

Chinmay Hegde

Address	New York University Tandon School of Engineering Brooklyn, NY 11201	Phone	(646) 997-4118
		Email	chinmay.h@nyu.edu
		Website	http://chinmayhegde.github.io/

Education

12/2012 Ph.D. in Electrical and Computer Engineering, Rice University
Advisor: Richard G. Baraniuk
Thesis: "Nonlinear Signal Models: Geometry, Analysis, and Algorithms"
Winner of 2013 Ralph Budd Award for Best Thesis in School of Engineering

04/2010 M.S. in Electrical and Computer Engineering, Rice University

08/2006 B.Tech. in Electrical Engineering, Indian Institute of Technology Madras

Positions

09/22-	New York University, CSE/ECE Departments	Associate Professor
11/19-08/22	New York University, CSE/ECE Departments	Assistant Professor
08/15-10/19	Iowa State University, ECpE Department	Assistant Professor
10/12-06/15	Massachusetts Institute of Technology, EECS Department	Postdoctoral Associate
02/14-05/15	Massachusetts Institute of Technology, EECS Department	Instructor
08/06-09/12	Rice University	Graduate Research Assistant
05/11-08/11	Mitsubishi Electric Research Labs (MERL)	Summer Intern

Honors and Awards

2018-23 NSF CAREER Award [\[link\]](#)

2019 NeurIPS Best Reviewer Award [\[link\]](#)

2019 MRS Open Data Challenge Award (2nd place) [\[link\]](#)

2018 Boast-Nilsson Educational Impact Award, ECpE Dept, Iowa State

2017 Black & Veatch Building a World of Difference Faculty Fellowship, Iowa State [\[link\]](#)

2017 Best Poster Award, Midwest Machine Learning Symposium (MMLS)

2016-18 NSF CISE Research Initiation Initiative (CRII) Award [\[link\]](#)

2016 Warren B. Boast Undergraduate Teaching Award, ECpE Dept, Iowa State

2015	Best Paper Award, International Conference on Machine Learning (ICML) [link]
2013	Ralph Budd Award for Best Thesis in the School of Engineering, Rice University
2010	Robert L. Patten Award for university service, Rice University
2009	Best Student Paper Award, SPARS Workshop
2002-03	National Board of Higher Mathematics (NBHM) Fellowship, India
2002	Gold Medal, Indian National Physics Olympiad
2001,02	Certificate of Distinction, Indian National Mathematics Olympiad
2001	Certificate of Distinction, Indian National Astronomy Olympiad
2000-02	Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship, India
2000	National Talent Search Exam (NTSE) Scholarship, India

Publications

Google Scholar metrics (Nov 2022): 4790 citations, h-index=28, i10-index=60. [\[link\]](#)

Note: **Boldface** indicates Ph.D. or M.S. student authors supervised by me. Underline indicates NYU student.

Journal Papers

Currently under review

B. Khara, A. Balu, **A. Joshi**, S. Sarkar, C. Hegde, A. Krishnamurthy, and B. Ganapathysubramanian, “Diffnet: Neural field solutions of parametric partial differential equations.” Preprint, Oct. 2021. [\[link\]](#)

Published while at NYU

30. **T. Nguyen, G. Jagatap**, and C. Hegde, “Provable compressed sensing with generative priors via langevin dynamics,” *IEEE Transactions on Information Theory*, vol. 68, pp. 7410–7422, Nov. 2022. [\[doi\]](#)
29. **M. Cho**, Z. Ghodsi, B. Reagan, S. Garg, and C. Hegde, “Sphynx: ReLU-efficient network design for private inference,” *IEEE Security and Privacy*, vol. 20, pp. 22–34, Oct. 2022. [\[doi\]](#)
28. **A. Mukherjee, A. Joshi**, A. Sharma, C. Hegde, and S. Sarkar, “Generative semantic domain adaptation for perception in autonomous driving,” *Journal of Big Data Analytics in Transportation*, Aug. 2022. [\[doi\]](#)
27. C. Yang, X. Lee, B. Pokuri, S. Balakrishnan, C. Hegde, B. Ganapathysubramanian, and S. Sarkar, “Multi-fidelity machine learning models for structure-property mapping of organic electronics,” *Computational Material Science*, June 2022.
26. A. Prasad, A. Balu, S. Sarkar, C. Hegde, and A. Krishnamurthy, “NURBS-Diff: A differentiable programming module for NURBS,” *Computer Aided Design*, vol. 1, Jan. 2022. [\[doi\]](#)
25. **G. Jagatap, A. Joshi**, A. Basak, S. Garg, and C. Hegde, “Adversarially robust learning via entropic regularization,” *Frontiers in Artificial Intelligence*, vol. 4, Jan. 2022. [\[doi\]](#)
24. Z. Jiang, C. Li, Y. Lee, C. Hegde, S. Sarkar, and D. Jiang, “The stochastic augmented lagrangian method for domain adaptation,” *Knowledge-Based Systems*, vol. 235, pp. 1–20, Jan. 2022. In press. [\[doi\]](#)

23. T. Huang, **P. Chakraborty**, C. Hegde, and A. Sharma, “Large scale data driven sensor health monitoring,” *Journal of Big Data Analytics in Transportation*, vol. 3, pp. 229–245, Dec. 2021. [\[doi\]](#)
22. C. Hegde, F. Keinert, and E. Weber, “A kaczmarz algorithm for solving tree based distributed systems of equations,” *Applied Numerical and Harmonic Analysis*, vol. 1, pp. 1–21, Sep. 2021. [\[link\]](#) [\[doi\]](#)
21. Z. Jiang, A. Balu, C. Hegde, and S. Sarkar, “Incremental consensus-based collaborative deep learning,” *Frontiers in Artificial Intelligence*, vol. 4, pp. 1–30, Aug. 2021. [\[link\]](#) [\[doi\]](#)
20. **T. Nguyen**, R. Wong, and C. Hegde, “Benefits of jointly training autoencoders: An improved neural tangent kernel analysis,” *IEEE Transactions on Information Theory*, vol. 67, pp. 4669–4692, July 2021. [\[doi\]](#)
19. X. Lee, J. Waite, C. Yang, B. Pokuri, **A. Joshi**, A. Balu, C. Hegde, B. Ganapathysubramanian, and S. Sarkar, “Fast inverse design of microstructures via generative invariance networks,” *Nature Computational Science*, vol. 1, pp. 229–238, March 2021. [\[doi\]](#)
18. **V. Shah** and C. Hegde, “Sparse signal recovery from modulo observations,” *EURASIP Journal on Advances in Signal Processing*, vol. 1, pp. 1–17, Apr. 2021. [\[doi\]](#)
17. V. Ahsani, A. Sharma, C. Hegde, S. Knickerbocker, and N. Hawkins, “Improving probe-based congestion performance metrics accuracy by using change point detection,” *Journal of Big Data Analytics in Transportation*, vol. 2, pp. 61–74, Apr. 2020. [\[doi\]](#)
16. **P. Chakraborty**, J. Merickel, **V. Shah**, A. Sharma, C. Hegde, C. Desouza, A. Drincic, P. Gunaratne, and M. Rizzo, “Quantifying vehicle control from physiology in type-1 diabetes,” *Traffic Injury Prevention*, pp. 26–31, Nov. 2019. [\[doi\]](#)

