Transportation Research Part C: Emerging Technologies,* 2023.

▷ V. Ong, A. Soleimani, F. Amirghasemi, S. Khazaee Nejad, M. Abdelmonem, M. Razaviyayn, P. Hosseinzadeh, L. Comai, and M. PS Mousavi, "Impedimetric sensing: an emerging tool for combating the COVID-19 pandemic," Biosensors 13, no. 2: 204, 2023.

▷ T. Huang, S. A Halbe, C. Sankar, P. Amini, S. Kottur, A. Geramifard, M. Razaviyayn, A. Beirami. "Robustness through Data Augmentation Loss Consistency." Accepted in Transactions on Machine Learning Research, 2022. a short version is presented at the ICML Uncertainty and Robustness in Deep Learning Workshop.

▷ A. Lowy, S. Baharlouei, R. Pavan, M. Razaviyayn, and A. Beirami. "FERMI: Fair Empirical Risk Minimization via Exponential Rényi Mutual Information." Transactions on Machine Learning Research, 2022. A shorter version was presented in the ICML Workshop on Socially Responsible Machine Learning.

▷ Z. Chowdhury, S. Khatamifard, S. Resch, H. Cilasun, Z. Zhao, M. Zabihi, M. Razaviyayn, J.-P. Wang, S. Sapatnekar, and U. R. Karpuzcu. "CRAM-Seq: Accelerating RNA-Seq Abundance Quantification using Computational RAM." IEEE Transactions on Emerging Topics in Computing, no. 4: 2055-2071, 2022.

*Names highlighted with * are USC students/postdocs.*

▷ M. Nouiehed* and Meisam Razaviyayn. "Learning deep models: Critical points and local openness." *INFORMS Journal on Optimization*, no. 2: 148-173, 2022.

▷ D. Ostrovskii*, A. Lowy*, and M. Razaviyayn. "Efficient search of first-order Nash equilibria in nonconvex-concave smooth min-max problems." *SIAM Journal on Optimization 31*, no. 4: 2508-2538, 2021.

▷ S. K. Khatamifard, Z. Chowdhury, N. Pande, M. Razaviyayn, C. H. Kim, and U. R. Karpuzcu. "GeNVoM: Read Mapping Near Non-Volatile Memory." *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 2021.

▷ S. Lu, J. D. Lee, M. Razaviyayn, and M. Hong"Linearized ADMM Converges to Second-Order Stationary Points for Non-Convex Problems," *IEEE Transactions on Signal Processing*, 2021.

▷ M. Nouiehed* and M. Razaviyayn, "A Trust Region Method for Finding Second-Order Stationarity in Linearly Constrained Non-Convex Optimization," *SIAM Journal on Optimization*, vol. 30, 2501-2529, 2020.

▷ M. Razaviyayn, S. Lu, M. Nouiehed*, T. Huang*, M. Sanjabi*, and M. Hong, "Nonconvex Min-Max Optimization: Applications, Challenges, and Recent Theoretical Advances," *IEEE Signal Processing Magazine*, 2020.

▷ H. Mohammadi*, M. Razaviyayn, and M. R. Jovanović, "Variance Amplification of Accelerated First-Order Methods for Strongly Convex Optimization Problems," *IEEE Transactions on Automatic Control*, 2020.

▷ Z. I. Chowdhury, M. Zabihi, S. K. Khatamifard, Z. Zhao, S. Resch, M. Razaviyayn, J.-P. Wang, S. S. Sapatnekar, and U. R. Karpuzcu. "A DNA read alignment accelerator based on computational ram," *IEEE Journal on Exploratory Solid-State Computational Devices and Circuits* vol. 6, no. 1, 80–88, 2020.

▷ M. Hong, T.-H. Chang, X. Wang, M. Razaviyayn, S. Ma and Z.-Q. Luo. "A Block Successive Upper Bound Minimization Method of Multipliers for Linearly Constrained Convex Optimization," *Mathematics of Operations Research*, 2019.

▷ M. Razaviyayn, M. Hong, N. Reyhanian, Z.-Q. Luo. "A Doubly Stochastic Gauss-Seidel Algorithm for Solving Linear Equations and Certain Convex Minimization Problems," *Mathematical Programming*, vol. 176, 465–496, 2019.

▷ M. Nouiehed*, J.-S. Pang, and M. Razaviyayn, "On the Pervasiveness of Difference-Convexity in Optimization and Statistics," *Math Programming Series B,* vol. 174, 195–222, 2019.

▷ A. Aubry, A. D. Maio, A. Zappone, M. Razaviyayn, and Z.-Q. Luo, "A New Sequential Optimization Procedure and Its Applications to Resource Allocation for Wireless Systems," *IEEE Transactions on Signal Processing*, vol. 66, no. 24, 6518–6533, 2018.

▷ Q. Shi, H. Sun, S. Lu, M. Hong, and M. Razaviyayn, "Inexact Block Coordinate Descent Methods For Symmetric Nonnegative Matrix Factorization," *IEEE Transactions on Signal Processing*, vol. 65, no. 22, pp. 5995–6008, 2017.

▷ M. Hong, X Wang, M Razaviyayn, Z.-Q. Luo, "Iteration Complexity Analysis of Block Coordinate Descent Methods," *Math Programming*, vol. 163, no. 1–2, pp. 85–114, 2017.

▷ J.-S. Pang, M. Razaviyayn, and A. Alvarado "Computing B-Stationary Points of Nonsmooth DC Programs", *Mathematics of Operations Research*, vol. 42, no. 1, pp. 95–118, 2016.

▷ Q. Shi, M. Razaviyayn, M. Hong, Z.-Q. Luo "SINR Constrained Beamforming for a MIMO Multi-user Downlink System," *IEEE Transactions on Signal Processing*, vol. 64, no. 11, pp. 2920–2933, 2016.

▷ M. Razaviyayn, M. Hong, Z.-Q. Luo, and J.-S. Pang, "A Unified Algorithmic Framework for Block-Structured Optimization Involving Big Data," *IEEE Signal Processing Magazine*, vol. 33, no. 1, pp. 57–77, 2016.

▷ M. Hong, Z.-Q. Luo, and M. Razaviyayn "Convergence Analysis of Alternating Direction Method of Multipliers for a Family of Nonconvex Problems", *SIAM Journal on Optimization*, vol. 26, no. 1, 337–364, 2016.

▷ M. Razaviyayn, M. Sanjabi, and Z.-Q. Luo "Stochastic Successive Minimization Method for Nonsmooth Nonconvex Optimization with Applications to Transceiver Design in Wireless Communication Networks", *Mathematical Programming Series B*, vol. 157, no. 2, pp. 515–545, 2016.

*Names highlighted with * are USC students/postdocs.*

▷ H. Baligh, M. Hong, W.-C. Liao, Z.-Q. Luo, M. Razaviyayn, M. Sanjabi, R. Sun "Cross-Layer Provision of Future Cellular Networks: A WMMSE-based Approach", *IEEE Signal Processing Magazine*, vol. 31, no. 6, pp. 56-68, 2014.

▷ M. Sanjabi, M. Razaviyayn, and Z.-Q. Luo "Optimal Joint Base Station Assignment and Beamforming for Heterogeneous Networks", *IEEE Transactions on Signal Processing*, vol 62, no. 8, pp. 1950-1961, 2014.

▷ M. Razaviyayn, H. Baligh, A. Callard, and Z.-Q. Luo, "Joint User Grouping and Transceiver Design in a MIMO Interfering Broadcast Channel," *IEEE Transactions on Signal Processing*, vol. 62, no. 1, pp. 85-94, 2014.

▷ M. Razaviyayn, M. Hong, Z.-Q. Luo "A Unified Convergence Analysis of Block Successive Minimization Methods for Nonsmooth Optimization", *SIAM Journal on Optimization (SIOPT)*, vol. 23, no. 2, pp. 1126-1153, 2013.

▷ M. Hong, Z. Xu, M. Razaviyayn, Z.-Q. Luo "Joint User Grouping and Linear Virtual Beamforming: Complexity, Algorithms and Approximation Bounds", *IEEE Journal on Selected Areas in Communications*, vol. 31, no. 10, 2013.

▷ M. Razaviyayn, L. Gennady, and Z.-Q. Luo, "On the Degrees of Freedom Achievable Through Interference Alignment in a MIMO Interference Channel," *IEEE Transactions on Signal Processing*, vol. 60, no. 2, pp. 812-821, 2012.

▷ M. Razaviyayn, M. Hong, Z.-Q. Luo "Linear Transceiver Design for a MIMO Interfering Broadcast Channel Achieving Max-Min Fairness", *IEEE Transactions on Signal Processing*, vol. 93, no. 12, pp. 3327-3340, 2012.

▷ M. Razaviyayn, M. S. Boroujeni, Z.-Q. Luo "Linear Transceiver Design for Interference Alignment: Complexity and Computation", *IEEE Transactions on Information Theory*, vol. 58, no. 5, pp. 2896-2910, 2012.

▷ Q. Shi, M. Razaviyayn, Z.-Q. Luo, C. He, "An Iteratively Weighted MMSE Approach to Distributed Sum-Utility Maximization for a MIMO Interfering Broadcast Channel," *IEEE Transactions on Signal Processing*, vol. 59, no. 9, pp. 4331-4340, 2011.

▷ M. Razaviyayn, Z.-Q. Luo, P. Tseng, and J.-S. Pang, "A Stackelberg Game Approach to Distributed Spectrum Management," *Mathematical Programming Series B*, 2011.

Peer-Reviewed Conference Proceedings:

Submitted/Underpreparations

▷ Y. Han, M. Razaviyayn, and R. Xu, "Neural Network-Based Score Estimation in Diffusion Models: Optimization and Generalization," Submitted to ICLR 2024.

▷ S. Baharlouei, S. Patel, and M. Razaviyayn, "f-FERM: A Scalable Framework for Robust Fair Empirical Risk Minimization," Submitted to ICLR 2024.

▷ S. Baharlouei* and M. Razaviyayn. "Dr. FERMI: A Stochastic Optimization Framework for Distributionally Robust Fair Empirical Risk Minimization," available at arXiv:2309.11682, 2023.

▷ A. Lowy, Z. Li, T. Huang, and M. Razaviyayn. "Optimal Differentially Private Learning With Public Data," arXiv preprint arXiv:2306.15056, 2023.

Published/Accepted

▷ D. Lundstrom* and M. Razaviyayn, "A Unifying Framework to the Analysis of Interaction Methods using Synergy Functions," International Conference on Machine Learning (ICML 2023) [**acceptance rate: 27%**].

▷ H. Mohammadi, M. Razaviyayn, and M. R. Jovanovi?. "Noise amplifiation of momentum-based optimization algorithms," In 2023 American Control Conference (ACC), 2023.

▷ S. Baharlouei*, F. Sheikholeslami, M. Razaviyayn, and Z. Kolter. "Improving Adversarial Robustness via Joint Classification and Multiple Explicit Detection Classes." The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023), [**acceptance rate: 29%**]. A shorter version was presented at the Workshop on Formal Verification of Machine Learning (WFVML), 2023.

*Names highlighted with * are USC students/postdocs.*

▷ A. Lowy[*] and M. Razaviyayn, "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," International Conference on Learning Representations (ICLR 2023), [**acceptance rate: 30%**]. A shorter version was presented at the ICML workshop on the Theory and Practice of Differential Privacy (TPDP).

▷ A. Lowy[*], D. Gupta[*], and M. Razaviyayn "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," International Conference on Learning Representations (ICLR 2023), [**acceptance rate: 30%**]. A shorter version was selected as an **oral presentation** (**top 6 papers** out of 36 accepted manuscripts) in NeurIPS workshop on Algorithmic Fairness through the Lens of Causality and Privacy (AFCP).

▷ S. Baharlouei, M. Razaviyayn, E. Tseng, and D. Tse. "I-CONVEX: Fast and Accurate de Novo Transcriptome Recovery from Long Reads," In Machine Learning and Principles and Practice of Knowledge Discovery in Databases: International Workshops of ECML PKDD, Proceedings, Part II, pp. 339-363. Cham: Springer Nature Switzerland, 2023 [**acceptance rate: 19%**].

▷ A. Lowy[*], A. Ghafelebashi[*], and M. Razaviyayn, "Private non-convex federated learning without a trusted server." The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023), [**acceptance rate: 29%**]. A shorter version was presented at the ICML Theory and Practice of Differential Privacy (TPDP).

▷ H. Mohammadi[*], M. Razaviyayn, and M. Jovanović "Noise Amplifiation of Momentum-based Optimization Algorithms." American Control Conference (ACC), 2023.

▷ A. Lowy and M. Razaviyayn. "Private Stochastic Optimization in the Presence of Outliers: Optimal Rates for (Non-Smooth) Convex Losses and Extension to Non-Convex Losses." accepted at The 34th International Conference on Algorithmic Learning Theory (ALT), Proceedings of Machine Learning Research (PMLR), volume 201, 2023 [**acceptance rate: $\leq$ 30%**]. A shorter version was presented at the Optimization for Machine Learning at NeurIPS 2022.

▷ D. Lundstrom[*], T. Huang[*], and M. Razaviyayn, "A rigorous study of integrated gradients method and extensions to internal neuron attributions," *ICML 2022,* available at arXiv:2202.11912, 2022 [**acceptance rate: 19%**].

▷ T. Huang[*], P. Singhania[*], M. Sanjabi, P. Mitra, and M. Razaviyayn, "Alternating Direction Method of Multipliers for Quantization," *AISTATS 2021,* available at arXiv:2009.03482, 2020 [**acceptance rate: 32%**].

● Z. Wang, K. Balasubramanian, S. Ma, and M. Razaviyayn. "Zeroth-Order Algorithms for Stochastic Nonconvex Minimax Problems with Improved Complexities." In Workshop on Beyond First-Order Methods in Machine Learning Systems, hosted by the 38th International Conference on Machine Learning. 2021.

▷ S. Lu, M. Razaviyayn, B. Yang, K. Huang, and M. Hong, "SNAP: Finding Approximate Second-Order Stationary Solutions Efficiently for Non-convex Linearly Constrained Problems," *Spotlight Presentation in NeurIPS 2020*, available at arXiv 1907.04450, 2020 [**acceptance rate for spotlight presentations: 3%**].

▷ S. Baharlouei[*], M. Nouiehed[*], and M. Razaviyayn, "Rényi Fair Inference," Accepted in International Conference on Learning Representation (ICLR), available at arXiv 1906.12005, 2020 [**acceptance rate: 26%**].

▷ B. Barazandeh[*] and M. Razaviyayn, "Solving Non-convex Non-differentiable Min-Max Games Using Proximal Gradient Method," International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2020.

▷ M. Nouiehed[*], M. Sanjabi[*], T. Huang[*], J. D. Lee, and M. Razaviyayn "Solving a Class of Non-Convex Min-Max Games Using Iterative First Order Methods," *Neural Information Processing Systems (NeurIPS)*, 2019 [**acceptance rate: 21%**].