Published while at Iowa State

15. **G. Jagatap**, Z. Chen, S. Nayer, C. Hegde, and N. Vaswani, “Sub-diffraction super-resolution imaging for structured data,” *IEEE Trans. Computational Imaging*, vol. 6, pp. 344–357, Oct. 2019. [\[doi\]](#)
14. **T. Nguyen**, R. Wong, and C. Hegde, “Provably accurate double-sparse coding,” *J. Machine Learning Research (JMLR)*, vol. 20, pp. 1–43, Sept. 2019. [\[link\]](#)
13. **P. Chakraborty**, C. Hegde, and A. Sharma, “Data-driven parallelizable traffic incident detection using spatio-temporally denoised robust thresholds,” *Transportation Research Part C*, vol. 105, pp. 81–99, August 2019. [\[doi\]](#)
12. **G. Jagatap** and C. Hegde, “Sample-efficient algorithms for recovering structured signals from magnitude-only measurements,” *IEEE Transactions on Information Theory*, vol. 65, pp. 4435–4456, July 2019. [\[doi\]](#)
11. **M. Soltani** and C. Hegde, “Provable algorithms for learning two-layer polynomial neural networks,” *IEEE Transactions on Signal Processing*, vol. 67, pp. 3361–3371, July 2019. [\[doi\]](#)
10. **M. Soltani** and C. Hegde, “Fast algorithms for demixing signals from nonlinear observations,” *IEEE Transactions on Signal Processing*, vol. 65, pp. 4209–4222, Aug. 2017. [\[doi\]](#)
9. C. Hegde, A. Sankaranarayanan, W. Yin, and R. Baraniuk, “NuMax: A convex approach for learning near-isometric linear embeddings,” *IEEE Transactions on Signal Processing*, vol. 63, pp. 6109–6121, Nov. 2015. [\[doi\]](#)
8. C. Hegde, P. Indyk, and L. Schmidt, “Fast algorithms for structured sparsity,” *Bulletin of the EATCS*, vol. 1, pp. 197–228, Oct. 2015. [\[link\]](#)
7. C. Hegde, P. Indyk, and L. Schmidt, “Approximation algorithms for model-based compressive sensing,” *IEEE Transactions on Information Theory*, vol. 61, pp. 5129–5147, Sept. 2015. [\[doi\]](#)

Published before Iowa State

6. Y. Li, C. Hegde, A. Sankaranarayanan, R. Baraniuk, and K. Kelly, “Compressive image classification via secant projections,” *J. Optics*, vol. 17, pp. 1–16, June 2015. [\[doi\]](#)
5. S. Nagaraj, C. Hegde, A. Sankaranarayanan, and R. Baraniuk, “Optical flow-based transport for image manifolds,” *Applied Computational Harmonic Analysis*, vol. 36, pp. 280–301, March 2014. [\[doi\]](#)
4. C. Hegde and R. Baraniuk, “Signal recovery on incoherent manifolds,” *IEEE Transactions on Information Theory*, vol. 58, pp. 7204–7214, Dec. 2012. [\[doi\]](#)
3. C. Hegde and R. Baraniuk, “Sampling and recovery of pulse streams,” *IEEE Transactions on Signal Processing*, vol. 59, pp. 1505–1517, Apr. 2011. [\[doi\]](#)
2. M. Davenport, C. Hegde, M. Duarte, and R. Baraniuk, “Joint manifolds for data fusion,” *IEEE Trans. Image Proc.*, vol. 19, pp. 2580–2594, Oct. 2010. [\[doi\]](#)
1. R. Baraniuk, V. Cevher, M. Duarte, and C. Hegde, “Model-based compressive sensing,” *IEEE Transactions on Information Theory*, vol. 56, pp. 1982–2001, Apr. 2010. [\[doi\]](#)

Highly Selective Conference Papers and Spotlights

Currently under review

G. Mittal, J. Yenphraphai, C. Hegde, and N. Memon, “GOTCHA: A challenge-response system for real-time deepfake detection.” Preprint, Oct. 2022.

A. Gajjar, C. Hegde, and C. Musco, “Active learning of single neuron models with lipschitz non-linearities.” Preprint, Oct. 2022.

F. Duman Keles, P. M. Wijewardena, and C. Hegde, “On the computational complexity of self-attention.” Preprint, May 2022.

J. Li, **T. Nguyen**, R. Wong, and C. Hegde, “Implicit regularization for group sparsity.” Preprint, May 2022.

B. Khara, Z. Jiang, A. Balu, E. Herron, C. Yang, X. Lee, S. Sarkar, C. Hegde, A. Krishnamurthy, and B. Ganapathysubramanian, “Neural PDE solvers for irregular domains.” Preprint, May 2022.

A. Joshi, **M. Cho**, **M. Pham**, L. Boykov, Z. Kolter, and C. Hegde, “Smooth-Reduce: Leveraging patches for improved certified robustness.” Preprint, March 2022.

Published while at NYU

28. **M. Cho**, **A. Joshi**, B. Reagan, S. Garg, and C. Hegde, “Selective network linearization for private inference,” in *Proc. International Conference on Machine Learning (ICML)*, July 2022.
27. Z. Jiang, X. Lee, S. Tan, K. Tan, A. Balu, Y. Lee, C. Hegde, and S. Sarkar, “MDPGT: Momentum-based decentralized policy gradient tracking,” in *Proc. AAAI Conference on Artificial Intelligence (AAAI)*, Feb. 2022. [\[link\]](#)
26. **M. Cho**, A. Balu, **A. Joshi**, A. Prasad, B. Khara, B. Ganapathysubramanian, S. Sarkar, A. Krishnamurthy, and C. Hegde, “Differentiable spline approximations,” in *Adv. Neural Information Processing Systems (NeurIPS)*, Dec. 2021. [\[link\]](#)
25. J. Li, **T. Nguyen**, R. Wong, and C. Hegde, “Implicit sparse regularization: The impact of depth and early stopping,” in *Adv. Neural Information Processing Systems (NeurIPS)*, Dec. 2021. [\[link\]](#)
24. A. Balu, S. Botelho, B. Khara, V. Rao, S. Sarkar, C. Hegde, S. Adavani, and B. Ganapathysubramanian, “Distributed multigrid neural solver on megavoxel domains,” in *Proc. International Conference on High Performance Computing (SC)*, Nov. 2021. [\[link\]](#)
23. Y. Esfendiari, S. Tan, A. Balu, Z. Jiang, E. Herron, C. Hegde, and S. Sarkar, “Cross-gradient aggregation for decentralized learning from non-IID data,” in *Proc. International Conference on Machine Learning (ICML)*, July 2021. [\[link\]](#)

22. **M. Cho, A. Joshi**, and C. Hegde, “ESPN: Extremely Sparse Pruned Networks,” in *IEEE Learning and Data Science Workshop (LDSW)*, June 2021. **Oral presentation.** [\[link\]](#)
21. **A. Joshi, M. Cho, V. Shah**, B. Pokuri, B. Ganapathysubramanian, S. Sarkar, and C. Hegde, “Invnet: Encoding geometric and statistical invariances in deep generative models,” in *Proc. AAAI Conference on Artificial Intelligence (AAAI)*, Feb. 2020. [\[doi\]](#)
20. X. Lee, S. Ghadai, K. Tan, C. Hegde, and S. Sarkar, “Spatiotemporally constrained action space attacks on deep reinforcement learning agents,” in *Proc. AAAI Conference on Artificial Intelligence (AAAI)*, Feb. 2020. [\[doi\]](#)
19. **G. Jagatap** and C. Hegde, “Algorithmic guarantees for inverse imaging with untrained network priors,” in *Adv. Neural Information Processing Systems (NeurIPS)*, Dec. 2019. [\[link\]](#)