▷ B. Barazandeh[*], M. Sanjabi[*], and M. Razaviyayn, "Training Generative Adversarial Networks Using Randomly Generated Discriminators," *IEEE Data Science Workshop*, 2019 [**won the best paper award**].

▷ H. Mohammadi[*], M. Razaviyayn, and M. Jovanović, "Performance of Noisy Nesterov's Accelerated Method for Strongly Convex Optimization Problems," *IEEE American Control Conference (ACC)*, pp. 3426-3431, 2019.

▷ M. Sanjabi[*], J. Ba, M. Razaviyayn, M., and J. D. Lee, "On the Convergence and Robustness of Training GANs with Regularized Optimal Transport," In *Advances in Neural Information Processing Systems (NIPS)*, 2018 [**acceptance rate: 21%**].

*Names highlighted with * are USC students/postdocs.*

▷ M. Hong, J. Lee, M. Razaviyayn, and J. D. Lee, "Gradient Primal-Dual Algorithm Converges to Second-Order Stationary Solution for Nonconvex Distributed Optimization Over Networks," In *International Conference on Machine Learning (ICML)*, 2018 [**acceptance rate: 25%**].

▷ M. Nouiehed* and M. Razaviyayn, "Learning Deep Models: Critical Points and Local Openness," in *The International Conference on Learning Representations (ICLR)*, 2018.

▷ H. Mohammadi*, M. Razaviyayn, and M. R. Jovanovic, "On the Stability of Gradient Flow Dynamics for a Rank-One Matrix Approximation Problem," In *IEEE Annual American Control Conference (ACC)*, 2018.

▷ B. Barazandeh* and M. Razaviyayn, "On the Behavior of the Expectation-Maximization Algorithm for Mixture Models," *IEEE Global Conference on Signal and Information Processing (GlobalSip)*, 2018.

▷ H. Mohammadi*, M. Razaviyayn, and M. R. Jovanovic, "Variance Amplification of Accelerated First-Order Algorithms for Strongly Convex Quadratic Optimization Problems," in *IEEE Conference on Decision and Control (CDC)*, 2018.

▷ S. Lu, J. Lee, M. Razaviyayn, and M. Hong. "Gradient Variable Splitting Method with Convergence to Second-Order Stationary Solutions," in *Asilomar Conference on Signals, Systems and Computers*, 2018.

▷ H. Mohammadi*, M. Razaviyayn, M. Jovanovic, "On the stability of gradient flow dynamics for a rank-one matrix approximation problem," in *American Control Conference (ACC)*, 2018.

▷ A. Beirami, M. Razaviyayn, S. Shahrampour, and V. Tarokh, "Optimal Generalizability in Parametric Learning," *Advances in Neural Information Processing Systems (NIPS)*, 2017 [**acceptance rate: 21%**].

▷ M. Razaviyayn, F. Farnia, and D. Tse, "Inference and Feature Selection via Maximal Correlation," *Advances in Neural Information Processing Systems (NIPS)*, 2015 [**acceptance rate: 21%**].

▷ F. Farnia, M. Razaviyayn, S. Kannan, and D. Tse, "Minimum HGR Correlation Principle: From Marginals to Joint Distribution," *IEEE International Symposium on Information Theory (ISIT)*, 2015.

▷ M. Razaviyayn, M. Hong, Z.-Q. Luo, and J.-S. Pang, "Parallel Successive Convex Approximation for Nonsmooth Nonconvex Optimization," *Advances in Neural Information Processing Systems (NIPS)*, 2014, [**acceptance rate: 24%**].

▷ M. Sanjabi, M. Hong, M. Razaviyayn, and Z.-Q. Luo, "Joint Base Station Clustering and Beamformer Design for Partial Coordinated Transmission using Statistical Channel State Information," *Signal Processing Advances in Wireless Communications (SPAWC)*, 2014.

▷ M. Hong, T.-H. Chang, X. Wang, M. Razaviyayn, S. Ma, and Z.-Q. Luo, "A Block Coordinate Descent Method of Multipliers: Convergence Analysis and Applications," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014.

▷ M. Razaviyayn, H.-W. Tseng, and Z.-Q. Luo, "Dictionary Learning for Sparse Representation: Complexity and Algorithms," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014.

▷ X. Wang, M. Hong, T.-H. Chang, M. Razaviyayn, and Z.-Q. Luo, "Joint Day-Ahead Power Procurement and Load Scheduling Using Stochastic Alternating Direction Method of Multipliers," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014.

▷ M. Razaviyayn, M. Sanjabi, and Z.-Q. Luo, "A Stochastic Weighted MMSE Approach to Sum Rate Maximization for a MIMO Interference Channel," *Signal Processing Advances in Wireless Communications (SPAWC)*, 2013.

▷ M. Hong, M. Razaviyayn, R. Sun, and Z.-Q. Luo, "Joint Transceiver Design and Base Station Clustering for Heterogeneous Networks," *Asilomar Conference on Signals, Systems, and Computers*, 2012 (*invited*).

▷ Q. Shi, M. Razaviyayn, M. Hong, and Z.-Q. Luo, "SINR Constrained Beamforming for a MIMO Multi-user Downlink System," *Asilomar Conference on Signals, Systems, and Computers*, 2012 (*invited*).

▷ M. Sanjabi, M. Razaviyayn, Z.-Q. Luo, "Optimal Joint Base Station Assignment and Downlink Beamforming for Heterogeneous Networks," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2012.

*Names highlighted with * are USC students/postdocs.*

▷ M. Razaviyayn, M. Hong, and Z.-Q. Luo, "Linear Transceiver Design for a Mimo Interfering Broadcast Channel Achieving Max-Min Fairness," *Asilomar Conference on Signals, Systems, and Computers*, 2011, (*invited*).

▷ M. Razaviyayn, H. Baligh, A. Callard, Z.-Q. Luo, "Joint Transceiver Design and User Grouping in a MIMO Interfering Broadcast Channel," *45th Conference on Information Sciences and Systems*, 2011.

▷ Q. Shi, M. Razaviyayn, Z.-Q. Luo, C. He, "An Iteratively Weighted MMSE Approach to Distributed Sum-Utility Maximization for a MIMO Interfering Broadcast Channel," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2011.

▷ M. Razaviyayn, Y. H. Morin, and Z.-Q. Luo "A Stackelberg Game Approach to Distributed Spectrum Management," *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2010.

▷ M. Razaviyayn, M. S. Boroujeni, Z.-Q. Luo "Linear Transceiver Design for Interference Alignment: Complexity and Computation," *Signal Processing Advances in Wireless Communications (SPAWC)*, 2010 (Shortlisted for SPAWC 2010s Best Student Paper Award).

▷ J. Lei, M. Razaviyayn, E. Song, Z.-Q. Luo, F. Y. Li "Power Allocation in Multi-Channel Cognitive Radio Networks with Channel Assembling," *Signal Processing Advances in Wireless Communications (SPAWC)*, 2011.

▷ M. Razaviyayn, L. Gennady, and Z.-Q. Luo, "On the Degrees of Freedom Achievable Through Interference Alignment in a MIMO Interference Channel," *Signal Processing Advances in Wireless Communications (SPAWC)*, 2011.

▷ M. Khosravifard, M. Razaviyayn, and T.A. Gulliver, "On the Overall Performance of the Uniform Code, *IEEE-GCC Conference on Innovative Engineering for Sustainable Environment*, 2009.

▷ M. Khosravifard, M. Razaviyayn, H. Narimani, and T.A. Gulliver, "The Overall Performance of the Shannon Code," Proceedings International Symposium on *Information Theory and Applications*, 2008.

Names highlighted with * *are USC students/postdocs.*

PATENTS

▷ M. Razaviyayn, H. Baligh, A. Callard, and Z.-Q. Luo, "System and Method for Transceiver Design", US patent filed, 2012

▷ Z.-Q. Luo, H. Baligh, and M. Razaviyayn, "System and Method for Transceivers in a Wireless Network", US patent filed, 2013

▷ M. Razaviyayn, H. Baligh, A. Callard, and Z.-Q. Luo, "Robust Transceiver Design", US patent filed, 2013

▷ R. Sun, M. Hong, M. Baligh, Z.-Q. Luo, and M. Razaviyayn, "System and Method for Transmission Point (TP) Association and Beamforming Assignment in Heterogeneous Networks", US patent filed, 2013

PROPOSALS
FUNDED

▷ "Private Learning With Public Data: From Theory to Practice and Back" is funded by Google; **Sole PI: Meisam Razaviyayn**; Period: 09/01/2023–08/31/2024; Funding Amount: $30,000

▷ "Privacy Capabilities for User Data in Feature Engineering" is funded by Meta Platforms; **Multi-PIs: Murali Annavaram and Meisam Razaviyayn**; Period: 01/01/2023–12/31/2023; Funding Amount: $150,000.

▷ "Fair Federated Learning With Private Access to Sensitive Features" is funded by the USC–Amazon Center on Secure & Trusted ML, Amazon; **Sole PI: Meisam Razaviyayn**; Period: 01/01/2023–12/31/2023; Funding Amount: $50,000.

▷ "CAREER: Foundations of Scalable Nonconvex Min-Max Optimization" is funded by NSF; **Sole PI: Meisam Razaviyayn**; Period: 04/01/2022–03/31/2026; Funding Amount: $562,241.

▷ "Finding Higher-order Stationary Points of Nonconvex Optimization Problems in Multi-agent, Uncertain and Adversarial Environments" is funded by the Air Force Office of Scientific Research Young Investigator Award program; **Sole PI: Meisam Razaviyayn**; Period: 04/01/2022–03/31/2024; Funding Amount: $450,000.

▷ "USC-Meta Center for Research and Education in AI and Learning" is funded by Meta Platforms; **Multi-PIs: Murali Annavaram, Meisam Razaviyayn, and Maged Dessouky**; Period: 01/01/2022–12/31/2026; Funding Amount: $1M/Year; Gift amount: $5M (*Meisam Razaviyayn is responsible for half of the spending*)

▷ "Towards Pandemic Preparedness: Development of Robust Platform Diagnostics for Rapid Point-of-care Detection of Pathogen", is supported by USC Provost Office; Lead PI: Maral Mousavi (USC); Co-PIs: Meisam Razaviyayn (USC), Parisa Hosseinzadeh (University of Oregon), Lucio Comai (USC), Constantine Sideris (USC): Period 07/2021–06/2022; Total Funding Amount: $198,000; Own Share: $40,000

▷ "Robust and Reliable Machine Learning in the Presence of Data Heterogeneity and Environmental Uncertainties" was selected by 3M for the **Non-Tenured Faculty Award (NTFA)**; **Sole PI**; Period May 2021–May 2024; Gift amount: $45,000; ($15,000/year)

▷ "Robust Inference in the Presence of Data Heterogeneity and Structured Missing Data in Biological and Health Datasets" is a part of the "Joint DMS/NLM Initiative on Generalizable Data program," and is supported by NSF and NIH. **Lead PI: Meisam Razaviyayn** (USC), Co-PIs: Sze-chuan Suen (USC) and Bangyan Stiles (USC); and is for the period 08/01/2019–07/31/2023 and the total amount of $707,563. Own share: $315,158.

▷ "Congestion Reduction via Personalized Incentives" is supported by The National Center for Sustainable Transportation. **Lead PI: Meisam Razaviyayn**; Co-PI: Maged Dessouky (USC); and is for the period 01/01/2020 – 12/31/2020 and the amount of $99,996. Own share: $74,836.

▷ "Incentive Systems for New Mobility Services", is supported by The National Center for Sustainable Transportation. **Lead PI: Meisam Razaviyayn**; Co-PI: Maged Dessouky (USC); and is for the period 01/01/2021 – 12/31/2021 and the amount of $100,000. Own share: $74,765.

▷ "An Inexpensive Portable Ion Sensing Platform for Sustainable Agriculture and Sustainable Healthcare Funding Amount", seed funding by USC Center for Sustainability Solutions; Lead PI: Maral Mousavi (USC), Co-PIs: Meisam Razaviyayn (USC), Bhavna Sharma (USC), Saeid Nosrati (USC); Period: 07/2020–06/2021; funding amount $39,840 (seed funding).

▷ "Conference on Nonconvex Statistical Learning", is supported by NSF. Lead PI: Jong-Shi Pang, Co-PIs: Meisam Razaviyayn and Phebe Vayanos.

MENTORING

Postdoctoral Researchers:

▷ Dmitrii M. Ostrovskii (Fall 2019-Summer 2021)
  ▷ Current Position: Assistant Professor (Tenure-Track) of Math and ISYE, Georgia Tech
  ▷ *Submitted/Published Papers:*
    – D. M. Ostrovskii, B. Barazandeh, and M. Razaviyayn. "Nonconvex-Nonconcave Min-Max Optimization with a Small Maximization Domain," arXiv:2110.03950, 2021.
    – D. M. Ostrovskii, A. Lowy, and M. Razaviyayn. "Efficient search of first-order Nash equilibria in nonconvex-concave smooth min-max problems," SIAM J. On Opt., 2021.
    – D. M. Ostrovskii, M. Ndaoud, A. Javanmard, and M. Razaviyayn. "Near-Optimal Model Discrimination with Non-Disclosure," available at arXiv:2012.02901, 2020.

PhD Students:

▷ Andrew Lowy (Fall 2019-Summer 2023)
  ▷ First position after graduation: Postdoctoral Researcher at the Computer Science Department, University of Wisconsin, Madison
  ▷ Won the Center for the Applied Mathematical Sciences (CAMS) Graduate Student Prize, May 2023.
  ▷ Passed the qualifying exam in 2021; expected to graduate in 2023
  ▷ *Submitted/Published Papers:*
    – A. Lowy, Z. Li, T. Huang, and M. Razaviyayn. "Optimal Differentially Private Learning With Public Data," arXiv preprint arXiv:2306.15056, 2023.
    – A. Lowy and M. Razaviyayn, "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," Accepted at International Conference on Learning Representations (ICLR 2023), [**acceptance rate: 30%**]. A shorter version was presented at the ICML workshop on Theory and Practice of Differential Privacy (TPDP), 2023.