Published while at Iowa State

18. **A. Joshi, A. Mukherjee**, S. Sarkar, and C. Hegde, “Semantic adversarial attacks: Parametric transformations that fool deep classifiers,” in *Intl. Conf. Computer Vision (ICCV)*, Oct. 2019. [\[doi\]](#)
17. **T. Nguyen**, R. Wong, and C. Hegde, “On the dynamics of gradient descent for autoencoders,” in *Proc. Intl. Conf. Artificial Intelligence and Statistics (AISTATS)*, April 2019. [\[link\]](#)
16. **T. Nguyen**, A. Soni, and C. Hegde, “On learning sparsely used dictionaries from incomplete samples,” in *Proc. International Conference on Machine Learning (ICML)*, Jul. 2018. [\[link\]](#)
15. Z. Jiang, A. Balu, C. Hegde, and S. Sarkar, “Incremental consensus-based collaborative deep learning,” in *Proc. ICML Workshop on Nonconvex Optimization for Machine Learning*, July 2018. **Oral presentation; acceptance rate: 11/?** [\[link\]](#)
14. **M. Soltani** and C. Hegde, “Towards provable learning of polynomial neural networks using low-rank matrix estimation,” in *Proc. Intl. Conf. Artificial Intelligence and Statistics (AISTATS)*, Apr. 2018. **Oral presentation; acceptance rate: 31/645.** [\[link\]](#)
13. **T. Nguyen**, R. Wong, and C. Hegde, “A provable approach for double-sparse coding,” in *Proc. AAAI Conference on Artificial Intelligence (AAAI)*, Feb. 2018. [\[link\]](#)
12. **G. Jagatap** and C. Hegde, “Fast sample-efficient algorithms for structured phase retrieval,” in *Adv. Neural Information Processing Systems (NIPS)*, Dec. 2017. [\[link\]](#)
11. Z. Jiang, A. Balu, C. Hegde, and S. Sarkar, “Collaborative deep learning over fixed topology networks,” in *Adv. Neural Information Processing Systems (NIPS)*, Dec. 2017. [\[link\]](#)
10. M. Cohen, C. Hegde, S. Jegelka, and L. Schmidt, “Efficiently optimizing over (non-convex) cones via approximate projections,” in *Proc. NIPS Workshop on Optimization for Machine Learning (OPT)*, Dec. 2017. **Oral presentation; acceptance rate: 4/?.** [\[link\]](#)
9. **M. Soltani** and C. Hegde, “Iterative thresholding for demixing structured superpositions in high dimensions,” in *Proc. NIPS Workshop on Learning in High Dimensions with Structure (LHDS)*, Dec. 2016. **Oral presentation; acceptance rate: 2/50.** [\[link\]](#)
8. C. Hegde, P. Indyk, and L. Schmidt, “Fast recovery from a union of subspaces,” in *Adv. Neural Information Processing Systems (NIPS)*, Dec. 2016. [\[link\]](#)

Published before Iowa State

7. C. Hegde, P. Indyk, and L. Schmidt, “A nearly linear-time framework for graph-structured sparsity,” in *Proc. International Conference on Machine Learning (ICML)*, July 2015. **Best Paper Award.** [\[link\]](#)
6. J. Acharya, I. Diakonikolas, C. Hegde, J. Li, and L. Schmidt, “Fast and near-optimal algorithms for approximating distributions by histograms,” in *Proc. Symposium on Principles of Database Systems (PODS)*, May 2015. [\[doi\]](#)

5. C. Hegde, P. Indyk, and L. Schmidt, “Nearly linear-time model-based compressive sensing,” in *Proc. Intl. Colloquium on Automata, Languages, and Programming (ICALP)*, July 2014. [\[doi\]](#)
4. C. Hegde, P. Indyk, and L. Schmidt, “Approximation-tolerant model-based compressive sensing,” in *Proc. ACM Symposium on Discrete Algorithms (SODA)*, Jan. 2014. [\[doi\]](#)
3. C. Hegde, M. Duarte, and V. Cevher, “Compressive sensing recovery of spike trains using a structured sparsity model,” in *Proc. Work. Struc. Parc. Rep. Adap. Signaux (SPARS)*, Apr. 2009. **Best Student Paper Award.** [\[link\]](#)
2. V. Cevher, M. Duarte, C. Hegde, and R. Baraniuk, “Sparse signal recovery using Markov Random Fields,” in *Adv. Neural Information Processing Systems (NIPS)*, Dec. 2008. [\[link\]](#)
1. C. Hegde, M. Wakin, and R. Baraniuk, “Random projections for manifold learning,” in *Adv. Neural Information Processing Systems (NIPS)*, Dec. 2007. [\[link\]](#)

Other Peer-reviewed Conference Proceedings

Published while at NYU

54. **T. Nguyen, G. Jagatap**, and C. Hegde, “Inverse imaging with generative priors via langevin dynamics,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2022. [\[link\]](#)
53. Z. Jiang, A. Balu, C. Hegde, and S. Sarkar, “Decentralized deep learning using momentum-accelerated consensus,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, June 2021. [\[doi\]](#)
52. S. Asif and C. Hegde, “The benefits of side information for structured phase retrieval,” in *Proc. Euro. Conf. Sig. Proc. Comm (EUSIPCO)*, Jan. 2021. [\[doi\]](#)
51. S. Botelho, **A. Joshi**, B. Khara, S. Sarkar, C. Hegde, S. Adavani, and B. Ganapathysubramanian, “Deep generative models that solve pdes: Distributed computing for training large models,” in *Machine Learning for High-Performance Computing (MLHPC)*, Nov. 2020. [\[doi\]](#)
50. **G. Jagatap** and C. Hegde, “High dynamic range imaging using deep image priors,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2020. [\[doi\]](#)
49. **V. Shah** and C. Hegde, “Signal reconstruction from modulo observations,” in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Nov. 2019. [\[doi\]](#)
48. **M. Soltani**, S. Jain, and C. Hegde, “Learning structured signals using gans with applications in denoising and demixing,” in *Proc. Asilomar Conference on Signals, Systems, and Computers*, Nov. 2019. [\[doi\]](#)
47. R. Hyder, C. Hegde, and S. Asif, “Phase retrieval with side information,” in *Proc. Asilomar Conference on Signals, Systems, and Computers*, Nov. 2019. [\[doi\]](#)

Published while at Iowa State

46. **P. Chakraborty**, J. Merickel, **V. Shah**, A. Sharma, C. Hegde, C. Desouza, A. Drincic, P. Gunaratne, and M. Rizzo, “Predicting risk from physiology in drivers with type-1 diabetes,” in *Proc. AAAM Annual Scientific Conf. (AAAM)*, Oct. 2019. [\[link\]](#)
45. **G. Jagatap** and C. Hegde, “Linearly convergent algorithms for learning shallow residual networks,” in *Proc. IEEE International Symposium on Information Theory (ISIT)*, July 2019. [\[doi\]](#)
44. **T. Nguyen**, A. Soni, and C. Hegde, “Tractable learning of sparsely used dictionaries from incomplete samples,” in *Proc. Sampling Theory and Applications (SampTA)*, July 2019. [\[doi\]](#)

43. R. Hyder, **V. Shah**, C. Hegde, and S. Asif, "Alternating phase projected gradient descent with generative priors for solving compressive phase retrieval," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2019. [\[doi\]](#)
42. **M. Cho** and C. Hegde, "Reducing the search space for hyperparameter optimization using group sparsity," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2019. [\[doi\]](#)
41. S. Asif and C. Hegde, "Phase retrieval for signals in a union of subspaces," in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Nov. 2018. [\[doi\]](#)
40. **P. Chakraborty**, C. Hegde, and A. Sharma, "Freeway incident detection from cameras: A semi-supervised learning approach," in *Proc. IEEE Int. Conf. Intelligent Transportation Systems (ITSC)*, Nov. 2018. [\[doi\]](#)
39. C. Hegde, "Algorithmic aspects of inverse problems using generative models," in *Proc. Allerton Conference on Communication, Control, and Computers*, Oct. 2018. [\[doi\]](#)
38. **G. Jagatap**, Z. Chen, C. Hegde, and N. Vaswani, "Model corrected low rank ptychography," in *Proc. IEEE Conference on Image Processing (ICIP)*, Sept. 2018. [\[doi\]](#)
37. **G. Jagatap** and C. Hegde, "Towards sample-optimal methods for solving random quadratic equations with structure," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, June 2018. [\[doi\]](#)
36. **M. Soltani** and C. Hegde, "Fast low-rank matrix estimation for ill-conditioned matrices," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, June 2018. [\[doi\]](#)
35. **V. Shah** and C. Hegde, "Solving linear inverse problems using GAN priors: An algorithm with provable guarantees," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Apr. 2018. [\[doi\]](#)
34. Z. Chen, **G. Jagatap**, S. Nayer, C. Hegde, and N. Vaswani, "Low rank fourier ptychography," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Apr. 2018. [\[doi\]](#)
33. **G. Jagatap**, Z. Chen, C. Hegde, and N. Vaswani, "Fourier ptychography using structured sparsity," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Apr. 2018. [\[doi\]](#)
32. **C. Hubbard** and C. Hegde, "Parallel computing heuristics for matrix completion," in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Nov. 2017. [\[doi\]](#)
31. **M. Soltani** and C. Hegde, "Demixing structured superposition signals from periodic and aperiodic nonlinearities," in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Nov. 2017. [\[doi\]](#)
30. **V. Shah**, **M. Soltani**, and C. Hegde, "Reconstruction from periodic nonlinearities, with applications to HDR imaging," in *Proc. Asilomar Conference on Signals, Systems, and Computers*, Nov. 2017. [\[doi\]](#)
29. **M. Soltani** and C. Hegde, "Fast algorithms for learning latent variables in graphical models," in *Proc. ACM KDD Workshop on Mining and Learning with Graphs (KDD MLG)*, Aug. 2017. [\[link\]](#)
28. B. Wang, C. Gan, J. Yang, C. Hegde, and J. Wu, "Graph-based multiple-line outage identification in power transmission systems," in *IEEE Power and Engineering Systems General Meeting (PES)*, Jul. 2017. [\[doi\]](#)
27. **M. Soltani** and C. Hegde, "Stable recovery of sparse vectors from random sinusoidal feature maps," in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Mar. 2017. [\[doi\]](#)
26. **M. Soltani** and C. Hegde, "A fast iterative algorithm for demixing sparse signals from nonlinear observations," in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Dec. 2016. [\[doi\]](#)
25. **M. Soltani** and C. Hegde, "Demixing sparse signals from nonlinear observations," in *Proc. Asilomar Conference on Signals, Systems, and Computers*, Nov. 2016. [\[doi\]](#)
24. **C. Hubbard**, J. Bavslik, C. Hegde, and C. Hu, "Data-driven prognostics of lithium-ion rechargeable battery using bilinear kernel regression," in *Annual Conf. Prognostics and Health Management (PHM)*, Oct. 2016. [\[doi\]](#)

23. C. Hegde, P. Indyk, and L. Schmidt, “Nearly linear-time algorithms for graph-structured sparsity,” in *Proc. Intl. Joint Conference on Artificial Intelligence (IJCAI)*, Best Paper Awards Track, July 2016. [\[link\]](#)
22. C. Hegde, “A fast algorithm for demixing signals with structured sparsity,” in *Proc. Intl. Conf. Sig. Proc. Comm. (SPCOM)*, June 2016. [\[doi\]](#)
21. C. Hegde, “Bilevel feature selection in nearly-linear time,” in *Proc. IEEE Workshop on Statistical Signal Processing*, June 2016. [\[doi\]](#)

Published before Iowa State

20. M. Araya-Polo, C. Hegde, P. Indyk, and L. Schmidt, “Greedy strategies for data-adaptive shot selection,” in *Proc. Annual EAGE Meeting*, May 2015. [\[doi\]](#)
19. L. Schmidt, C. Hegde, P. Indyk, L. Lu, X. Chi, and D. Hohl, “Seismic feature extraction using Steiner tree methods,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Apr. 2015. [\[doi\]](#)
18. C. Hegde, P. Indyk, and L. Schmidt, “A fast approximation algorithm for tree-sparse recovery,” in *Proc. IEEE International Symposium on Information Theory (ISIT)*, June 2014. [\[doi\]](#)
17. Y. Li, C. Hegde, and K. Kelly, “Object tracking via compressive sensing,” in *Proc. Comput. Optical Sensing and Imaging (COSI)*, June 2014. [\[doi\]](#)
16. C. Hegde, A. Sankaranarayanan, and R. Baraniuk, “Lie operators for compressive sensing,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2014. [\[doi\]](#)
15. L. Schmidt, C. Hegde, P. Indyk, J. Kane, L. Lu, and D. Hohl, “Automatic fault localization using the Generalized Earth Movers Distance,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2014. [\[doi\]](#)
14. E. Grant, C. Hegde, and P. Indyk, “Nearly optimal linear embeddings into very low dimensions,” in *Proc. IEEE Global Conf. Signal and Image Processing (GlobalSIP)*, Dec. 2013. [\[doi\]](#)
13. L. Schmidt, C. Hegde, and P. Indyk, “The Constrained Earth Movers Distance model, with applications to compressive sensing,” in *Proc. Sampling Theory and Applications (SampTA)*, July 2013. [\[link\]](#)
12. Y. Li, C. Hegde, R. Baraniuk, and K. Kelly, “Compressive classification via secant projections,” in *Proc. Comput. Optical Sensing and Imaging (COSI)*, June 2013. [\[doi\]](#)
11. D. Grady, M. Moll, C. Hegde, A. Sankaranarayanan, R. Baraniuk, and L. Kavraki, “Multi-robot target verification with reachability constraints,” in *Proc. IEEE Int. Symp. on Safety, Security, and Rescue Robotics (SSRR)*, Nov. 2012. [\[doi\]](#)
10. D. Grady, M. Moll, C. Hegde, A. Sankaranarayanan, R. Baraniuk, and L. Kavraki, “Multi-objective sensor re-planning for a car-like robot,” in *Proc. IEEE Int. Symp. on Safety, Security, and Rescue Robotics (SSRR)*, Nov. 2012. [\[doi\]](#)
9. C. Hegde, A. Sankaranarayanan, and R. Baraniuk, “Near-isometric linear embeddings of manifolds,” in *Proc. IEEE Workshop on Statistical Signal Processing*, Aug. 2012. [\[doi\]](#)
8. C. Hegde and R. Baraniuk, “SPIN: Iterative signal recovery on incoherent manifolds,” in *Proc. IEEE International Symposium on Information Theory (ISIT)*, July 2012. [\[doi\]](#)
7. A. Sankaranarayanan, C. Hegde, S. Nagaraj, and R. Baraniuk, “Go with the flow: Optical flow-based transport operators for image manifolds,” in *Proc. Allerton Conference on Communication, Control, and Computers*, Sept. 2011. [\[doi\]](#)
6. M. Davenport, C. Hegde, M. Duarte, and R. Baraniuk, “High-dimensional data fusion via joint manifold learning,” in *Proc. AAAI Fall Symp. on Manifold Learning*, Nov. 2010. [\[link\]](#)

5. C. Hegde and R. Baraniuk, “Compressive sensing of a superposition of pulses,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, March 2010. [\[doi\]](#)
4. S. Schnelle, J. Laska, C. Hegde, M. Duarte, M. Davenport, and R. Baraniuk, “Texas hold ’em algorithms for distributed compressive sensing,” in *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, March 2010. [\[doi\]](#)
3. C. Hegde and R. Baraniuk, “Compressive sensing of streams of pulses,” in *Proc. Allerton Conference on Communication, Control, and Computers*, Sept. 2009. [\[doi\]](#)
2. V. Cevher, P. Indyk, C. Hegde, and R. Baraniuk, “Recovery of clustered sparse signals from compressive measurements,” in *Proc. Sampling Theory and Applications (SampTA)*, May 2009. [\[link\]](#)
1. M. Duarte, C. Hegde, V. Cevher, and R. Baraniuk, “Recovery of compressible signals from unions of subspaces,” in *Proc. IEEE Conference on Information Science and Systems (CISS)*, March 2009. [\[doi\]](#)