- A. Lowy, D. Gupta, and M. Razaviyayn "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," Accepted at International Conference on Learning Representations (ICLR 2023), [**acceptance rate: 30%**]. A shorter was presented as **oral talk** (**top 6 papers** out of 36 accepted manuscripts) in the NeurIPS workshop on Algorithmic Fairness through the Lens of Causality and Privacy (AFCP), 2023.
- A. Lowy, A. Ghafelebashi, and M. Razaviyayn, "Private non-convex federated learning without a trusted server." The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023), [**acceptance rate: 29%**]. A shorter version was presented at the ICML workshop on the Theory and Practice of Differential Privacy (TPDP), 2023.
- A. Lowy and Meisam Razaviyayn. "Output Perturbation for Differentially Private Convex Optimization with Improved Population Loss Bounds, Runtimes and Applications to Private Adversarial Training," submitted, available at arXiv:2102.04704, 2021.
- D. M. Ostrovskii, A. Lowy, and M. Razaviyayn. "Efficient search of first-order Nash equilibria in nonconvex-concave smooth min-max problems," SIAM Journal On Optimization, 2021.
- ▷ A. Lowy, R. Pavan, S. Baharlouei, M. Razaviyayn, and A. Beirami, "FERMI: Fair Empirical Risk Minimization via Exponential Rényi Mutual Information," Transactions on Machine Learning Research (TMLR 2022). A shorter version was accepted in ICML-21 Workshop on Socially Responsible Machine Learning, 2021

- ▷ Daniel Lundstrom (Spring 2021-Summer 2023)
  - ▷ PhD student in the Math department.
  - ▷ First position after graduation: Principal Signal and Image Processing Engineer at Northrop Grumman.
  - ▷ *Submitted/Published Papers:*
    - D. Lundstrom and M. Razaviyayn, "Four Axiomatic Characterizations of the Integrated Gradients Attribution Method," submitted. available at arXiv:2306.13753, 2023.
    - D. Lundstrom* and M. Razaviyayn, "A Unifying Framework to the Analysis of Interaction Methods using Synergy Functions," International Conference on Machine Learning (ICML 2023) [**acceptance rate: 27%**].
    - D. Lundstrom*, T. Huang*, and M. Razaviyayn, "A rigorous study of integrated gradients method and extensions to internal neuron attributions," *ICML 2022,* available at arXiv:2202.11912, 2022 [**acceptance rate: 19%**].

- ▷ Maher Nouiehed (Fall 2016 - Summer 2019)
  - ▷ Primary advisor: Meisam Razaviyayn, Co-Advisor: Jong-Shi Pang
  - ▷ First Position: Assistant Professor at the Department of Industrial Engineering and Management at the American University of Beirut
  - ▷ Won the Epstein ISE Department, 2019-2020 Best Dissertation award (only a single dissertation in the department is recognized by this award each year)
  - ▷ *Submitted/Published Papers:*
    - M. Nouiehed, J. Lee, and M. Razaviyayn, "Convergence to Second-Order Stationarity for Constrained Non-Convex Optimization," *available at arXiv: 1810.02024v2,* submitted.
    - M. Nouiehed and M. Razaviyayn, "Learning Deep Models: Critical Points and Local Openness," *INFORMS Journal on Optimization*, doi:v10.1287/ijoo.2021.0062, 2021
    - M. Razaviyayn, S. Lu, M. Nouiehed*, T. Huang*, M. Sanjabi*, and M. Hong, "Nonconvex Min-Max Optimization: Applications, Challenges, and Recent Theoretical Advances," *IEEE Signal Processing Magazine*, 2020
    - S. Baharlouei, M. Nouiehed, M. Razaviyayn, "Rényi Fair Inference," International Conference on Learning Representation (ICLR), 2020. [**acceptance rate: 26%**].
    - M. Nouiehed and M. Razaviyayn, "A Trust Region Method for Finding Second-Order Stationarity in Linearly Constrained Non-Convex Optimization," *SIAM Journal on Optimization*, vol. 30, pp. 2501–2529, 2020
    - M. Nouiehed, J.-S. Pang, and M. Razaviyayn, "On the Pervasiveness of Difference-

Convexity in Optimization and Statistics," *Math Programming Series B,* vol. 174, pp. 195–222, 2019

- M. Nouiehed, M. Sanjabi, T. Huang, J. D. Lee, and M. Razaviyayn, "Solving a Class of Non-Convex Min-Max Games UsingIterative First Order Methods," *Neural Information Processing Systems (NeurIPS),* 2019 [**acceptance rate: 21%**]
- M. Nouiehed and M. Razaviyayn "Learning Deep Models: Critical Points and Local Openness," Presented in *International Conference on Learning Representations Workshop (ICLR)*, 2018

▷ Babak Barazandeh (Fall 2017 - Spring 2021)
  ▷ First position: Senior Research Scientist at Splunk
  ▷ Won the Epstein ISE Department, 2020-2021 Best Dissertation award (only a single dissertation in the department is recognized by this award each year)
  ▷ Won the Best Paper Award at IEEE DSW (see below)
  ▷ *Submitted/Published Papers:*
    - D. M. Ostrovskii, B. Barazandeh, and M. Razaviyayn. "Nonconvex-Nonconcave Min-Max Optimization with a Small Maximization Domain.", arXiv:2110.03950, 2021.
    - B. Barazandeh and M. Razaviyayn, "Solving Non-convex Non-differentiable Min-Max Games Using Proximal Gradient Method," Accepted in International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2020.
    - B. Barazandeh, M. Sanjabi, and M. Razaviyayn, "Training Generative Adversarial Networks Using Randomly Generated Discriminators," *IEEE Data Science Workshop*, 2019 [**Best paper award**].
    - B. Barazandeh and M. Razaviyayn, "On the Behavior of the Expectation-Maximization Algorithm for Mixture Models," Published in *IEEE Global Conference on Signal and Information Processing (GlobalSip)*, 2018.

▷ Sina Baharlouei (Fall 2017-Present)
  ▷ Passed the screening exam; expected to pass the qualifying exam in 2022; expected to graduate in early 2024
  ▷ *Submitted/Published Papers:*
    - S. Baharlouei, S. Patel, and M. Razaviyayn, "f-FERM: A Scalable Framework for Robust Fair Empirical Risk Minimization," Submitted to ICLR 2024.
    - S. Baharlouei* and M. Razaviyayn. "Dr. FERMI: A Stochastic Optimization Framework for Distributionally Robust Fair Empirical Risk Minimization," available at arXiv:2309.11682, 2023.
    - S. Baharlouei*, F. Sheikholeslami, M. Razaviyayn, and Z. Kolter. "Improving Adversarial Robustness via Joint Classification and Multiple Explicit Detection Classes." The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023), [**acceptance rate: 29%**]. A shorter version was presented at the Workshop on Formal Verification of Machine Learning (WFVML), 2023.
    - S. Baharlouei, M. Razaviyayn, E. Tseng, and D. Tse. "I-CONVEX: Fast and Accurate de Novo Transcriptome Recovery from Long Reads," In Machine Learning and Principles and Practice of Knowledge Discovery in Databases: International Workshops of ECML PKDD, Proceedings, Part II, pp. 339-363. Cham: Springer Nature Switzerland, 2023 [**acceptance rate: 19%**].
    - S. Baharlouei*, S.-Z Suen, and M. Razaviyayn. "RIFLE: Imputation and Robust Inference from Low Order Marginals," Transactions on Machine Learning Research, 2023. A shorter version was **selected for oral presentation** in the ICML 2023 workshop on Duality Principles for Modern Machine Learning, 2023.
    - A. Lowy, S. Baharlouei, R. Pavan, M. Razaviyayn, and A. Beirami. "FERMI:

Fair Empirical Risk Minimization via Exponential Rényi Mutual Information." Transactions on Machine Learning Research, 2022. A shorter version was presented in the ICML Workshop on Socially Responsible Machine Learning.

– S. Baharlouei*, M. Nouiehed*, and M. Razaviyayn, "Rényi Fair Inference," Accepted in International Conference on Learning Representation (ICLR), available at arXiv 1906.12005, 2020 [**acceptance rate: 26%**].

– A. Lowy, R. Pavan, S. Baharlouei, M. Razaviyayn, and A. Beirami, "FERMI: Fair Empirical Risk Minimization via Exponential Rényi Mutual Information," Transactions on Machine Learning Research (TMLR 2022). A shorter version was accepted in ICML-21 Workshop on Socially Responsible Machine Learning, 2021

– M. Sanjabi, S. Baharlouei, M. Razaviyayn, and J. D. Lee, "When Does Non-Orthogonal Tensor Decomposition Have No Spurious Local Minima?," available at arXiv 1911.09815, 2020.