Workshop Proceedings

Published while at NYU

19. **A. Gajjar**, C. Hegde, and C. Musco, “Active learning of single neuron models with lipschitz non-linearities,” in *Proc. NeurIPS Workshop on Deep Learning for Differential Equations (DLDE)*, Dec. 2022. **Spotlight paper.**
18. M. Z. Hasan, **A. Joshi**, V. Archana, A. Sharma, C. Hegde, and S. Sarkar, “DriveCLIP: Zero-shot transfer for distracted driving activity understanding using CLIP,” in *Proc. NeurIPS Autonomous Driving Workshop (ADW)*, Dec. 2022.
17. **B. Feuer**, **A. Joshi**, and C. Hegde, “A meta-review of distributionally robust models,” in *Proc. ICML Workshop on Principles of Distribution Shift (PODS)*, May 2022.
16. **A. Joshi**, **G. Jagatap**, and C. Hegde, “Adversarial token attacks on vision transformers,” in *Proc. CVPR Workshop on Transformers for Vision*, June 2022.
15. **K. Marshall**, **M. Cho**, and C. Hegde, “Differentiable design with dynamic programming,” in *Proc. AAAI Workshop on AI for Design and Manufacturing (ADAM)*, Feb. 2022. [\[link\]](#)
14. **M. Cho**, K. Nagasubramanian, A. Singh, A. K. Singh, B. Ganapathysubramanian, S. Sarkar, and C. Hegde, “Privacy preserving deep models for plant stress phenotyping,” in *Proc. AAAI Workshop on AI for Agriculture and Food Systems (ALAFS)*, Feb. 2022. [\[link\]](#)
13. **G. Jagatap**, **A. Joshi**, S. Garg, and C. Hegde, “Adversarially robust learning via entropic regularization,” in *Proc. ICML Workshop on Adversarial Machine Learning (AML)*, July 2021.
12. **M. Cho**, **M. Soltani**, and C. Hegde, “One-shot neural architecture search via compressive sensing,” in *Proc. ICLR Workshop on Neural Architecture Search*, May 2021. [\[link\]](#)
11. B. Khara, A. Balu, **A. Joshi**, A. Krishnamurthy, S. Sarkar, C. Hegde, and B. Ganapathysubramanian, “Field solutions of parametric PDEs,” in *Proc. AAAI Symp. on Machine Learning for Physical Sciences (AAAI-MLPS)*, March 2021. [\[link\]](#)
10. **M. Cho**, **A. Joshi**, X. Lee, A. Balu, A. Krishnamurthy, B. Ganapathysubramanian, S. Sarkar, and C. Hegde, “Differentiable programming for piecewise polynomial functions,” in *Proc. NeurIPS Workshop: Learning Meets Combinatorial Algorithms (LMCA)*, Dec. 2020. [\[link\]](#)
9. **T. Nguyen**, Y. Mroueh, S. Hoffman, P. Das, P. Dognin, G. Romano, and C. Hegde, “Nano-material configuration design with deep surrogate langevin dynamics,” in *Proc. ICLR Workshop on Deep Learning and Differential Equations*, May 2020. [\[link\]](#)

Published while at Iowa State

8. **A. Mukherjee, A. Joshi**, S. Sarkar, and C. Hegde, "Attribute-controlled traffic data augmentation using conditional generative models," in *Proc. CVPR Workshop on Vision for All Seasons (CVPR VAS)*, June 2019. [\[link\]](#)
7. R. Singh, **V. Shah**, B. Pokuri, B. Ganapathysubramanian, S. Sarkar, and C. Hegde, "Physics-aware deep generative models for microstructure simulation," in *Proc. NIPS Workshop on Machine Learning for Molecules and Materials*, Dec. 2018. [\[link\]](#)
6. A. Balu, **T. Nguyen**, A. Kokate, C. Hegde, and S. Sarkar, "A forward-backward approach for visualizing information flow in deep networks," in *Proc. NIPS Symposium on Interpretability for Machine Learning*, Dec. 2017. [\[link\]](#)
5. **P. Chakraborty**, C. Hegde, and A. Sharma, "Trend filtering in network time series with applications to traffic incident detection," in *Proc. NIPS Time Series Workshop (TSW)*, Dec. 2017. [\[link\]](#)

Published before Iowa State

4. C. Hegde, P. Indyk, and L. Schmidt, "A fast adaptive variant of the GW algorithm for the Prize-Collecting Steiner Tree problem." DIMACS Workshop, Dec. 2014. [\[link\]](#)
3. D. Grady, M. Moll, C. Hegde, A. Sankaranarayanan, R. Baraniuk, and L. Kavraki, "Look before you leap: Predictive sensing and opportunistic navigation," in *Proc. IROS Workshop on Open Prob. Motion Plan.*, Sept. 2011. [\[link\]](#)
2. M. Davenport, C. Hegde, M. Wakin, and R. Baraniuk, "Manifold-based approaches for improved classification," in *Proc. NIPS Workshop on Topology Learning*, Dec. 2007. [\[link\]](#)
1. C. Hegde, M. Davenport, M. Wakin, and R. Baraniuk, "Efficient machine learning using random projections," in *Proc. NIPS Workshop on Efficient Machine Learning*, Dec. 2007. [\[link\]](#)

Other Products

PhD Thesis

C. Hegde, *Nonlinear Signal Models: Geometry, Algorithms, and Analysis*. PhD thesis, ECE Department, Rice University, Sept. 2012. ***Ralph Budd Award for Best Thesis in School of Engineering***. [\[doi\]](#)

Books and Lecture Notes

6. C. Hegde, "Lecture notes on Foundations of Deep Learning." Monograph available online, Feb. 2022. [\[link\]](#)
5. C. Hegde, "Lecture notes on deep learning." Monograph available online, Dec. 2020. [\[link\]](#)
4. C. Hegde, "Lecture notes on introduction to machine learning." Monograph available online, June 2020. [\[link\]](#)
3. C. Hegde and A. Kamal, "Theoretical foundations of computer engineering." Monograph available online, June 2017. [\[link\]](#)
2. C. Hegde, "Lecture notes on data analytics." Monograph available online, June 2017. [\[link\]](#)
1. R. Baraniuk, M. Davenport, M. Duarte, and C. Hegde, *An Introduction to Compressive Sensing*. Connexions e-textbook, 2011. [\[link\]](#)

Technical Reports and Non-Reviewed Manuscripts

4. **C. Hubbard** and C. Hegde, “GPUFish: A parallel computing framework for matrix completion from a few observations,” tech. rep., Iowa State University, December 2016. [\[link\]](#)
3. C. Hegde, O. Tuzel, and F. Porikli, “Efficient upsampling of natural images.” MERL Technical Report, March 2012. [\[link\]](#)
2. M. Davenport, C. Hegde, M. Duarte, and R. Baraniuk, “A theoretical analysis of joint manifolds,” Tech. Rep. TREE0901, Rice University ECE Department, Jan. 2009. [\[link\]](#)
1. C. Hegde, M. Wakin, and R. Baraniuk, “Random projections for manifold learning: Proofs and analysis,” Tech. Rep. TREE-0710, Rice Univ., ECE Dept., Dec. 2007. [\[link\]](#)

Patents

2. T. Nguyen, Y. Mroueh, S. Hoffman, P. Das, P. Dognin, G. Romano, C. Hegde, “Deep Surrogate Langevin Sampling for Multi-objective Constraint Black Box Optimization with Applications to Optimal Inverse Design Problems”, US Patent No US20220076130A1, March 2022.
1. O. Tuzel, F. Porikli, and C. Hegde, “Upscaling Natural Images”, US Patent No. 8,620,073, December 2013.

Datasets

2. B. Pokuri, **V. Shah**, **A. Joshi**, C. Hegde, S. Sarkar, and B. Ganapathysubramanian, “Binary 2d morphologies of polymer phase separation,” Feb. 2019. [\[doi\]](#)
 1. B. Pokuri, X. Lee, **A. Joshi**, C. Hegde, S. Sarkar, and B. Ganapathysubramanian, “Binary 3d morphologies of polymer phase separation,” Feb. 2020. [\[doi\]](#)
-

Grants and Contracts

Major funding

Grants awarded while at NYU

15. co-PI, “Leverage Score Sampling for Parametric PDEs”, Department of Energy (DOE), September 2021-August 2023, \$300,000 (my share: 50%).
Team members: Christopher Musco (PI).
14. NYU PI, “AIIRA: AI Institute for Resilient Agriculture”, National Science Foundation (NSF), September 2021-August 2026, \$20,000,000 (my share: 3% = \$600,000).
Team members: B. Ganapathysubramanian (PI, ISU), A. Singh (ISU), G. Kantor (CMU), K. Sycara (CMU), N. Merchant (ASU).
13. co-PI, “Context-Aware Learning for Inverse Design in Photovoltaics”, Advanced Research Projects Agency-Energy (ARPA-E), May 2020-January 2022, \$1,979,995 (my share: 15%).
Team members: B. Ganapathysubramanian (PI, ISU), S. Sarkar (ISU), Adarsh Krishnamurthy (ISU), Zhenan Bao (Stanford), Ross Larsen (NREL).

12. co-PI, “Novel ceramic capacitors with ultrahigh energy density and efficiency”, Department of Energy (AMO), September 2020-June 2023, \$2,499,995 (my share: 10%).

Team members: Xiaoli Tan (PI, ISU), Jun Cui (ISU), Duane Johnson (Ames Lab).

11. co-PI, “PALM: A Physics-Aware Learning Framework for Microstructure Design, Phase II”, Defence Advanced Research Projects Agency (DARPA), November 2019-June 2020, \$385,000 (my share: 40%).

Team members: S. Sarkar (PI, ISU), B. Ganapathysubramanian.

Grants awarded while at Iowa State

10. PI, “PALM: A Physics-Aware Learning Framework for Microstructure Design, Phase I”, Defence Advanced Research Projects Agency (DARPA), January 2019-October 2020, \$400,000 (my share: 40%).

Team members: S. Sarkar (PI), B. Ganapathysubramanian.

9. co-PI, “HDR TRIPODS: D4 (Dependable Data-Driven Discovery) Institute”, National Science Foundation (NSF), Jan 2020-Dec 2022, \$1,498,999 (my share: 10%).

Team members: H. Rajan (PI), D. Nettleton, P. Aduri, E. Weber.

8. co-PI, “Deep Insight: A Deep-Net Approach for Estimating Driver State from Naturalistic Data”, Federal Highway Administration, 7/1/2019-6/30/2021, \$1,354,417 (my share: 5%).

Team members: A. Sharma (PI), S. Sarkar, S. Velipasalar, J. Merickel, M. Rizzo.

7. co-PI, “ATD: Efficient and Stable Algorithms for Non-Euclidean Regression in Discrete Geometries”, National Science Foundation (NSF), October 2018-September 2021, \$225,000. (My share: 33%).

Team members: E. Weber (PI), F. Keinert.

6. co-PI, “CIF: Small: Structured High-dimensional Data Recovery from Phaseless Measurements”, National Science Foundation (NSF), July 2018-June 2021, \$499,071. (my share: 50%).

Team members: Namrata Vaswani (PI).

5. PI, “CAREER: Advances in Graph Learning and Inference”, National Science Foundation (NSF), February 2018-January 2023, \$420,000 (sole PI).

4. Co-PI, “Modeling Multi-dimensional Risk in Real-World Drivers with Diabetes”, Toyota Collaborative Safety Research Center (sub-award of grant given to University of Nebraska), \$198,664. (My share: 33%).

Team members: A. Sharma (PI), S. Sarkar, J. Merickel, M. Rizzo, A. Drinzic, C. DeSouza.

3. Co-PI, “Prediction of Driver Safety in Advancing Age: Real-World Recorders”, University of Nebraska Medical Center (sub-award of NIH grant), \$76,122. (My share: 10%).

Team members: A. Sharma (PI), S. Sarkar, J. Merickel, M. Rizzo, A. Drinzic, C. DeSouza.

2. Senior Personnel, “PFI: BIC: A Smart Service System for Traffic Incident Management Enabled by Large-data Innovations”, National Science Foundation (NSF), September 2016-August 2019, \$1,000,000. (My share: 5%).

Team members: A. Sharma (PI), S. Sarkar, U. Vaidya, A. Krishnamurthy.

1. PI, “CRII: CIF: Towards Linear-Time Computation of Structured Data Representations”, National Science Foundation (NSF), April 2016-March 2018, \$173,282 (sole PI).

Other funding

At NYU

7. PI, “Neocortex Allocation: Towards Deep Vision-Language Models for Ecological Monitoring”, National Science Foundation (NSF), August 2022, Research cloud credits.
6. PI, “XSEDE Startup: Semi-supervised learning for Ecological Monitoring”, National Science Foundation (NSF), June 2022, \$1500 (research cloud credits).
5. PI, “AWS Sagemaker Credits”, Amazon, February 2021, \$60,000 (educational cloud credits).
4. PI, “Unrestricted Gift”, Air Force Research Laboratory, December 2019, \$25,000.

At Iowa State

3. co-PI, “Learning under Adversarial Conditions with a focus on Self-Driving Car Applications”, Exploratory Research Program (ERP), Iowa State University, January 2019-July 2019, \$33,000 (CH share: 33%).

Team members: A. Sharma (PI), S. Sarkar.

2. PI, “Faculty Fellowship”, Black & Veatch Foundation, September 2017-May 2020, \$22,500.
 1. PI, “GPU Grant Program”, NVIDIA Corporation, August 2017 and August 2018, \$2,500 (equipment).
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Invited Presentations

Keynote/Plenary Talks

2. “Solving Partial Differential Equations via Conditional Generative Models”, NIH Workshop on Machine Learning and Multiscale Modeling, Bethesda MD, October 2019.
1. “Fast Algorithms for Learning Structured Dictionaries and Autoencoders”, Midwest Machine Learning Symposium, Chicago IL, June 2018.

Other Invited Talks

At NYU

56. “Sparsity for Free?”, SIP Seminar, November 2022.
55. “Sparsity for Free?”, ECE Department Seminar, UC San Diego, June 2022.
54. “Designing Neural Networks for Efficient Encrypted Inference”, ECE Colloquium, UC Riverside, May 2022.
53. “Inverse Imaging Using Langevin Dynamics”, ICASSP, May 2022.
52. “Designing Neural Networks for Efficient Encrypted Inference”, LIONS Seminar, Arizona State University, April 2022.
51. “Designing Neural Networks for Efficient Encrypted Inference”, Data Science Seminar, University of Utah, January 2022.
50. “The Benefits of Side Information in Structured Phase Retrieval”, EUSIPCO, January 2021.

49. “The Neural Tangent Kernel, and Application to Autoencoders”, INFORMS Conference, November 2020.
48. “Towards a Theoretical Understanding of Inverse Problems with Neural Priors”, Asilomar Conference, November 2020.
47. “Solving Inverse Problems Using Deep Generative Models”, Physics-Informed Learning Machines (PhILMS) Seminar, Brown University, July 2020.
46. “High Dynamic Range Imaging Using Deep Image Priors”, International Conference on Acoustics, Speech, and Signal Processing, May 2020.
45. “The Neural Tangent Kernel, and Application to Autoencoders”, Math and Deep Learning Seminar, Iowa State University (held online), April 2020.