▷ Tianjian Huang (Fall 2018-Present)
    ▷ Passed the qualifying exam; expected to graduate in Fall 2024
    ▷ *Submitted/Published Papers:*
      – A. Lowy, Z. Li, T. Huang, and M. Razaviyayn. "Optimal Differentially Private Learning With Public Data," arXiv preprint arXiv:2306.15056, 2023.
      – D. Lundstrom, T. Huang, and M. Razaviyayn, "A rigorous study of integrated gradients method and extensions to internal neuron attributions," *ICML 2022,* available at arXiv:2202.11912, 2022 [**acceptance rate: 19%**].
      – T. Huang, S. Halbe, C. Sankar, P. Amini, S. Kottur, A. Geramifard, M. Razaviyayn, and A. Beirami "DAIR: Data Augmented Invariant Regularization", Submitted, available at arXiv:2110.11205, a short version is presented at the Uncertainty and Robustness in Deep Learning Workshop in ICML 2021.
      – T. Huang, P. Singhania, M. Sanjabi, P. Mitra, and M. Razaviyayn, "Alternating Direction Method of Multipliers for Quantization," *AISTATS 2021,* [**acceptance rate: 32%**]
      – M. Razaviyayn, S. Lu, M. Nouiehed, T. Huang, M. Sanjabi, and M. Hong, "Non-convex Min-Max Optimization: Applications, Challenges, and Recent Theoretical Advances," *IEEE Signal Processing Magazine*, 2020
      – M. Nouiehed, M. Sanjabi, T. Huang, J. D. Lee, and M. Razaviyayn, "Solving a Class of Non-Convex Min-Max Games UsingIterative First Order Methods," *Neural Information Processing Systems (NeurIPS)*, 2019 [**acceptance rate: 21%**]

▷ Ali Ghafelebashi (Fall 2018-Present)
    ▷ Passed the qualification exam; expected to graduate in Fall 2024
    ▷ *Submitted/Published Papers:*
      – A. Ghafelebashi, M. Razaviyayn, and M. Dessouky, "Incentive Systems for New Mobility Services," in prep., 2023.
      – A. Lowy*, A. Ghafelebashi*, and M. Razaviyayn, "Private non-convex federated learning without a trusted server." The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023), [**acceptance rate: 29%**]. A shorter version was presented at the ICML workshop on the Theory and Practice of Differential Privacy (TPDP), 2023.
      ▷ A. Ghafelebashi*, M. Razaviyayn, and M. Dessouky. "Congestion Reduction via Personalized Incentives," *Transportation Research Part C: Emerging Technologies,* 2023.

▷ Yinbin Han (Fall 2021-Present)
    ▷ Co-advised with: Renyuan Xu

▷ Expected to take the qualifying exam in Spring 2025
  – Y. Han, M. Razaviyayn, and R. Xu, "Neural Network-Based Score Estimation in Diffusion Models: Optimization and Generalization," Submitted to ICLR 2024.
  – Y. Han, M. Razaviyayn, and R. Xu, "Policy Gradient Converges to the Globally Optimal Policy for Nearly Linear-Quadratic Regulators," arXiv preprint arXiv:2303.08431, 2023.

▷ Zeman Li (Fall 2023-Present)
  ▷ Expected to take the screening exam in 2024
    – A. Lowy, Z. Li, T. Huang, and M. Razaviyayn. "Optimal Differentially Private Learning With Public Data," arXiv preprint arXiv:2306.15056, 2023.

▷ Devansh Gupta (Fall 2023-Present)
  ▷ Co-advised with: Vatsal Sharan
  ▷ Expected to take the qualifying exam in 2024
    – A. Lowy*, D. Gupta*, and M. Razaviyayn "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," International Conference on Learning Representations (ICLR 2023), [**acceptance rate: 30%**].

Undergraduate Students:

▷ Shahriar Norouzizadeh (Summer 2017), Supported by USC SURE program, visiting student from University of British Columbia, currently a PhD student at Carnegie Mellon University (CMU)

▷ Prajwal Singhania (Summer 2018), Supported by IUSSTF-Viterbi Summer Research Program, visiting student from Indian Institute of Technology (IIT) Kharagpur, currently completing his undergraduate at IIT Kharagpur
  – Published paper: T. Huang, P. Singhania, M. Sanjabi, P. Mitra, and M. Razaviyayn, "Alternating Direction Method of Multipliers for Quantization," *AISTATS 2021*, [**acceptance rate: 32%**]

▷ Rakesh Pavan (Summer 2020), Supported by IUSSTF-Viterbi Summer Research Program, visiting student from National Institute of Technology Karnataka, Surathkal, currently completing his undergraduate at NITK
  – Submitted Paper: A. Lowy, R. Pavan, S. Baharlouei*, M. Razaviyayn, and A. Beirami. "FERMI: Fair Empirical Risk Minimization via Exponential Rényi Mutual Information," available at arXiv:2102.12586, 2021.

▷ Eileen Stiles (Spring 2021), visiting student from Johns Hopkins University
  – Submitted workshop paper: S. Baharlouei, P. Dai, K. Ogudu, E. X. Stiles, T. Tu, H. Hong, M. Razaviyayn, B. L. Stiles, S.-c Suen, "RIFLE: Robust Inference from Low-order Marginals", submitted to an ICML 2022 workshop, under review.

▷ Yan Wen (Summer 2021), visiting student from Tsinghua University

▷ Shaunak Halbe (Summer 2021), visiting student from College of Engineering, Pune (COEP)
  – Submitted Paper: T. Huang, S. Halbe, C. Sankar, P. Amini, S. Kottur, A. Geramifard, M. Razaviyayn, and A. Beirami, "DAIR: Data Augmented Invariant Regularization", Submitted, available at arXiv:2110.11205, a short version is presented at the Uncertainty and Robustness in Deep Learning Workshop in ICML 2021.

▷ Gaia Dennison (Summer 2022), Supported by USC SURE program, visiting student from California State Polytechnic University, Pomona

▷ Devansh Gupta (Summer 2022), Supported by IUSSTF-Viterbi Summer Research Program, visiting student from Indraprastha Institute of Information Technology, Delhi

– Submitted Paper: A. Lowy*, D. Gupta*, and M. Razaviyayn "Private Federated Learning Without a Trusted Server: Optimal Algorithms for Convex Losses," Accepted at International Conference on Learning Representations (ICLR) 2023, [**acceptance rate: 30%**]. A shorter version obtained an **oral presentation** (**top 6 papers** out of 36 accepted manuscripts) in Algorithmic Fairness through the Lens of Causality and Privacy (AFCP) at NeurIPS, PMLR 2022.

▷ Vikram Meyer (Summer 2023), Supported by USC SURE program, visiting student from Vanderbilt University

▷ Shivam Patel (Summer 2023), Supported by the USC-IUSSTF program, visiting student from the Indian Institute of Technology, Bombay
  – Submitted Paper: S. Baharlouei, S. Patel, and M. Razaviyayn, "f-FERM: A Scalable Framework for Robust Fair Empirical Risk Minimization," Submitted to ICLR 2024.