At Iowa State

44. “Towards a Theoretical Understanding of Inverse Problems with Neural Priors”, University of Wisconsin, Madison WI, October 2019.
43. “Towards a Theoretical Understanding of Inverse Problems with Neural Priors”, Data Science Seminar, Iowa State University, October 2019.
42. “Tractable Dictionary Learning from Incomplete Samples”, Sampling Theory and Applications, Bordeaux, France, July 2019.
41. “Unsupervised Neural Network Learning via an Algorithmic Lens”, Department Seminar, New York University Tandon School of Engineering, New York NY, March 2019.
40. “On the Dynamics of Gradient Descent for Autoencoders”, Information Theory and Applications Workshop, San Diego CA, February 2019.
39. “Algorithmic Aspects of Inverse Problems using Generative Models”, Allerton Conference, Monticello IL, October 2018.
38. “Event Detection in Networks using Steiner Tree Methods”, NSF Workshop on Algorithms for Threat Detection, Washington DC, October 2018.
37. “Unsupervised Neural Network Learning from an Algorithmic Lens”, CS Department Seminar, University of Iowa, Iowa City IA, September 2018.
36. “Unsupervised Neural Network Learning from an Algorithmic Lens”, ECE Graduate Seminar, Carnegie Mellon University, Pittsburgh PA, September 2018.
35. “Provably Accurate Double-Sparse Coding”, Information Theory and Applications Workshop, San Diego CA, February 2018.
34. “The Curse of Dimensionality”, Big Data Seminar Series, Iowa State University, November 2017.
33. “Phase Retrieval: Challenges, Solutions, and Applications”, Department of Mathematics Seminar, Iowa State University, October 2017.
32. “Fast(er) Algorithms for Machine Learning in High Dimensions”, Department of Statistics Seminar, Iowa State University, September 2017.
31. “Fast Algorithms for Learning Latent Variables in Graphical Models”, ACM KDD Mining and Learning with Graphs Workshop (spotlight presentation), Halifax NS, August 2017.
30. “Fast(er) Algorithms for Machine Learning in High Dimensions”, The Alan Turing Institute, London UK, August 2017.

29. "Phase Retrieval with Structured Sparsity", International Linear Algebra Society (ILAS) Conference, Ames IA, July 2017.
28. "SVD-free Algorithms for Low-Rank Matrix Recovery", SIAM Conference on Optimization, Vancouver BC, Canada, May 2017.
27. "Stable Inversion of (Certain) Periodic Random Feature Maps", Information Theory and Applications Workshop, San Diego CA, February 2017.
26. "Iterative Thresholding for Demixing Structured Superpositions in High Dimensions", NIPS Workshop on Learning in High Dimensions, Barcelona, Spain, December 2016.
25. "A Fast Algorithm for Demixing Signals with Structured Sparsity", International Conference on Signal Processing and Communications, Bangalore, India, June 2016.
24. "Nearly Linear-Time Algorithms for Structured Sparsity", Information Theory and Applications Workshop, San Diego CA, February 2016.
23. "Learning Structured Sparse Representations Using Approximation", Joint Mathematics Society, Special Session on "Analysis, Geometry, and Data", Seattle WA, January 2016.
22. "Fast Algorithms for Structured Sparsity", EE Seminar, Indian Institute of Technology Bombay, Mumbai, India, October 2015.
21. "Fast Algorithms for Structured Sparsity", ECE Seminar, Indian Institute of Science, Bangalore, India, October 2015.
20. "Fast Algorithms for Structured Sparsity", Computer Science Colloquium, Iowa State University, Ames IA, September 2015.

Pre- Iowa State

19. "Nearly Linear-Time Algorithms for Structured Sparsity", International Symposium on Mathematical Programming (ISMP), Pittsburgh PA, July 2015.
18. "The Power of Structured Sparsity in Data Acquisition and Analysis", ECE Seminar, Ohio State University, Columbus OH, April 2015.
17. "The Power of Structured Sparsity in Data Acquisition and Analysis", ECpE Seminar, Iowa State University, Ames IA, March 2015.
16. "Structured Sparsity: Models, Algorithms, and Applications", ECE Seminar, University of Illinois, Chicago IL, March 2015.
15. "Structured Sparsity: Models, Algorithms, and Applications", EECS Seminar, Washington State University, Pullman WA, February 2015.
14. "Structured Sparsity: Models, Algorithms, and Applications", EECS Seminar, University of California, Irvine CA, February 2015.
13. "Nearly Linear-Time Algorithms for Structured Sparsity", ECE Seminar, Rice University, Houston TX, October 2014.
12. "Nearly Linear-Time Algorithms for Structured Sparsity", ECE Seminar, University of Massachusetts, Amherst MA, October 2014.
11. "Linear Dimensionality Reduction of Large-Scale Datasets", PED Seminar Series, MIT Lincoln Laboratory, Lexington MA, March 2014.
10. "Approximation Algorithms for Structured Sparse Recovery", INFORMS Optimization Society Conference, Houston TX, March 2014.

9. “Approximation-Tolerant Model-Based Compressive Sensing”, EIS Seminar, Carnegie Mellon University, Pittsburgh PA, November 2013.
8. “Approximation-Tolerant Model-Based Compressive Sensing”, CSIP Seminar, Georgia Institute of Technology, Atlanta GA, October 2013.
7. “Sparse Modeling Techniques for Geological Exploration”, Hunters Network Meeting, Massachusetts Institute of Technology, Cambridge MA, August 2013.
6. “A Convex Approach for Designing Good Linear Embeddings”, Workshop on Sparse Fourier Transform etc., Massachusetts Institute of Technology, Cambridge MA, February 2013.
5. “Geometric Models for Signal Acquisition and Processing”, University of Wisconsin, Madison WI, May 2012.
4. “Near-Isometric Linear Embeddings of Manifolds”, KECOM Workshop, The Ohio State University, Columbus OH, May 2012.
3. “A Geometric Approach for Compressive Sensing”, Shell Bellaire Technology Center, Houston TX, April 2012.
2. “Geometric Signal Models for Compressive Sensing”, Mitsubishi Electric Research Labs, Cambridge MA, June 2011.
1. “Random Projections for Manifold Learning”, IMA Workshop on Multi-Manifold Data Modeling, Minneapolis MN, October 2008.

Media Coverage

Press Releases

- “ARPA-E Funds 23 Projects to Accelerate the Energy Technology Design Process”, [Department of Energy Press Release](#), November 2019.
 - “Tandon researcher joins major collaboration aimed at using AI models to improve agriculture”, [NYU Tandon Press Release](#), July 2021.
 - “Department of Energy Invests \$2.8 Million for Novel Research in High-Performance Algorithms”, [Department of Energy Press Release](#), August 2021.
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Educational Innovation

At NYU

- **Deep Learning:** In Fall 2020, I revived the graduate course on Deep Learning in the CSE Department, with a fresh new curriculum (loosely following Y. LeCun’s syllabus in NYU Courant). My course materials are [freely available online](#). In Spring 2021, I offered a similar course in the ECE Department. In total, nearly 400 NYU students have taken this course in 3 semesters.
- **Introduction to Machine Learning:** In Spring 2020, I offered the graduate course on Introduction to Machine Learning in the ECE Department. I created a completely new set of course notes, and added new programming/lab exercises. My course materials are [freely available online](#). I co-taught a similar course along with F. Fund for the inaugural NYU Tandon Summer Scholars Program in Summer 2021. In total, nearly 300 NYU students have taken this course in 2 semesters.