TEACHING
EXPERIENCES

▷ **ISE 633: Large Scale Optimization for Machine Learning** (Graduate Level)
  – **Developed the course from scratch**
    Slides and course notes available at: https://sites.usc.edu/razaviyayn/teaching/teaching-ise-633/
  – Fall 2016: 14 registered students (it was offered under the special topics ISE-599)
  – Fall 2017: 14 registered students
  – Fall 2018: 30 registered students
  – Fall 2019: 30 registered students
  – Fall 2020: 25 registered students
  – Fall 2021: 28 registered students

▷ **ISE 530: Optimization Methods for Analytics**, (Graduate Level)
  – Fall 2019: 42 registered students
  – Fall 2020: 48 registered students
  – Fall 2021: 64 registered students
  – Fall 2022: 100 registered students (2 sessions)

▷ **ISE 220: Probability Concepts in Engineering**, (Undergraduate Level)
  – Spring 2018: 27 registered students
  – Fall 2018: 36 registered students

▷ **ISE 790: Research**
  – Spring 2017: Maher Nouiehed
  – Summer 2017: Babak Barazandeh, Shichun Hu
  – Spring 2018: Maher Nouiehed, Sina Baharlouei
  – Summer 2019: Ali Ghafelebashi, Tianjian Huang
  – Fall 2019: Sina Baharlouei, Babak Barazandeh
  – Spring 2020: Babak Barazandeh
  – Fall 2020: Ali Ghafelebashi
  – Fall 2021: Ali Ghafelebashi
  – Spring 2021: Ali Ghafelebashi, Yinbin Han
  – Fall 2022: Ali Ghafelebashi, Tianjian Huang, Sina Baharlouei
  – Spring 2023: Tianjian Huang, Ali Ghafelebashi
  – Fall 2023: Yinbin Han

▷ **CS 590: Directed Research**

- Fall 2021: Ali Ghafelebashi
- Fall 2022: Tianjian Huang

▷ **CS 790: Research**
- Fall 2023: Sina Baharlouei

▷ **EE 790: Research**
- Spring 2021: Amirhesam Abedsoltan

▷ **ENGR 596**
- Summer 2021: Tianjian Huang, Sina Baharlouei
- Fall 2021: Tianjian Huang, Sina Baharlouei
- Summer 2022: Tianjian Huang, Ali Ghafelebashi
- Summer 2023: Ali Ghafelebashi

▷ **Math 590: Directed Research**
- Fall 2021: Daniel Lundstrom
- Spring 2021: Daniel Lundstrom

▷ **Math 790: Research**
- Spring 2020: Andrew Lowy

▷ **Math 794: Doctoral Dissertation**
- Summer 2022: Andrew Lowy

SYNERGISTIC ACTIVITIES & SERVICE

▷ **Service as the Associate Director of the USC-Meta Center for Research and Education in AI and Learning:**
- Co-organized three research workshops/meetings with the participation of the USC and Meta researchers, 2022-2023
- Directly involved in the process of offering 15+ top-off fellowships to incoming PhD students at the ISE and ECE departments, 2022-2023
- Directly involved in the process of offering 10 fellowships (fully covering tuition costs) to the incoming masters students in the Viterbi School of Engineering, 2022-2023
- Directly involved in the process of supporting 8 undergraduate students to participate in the USC SURE program, 2022-2023
- Directly involved in the process of supporting 10 high school students to participate in the USC SHINE program, 2022-2023

▷ **Conference Chair:**
- Uncertainty in Artificial Intelligence 2024 (Workshop Chair)
- International Conference on Continuous Optimization 2025 (ICCOPT, Conference Chair)

▷ **Organizing Committee:**
- Organizer of Conference on Non-convex Statistical Learning 2017 (https://sites.google.com/a/usc.edu/cnsl2017/)
- Organizer of Workshop on Responsible AI Workshop in ICLR 2021 (https://sites.google.com/view/rai-workshop/home).

▷ **Area Editor:** The Journal of Optimization Theory and Applications; responsibility: assign and distribute the submissions to the associate editors (Jan 2024-Dec 2025)

▷ **Associate Editor:** IEEE Transactions on Signal Processing (April 2022-March 2024)

▷ **Area Chair Positions:** The International Conf. on Artificial Intelligence and Statistics (AISTATS 2022, 2023, 2024); Neural Information Processing Systems (NeurIPS 2021, 2022, 2023); International Conference on Machine Learning (ICML 2021, 2023), Conference on Uncertainty in Artificial Intelligence (UAI 2023).

▷ **NSF Panels Served:**
- Directorate for Engineering (ENG) in 2018

– Directorate for Computer & Information Science & Engineering (CISE) in 2018, 2020, 2021, 2022

▷ **Grant Reviewer for the Air Force Office of Scientific Research**, 2021, 2023

▷ **Course Development:** Developed a freely available course "Large Scale Optimization for Machine Learning", available at https://sites.usc.edu/razaviyayn/teaching/

▷ **Journal Reviewer:** Mathematical Programming; SIAM Journal on Optimization, Mathematics of Operations Research; Foundations of Computational Mathematics; Journal of Optimization Theory and Application; Pacific Journal of Optimization; Optimization Letters; Optimization Methods and Software; Journal of Machine Learning Research; IEEE Transactions on Pattern Analysis and Machine Intelligence; IEEE Transactions on Signal Processing; IEEE Transactions on Information Theory; IEEE Transactions on Wireless Communications; IEEE Transactions on Communications; IEEE Transactions on Networking; IEEE Journal on Selected Areas in Communications; IEEE Signal Processing Letters; IEEE Communications Letters; IEEE Wireless Communication Letters; EURASIP Signal Processing; EURASIP Journal on Advances in Signal Processing.

▷ **Conference Reviewer:** Neural Information Processing Systems (NeurIPS); AAAI Conference on Artificial Intelligence, International Conference on Machine Learning (ICML); International Conference on Learning Representations (ICLR); International Symposium on Information Theory (ISIT); International Conference on Artificial Intelligence and Statistics (AISTAT); American Control Conference; IEEE International Symposium on Information Theory (ISIT); IEEE International Conference on Acoustics, Speech, and Signal Processing; Signal Processing Advances in Wireless Communications; International Symposium on Wireless Communication Systems; IEEE International Conference on Communications - Wireless Communications Symposium.

▷ **Invited Session Organizer:** INFORMS 2016, INFORMS 2017, INFORMS 2018, INFORMS 2019, ICSP 2019, Information Theory and Applications (ITA) 2020, International Conference on Continuous Optimization (ICCOPT) 2022.

▷ **Tutorial Speaker:** "Solving Nice Non-Convex Optimization Problems and its Connections to Training Deep Neural Networks", INFORMS Association of Latin-Iberoamerican Operational Research Societies (ALIO), Cancún, 2019

▷ **Service to the Industrial and Systems Engineering Department:**
  – PhD admission committee, 2017, 2018
  – Organized the machine learning and optimization biweekly reading group, 2017
  – Undergraduate committee, 2018, 2019
  – MS in Analytics curriculum enhancement committee, 2020, 2021
  – Teaching faculty promotion committee, 2019, 2020
  – Academic integrity committee, 2020
  – Three search committees for recruiting teaching faculty, 2020, 2021, 2022
  – The ISE department representative in the USC Explore day, 2017, 2018, 2019, and 2022
  – Served in 24 qualification/defense committees in the department, 2016-2022

▷ **Service to the Viterbi School of Engineering:**
  – Guest lecturer for CSCI 697, ISE 105, BME 650
  – Served in 50+ qualification/defense committees across Viterbi (see the mentoring section above for list of students)
  – Viterbi Task Force Committee for Data Science and AI Curriculum
  – For other service to the Viterbi School of Engineering, see the service through USC-Meta Center section above

▷ **Service to the University of Southern California:**
  – Associate Director of the USC-Meta Center for Research and Education in AI and Learning
  – Member of the USC Machine Learning Center
  – Member of the USC Center for Systems and Control
  – Reviewer for the Provost New Strategic Directions for Research Award, 2021
  – Served in the PhD qualification/defense committee of students in the Mathematics Department, Chemistry Department, and the Marshall School of Business

– Guest lecturer for QBIO 493 and PPSI 556 in the Quantitative Biology and Pharmaceutical Sciences departments

▷ **High School Outreach:** USC Neighborhood Academic Initiative (NAI); delivered two to three lectures in each semester for high school students discussing topics in optimization, 2017–present.

▷ **Professional Membership:** Society for Industrial and Applied Mathematics (SIAM), Institute of Electrical and Electronics Engineers (IEEE); Association for Computing Machinery (ACM); Institute for Operations Research and the Management Sciences (INFORMS); Sigma Xi,The Scientific Research Society.

RECENT TALKS/PANELS

▷ Invited Talk, "A scalable stochastic optimization framework for robust and private fair learning" at the CIS Colloquium, EPFL, Lausanne, October 2023.

▷ Invited Talk, "A scalable stochastic optimization framework for robust and private fair learning" at the CS Department, ETH, Zurich, September 2023.

▷ Talk, "Solving certain classes of smooth nonconvex min-max optimization problems" at AFOSR Mathematical Optimization Program, August 2023.

▷ Invited Talk, "Tradeoffs between convergence rate and noise amplification of first-order methods" at the Workshop on Optimization, Equilibrium, and Complementary, Hong Kong, August 2023.

▷ Invited Talk, "A scalable stochastic optimization framework for robust and private fair learning" at the CS Department, CUHK, Hong Kong, August 2023.

▷ Invited Talk, "Scalable Responsible AI" at the 3M workshop for NTFA awardees, 3M, Minneapolis, August 2023.

▷ Invited Talk, "Tradeoffs between convergence rate and noise amplification of first-order methods" at the SIAM-OP Conference, Seattle, May 2023.

▷ Invited Talk, "Fair and Private Backpropagation: A Scalable Framework for Fair and Private Learning" at the USC-Amazon Center on Secure & Trusted ML, April 2023.

▷ Invited Poster, German-American Frontiers of Engineering Symposium, Jülich, Germany, March 2023

▷ Invited Talk, Information Theory and Applications (ITA), San Diego, February 2023

▷ Invited Talk, Engineering for Mental Health, USC, January 2023.

▷ Invited Talk, ML+AI Symposium @ USC, November 2022

▷ Invited Talk, Corporate Advisory Board Meeting of Viterbi School of Engineering, USC, November 2022

▷ Invited Talk, Industrial and Systems Engineering Department Advisory Board Meeting, November 2022

▷ Invited Talk, USC-Amazon Center on Secure & Trusted ML , September 2022

▷ Invited Panelist, North American School of Information Theory, August 2022

▷ Invited Panelist, The International Symposia on Mathematical Programming, August 2022

▷ Invited Talk at The International Conference on Continuous Optimization (ICCOPT), July 2022

▷ Invited Talk at Oracle, Responsible AI in Health, Guild Seminar Series, April 2022

▷ Invited Talk at the WPI Data Science Colloquium, April 2022

▷ Invited Talk at Georgia Institute of Technology, ISE Dept., Atlanta, March 2022

▷ Invited Talk at INFORMS Optimization Society Conference, Greenville, March 2022

▷ Invited Talk at the Simons Institute for the Theory of Computing, Berkeley University, February 2022

▷ Invited Talk at One Word Optimization Seminar Series, January 2022

▷ Invited Talk at the Rensselaer Polytechnic Institute Seminar Series, Applied Math Department Seminar Series, Rensselaer Polytechnic institute, October 2021

▷ Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, August 2021

▷ SIAM Conference on Optimization (OP21), July 2021

▷ East Coast Optimization Meeting 2021 (ECOM21), April 2021

▷ Invited Talk at the Industrial and Systems Engineering Department Seminar Series, Lehigh University, March 2021

▷ Invited Talk at the National Center for Sustainable Transportation, March 2021

▷ Invited Talk at the Industrial and Systems Engineering Department Seminar Series, USC,

March 2021

- ▷ Spotlight Presentation, Neural Information Processing Systems, December 2020 [Acceptance rate < 4%]
- ▷ Invited Talk, INFORMS Annual Meeting, November 2020
- ▷ Talk at the International Conference on Learning Representations (ICLR), April 2020
- ▷ Invited Speaker at SINE seminar series, University of Illinois at Urbana-Champagne, Urbana, February 2020
- ▷ Invited Speaker at IEMS / McCormick School of Engineering and Applied Science, Evanston, March 2020
- ▷ Invited Talk, Information Theory and Applications Workshop, University of California, San Diego, February 2020
- ▷ Invited Speaker at International Workshop on Mathematical Issues in Information Sciences, Shenzhen, December 2019
- ▷ Poster [acceptance rate < 25%] at Neural Information Processing Systems Conference, Vancouver, December 2019
- ▷ Invited Talk and Session Chair at INFORMS Annual Meeting, Seattle, November 2019
- ▷ Invited Talk at ECE Department Seminar Series, Princeton University, October 2019
- ▷ Invited Talk at the center of Mathematics of Data and Decisions at Davis (MADDD), University of California, Davis, October 2019
- ▷ Invited Talk at Digital Technology Center, University of Minnesota, October 2019
- ▷ Invited Talk, International Conference on Continuous Optimization (ICCOPT), Berlin, August 2019
- ▷ Invited mini-symposia, International Conference on Stochastic Programming (ICSP), "Interfaces between Learning and Stochastic Optimization", Trondheim, July 2019
- ▷ Invited Talk, IEEE Data Science Workshop, Minneapolis, June 2019
- ▷ **Invited Tutorial**, INFORMS Association of Latin-Iberoamerican Operational Research Societies (ALIO), "Solving Nice Non-Convex Optimization Problems and its Connections to Training Deep Neural Networks", Cancún, June 2019
- ▷ Invited Talk, Information Theory and Applications Workshop, University of California, San Diego, February 2019
- ▷ Invited Speaker at Computer Science Colloquium Seminar, University of Georgia, Athens, February 2019
- ▷ Poster [acceptance rate < 25%], Neural Information Processing Systems, Montreal, December 2018
- ▷ Talk, Global Conference on Signal and Information Processing Conference, Anaheim, November 2018
- ▷ Invited Talk, Electrical Engineering Department Seminars, University of Southern California, Los Angeles, November 2018
- ▷ Invited Talk, INFORMS Annual Meeting, Phoenix, November 2018
- ▷ Poster [acceptance rate < 50%], International Conference on Learning Representations (ICLR), Vancouver, May 2018
- ▷ Invited Talk, Princeton University, Conference on Information Systems and Sciences, Princeton, March 2018
- ▷ Invited Talk, INFORMS Optimization Society Conference, University of Colorado, Denver, March 2018
- ▷ Invited Talk, Information Theory and Applications Workshop, University of California, San Diego, February 2018
- ▷ Invited Speaker at California Institute of Technology, Electrical Engineering Colloquium, Pasadena, February 2018
- ▷ Poster [acceptance rate < 25%], Neural Information Processing Systems, Long Beach, December 2017
- ▷ Invited Talk, INFORMS Annual Meeting, Houston, November 2017
- ▷ Invited Talk, Mathematics Department Seminar, University of Southern California, November 2017
- ▷ Invited Talk, Machine Learning Center Seminar, USC, October 2017
- ▷ Talk, Conference on Non-Convex Statistical Learning, May 2017
- ▷ Invited Talk, Bay Area Optimization Meeting, University of California, Davis, May 2017
- ▷ Invited Talk, INFORMS Meeting, Nashville, November 2016
- ▷ Invited Talk, Machine Learning Center Seminar, USC, October 2016