- **Foundations of Deep Learning:** In Spring 2022, I offered a new special topics graduate course on theoretical aspects of deep learning, jointly listed in both the CSE and ECE departments. My course materials are [freely available online](#).
- **ESPI STEM program:** In Spring 2021 and 2022, I co-organized (along with Y. Dvorkin, S. Garg, G. Lioanno, and L. Righetti) a semester-long weekend course instructing middle school students enrolled in the Exam Schools Partnership Initiative (ESPI) City Smart Program on topics in Computer Science and Engineering.
- **K-12 education:** In Summer 2021 and 2022, I co-organized (along with S. Garg and L. Righetti) an introductory course on Machine Learning for high school students as part of the NYU Tandon Summer School program.
- **NYU Tandon Online:** In Fall 2021, I developed an online version of my graduate Deep Learning course for Tandon Online, to be offered as a pillar in the proposed Bring Your Own Masters (BYOM) program at NYU Tandon.
- **CS Bridge Program:** Since Fall 2020, I have been working with N. Memon to develop AI-based personalized recommendation systems for course content curation to be eventually integrated in the NYU Tandon CS Bridge Program.

At Iowa State

- **Data Science Undergraduate Programs.** I served on the Data Science Undergraduate Major/Minor Curriculum Committees, and helped shape the Data Science (DS) major and minor programs at Iowa State.
- **CPRE 310: Theoretical Foundations of Computer Engineering.** This is a core junior-level course in the computer engineering undergraduate curriculum. In Fall 2017, with support from the department, I initiated a new weekly recitation section which reaffirms the lecture material and exposes students to more hands-on problem solving with pen-and-paper.
- **EE/CPRE 529: Principles of Data Analytics.** In Fall 2015, I designed a new course focusing on foundational principles of massive data analysis, and applications of these principles to solve engineering challenges. I offered it first in Spring 2016 and annually henceforth until 2018. This course is now a staple in the ECpE department graduate curriculum.
- **Robustifying Machine Learning.** In Fall 2018, I designed and co-organized a short 6-week course on adversarial machine learning (outside of my regular teaching duties), which was attended by 5+ faculty and 20+ students at Iowa State who were interested in the area.

Classes Taught

At NYU

Note: Evaluations at NYU are expressed in a 5-point scale.

Spring 2023	ECE-GY 7123/CSE-GY 6953: Deep Learning (Enrolment: 200)	Course eval: - Instructor eval: -
Fall 2022	ECE-GY 7123/CSE-GY 6953: Deep Learning (Enrolment: 200)	Course eval: - Instructor eval: -
Spring 2022	CSE-GY 9223: Foundations of Deep Learning (Enrolment: 15)	Course eval: 4.8 Instructor eval: 5.0
Fall 2021	ECE-GY 7123/CSE-GY 6953: Deep Learning (Enrolment: 139)	Course eval: 4.8 Instructor eval: 4.9

Spring 2021	ECE-GY 9123: Deep Learning (Enrolment: 188)	Course eval: 4.7 Instructor eval: 4.7
Fall 2020	CS-GY 9223: Deep Learning (Enrolment: 66)	Course eval: 4.6 Instructor eval: 4.7
Summer 2020	ECE-GY 6143: Intro. to Machine Learning (Enrolment: 116)	Course eval: 4.7 Instructor eval: 4.6
Spring 2020	ECE-GY 6143: Intro. to Machine Learning (Enrolment: 156)	Course eval: 4.8 Instructor eval: 4.9

At Iowa State

Note: Evaluations at ISU were expressed in a 5-point scale, similar to NYU.

Spring 2019	CprE 310: Theoretical Foundations of Computer Eng. (Enrolment: 94)	Course eval: 4.6 Instructor eval: 4.4
Fall 2018	CprE 310: Theoretical Foundations of Computer Eng. (Enrolment: 127)	Course eval: 4.0 Instructor eval: 4.4
Spring 2018	EE 525X: Principles of Data Analytics for ECpE (Enrolment: 38)	Course eval: 4.5 Instructor eval: 4.8
Spring 2018	CprE 310: Theoretical Foundations of Computer Eng. (Enrolment: 86)	Course eval: 4.6 Instructor eval: 4.5
Fall 2017	CprE 310: Theoretical Foundations of Computer Eng. (Enrolment: 97)	Course eval: 4.4 Instructor eval: 4.3
Spring 2017	EE 525X: Principles of Data Analytics for ECpE (Enrolment: 23)	Course eval: 4.8 Instructor eval: 4.8
Fall 2016	CprE 310: Theoretical Foundations of Computer Eng. (Enrolment: 111)	Course eval: 4.0 Instructor eval: 4.4
Spring 2016	EE 525X: Principles of Data Analytics for ECpE (Enrolment: 25)	Course eval: 4.7 Instructor eval: 4.7
Fall 2015	EE 324: Signals and Systems II (Enrolment: 50)	Course eval: 4.6 Instructor eval: 4.8

Pre-ISU

Spring 2015	6.006: Introduction to Algorithms Instructor	MIT
Spring 2014	6.042: Mathematics for Computer Science Instructor	MIT
Summer 2010	Summer School on Image Analysis Teaching Assistant	Park City Mathematical Institute
2007-2011	ELEC 301, ELEC431, ELEC 531 Graduate Course Assistant	Rice University

Mentoring

Current Group

PhD students

Name: Ameya Joshi

Degree: Ph.D.

Department: ECE

Period: Aug 2018-present.

Name: Kelly Marshall

Degree: Ph.D.

Department: CSE

Period: Sept 2020-present.

Name: Aarshvi Gajjar

Degree: Ph.D.

Department: CSE (co-advisor: Christopher Musco)

Period: Sept 2021-present.

Name: Feyza Duman

Degree: Ph.D.

Department: ECE

Period: Sept 2021-present.

Name: Minh Pham

Degree: Ph.D.

Department: CSE

Period: Sept 2021-present.

Name: Govind Mittal

Degree: Ph.D.

Department: CSE (co-advisor: Nasir Memon)

Period: January 2022-present.

Name: Benjamin Feuer

Degree: Ph.D.

Department: CSE

Period: Sept 2022-present.

Name: Noelle Law

Degree: M.S.

Department: CSE

Period: Sept 2022-May 2023.

Alumni

At NYU

PhD students

Name: Daniel Cho

Degree: Ph.D.

Department: ECE

Period: December 2022. Samsung America

Name: Gauri Jagatap

Degree: Ph.D., ECE

Date of completion: December 2021

First position: Dolby AI.

Postdoctoral associates, NYU

Name: Pruthuvi Wijewardena

Department: CSE

Period: Nov 2021-June 2022.

MS students

Name: Prajwala Srivatsa

Degree: M.S., Computer Science

Date of completion: May 2021

First position: Nielsen Research.

Name: Sarah Pardo

Degree: M.S., Computer Science

Date of completion: May 2021

First position: RA in NYU Abu Dhabi.

Name: Michael Lally

Degree: M.S., Computer Science (co-advised with Farokh Atashzar)

Date of completion: August 2021

First position: Etsy.

Name: Benjamin Feuer

Degree: M.S., Computer Science

Date of completion: August 2022

First position: Ph.D. student in NYU CSE.

K-12 students

Sydney Feldman (GSTEM scholar, 2021)

Sofia Rodriguez (GSTEM scholar, 2021)

At Iowa State

PhD students

Name: Thanh Nguyen

Degree: Ph.D.

Date of completion: May 2020

First position: Research Scientist, Amazon.

Winner of Research Excellence Award at ISU.

Name: Pranamesh Chakraborty

Degree: Ph.D. (co-advised with Anuj Sharma)

Date of completion: July 2019

First position: Assistant Professor (Transportation Engineering), IIT Kanpur.

Name: Mohammadreza Soltani

Degree: Ph.D.

Date of completion: Feb 2019

First position: Postdoc, Duke University.

MS students

Name: Rishikumar Sureshkumar

Degree: M.S. (co-advised with Brian Gelder)

Date of completion: Oct 2019

First position: Collins Aerospace.

Name: Amitangshu Mukherjee

Degree: M.S. (co-advised with Soumik Sarkar)

Date of completion: Oct 2019
First position: Ph.D. student, Purdue University.

Name: Viraj Shah
Degree: M.S.
Date of completion: Oct 2019
First position: Ph.D. Student, U. Illinois Urbana Champaign.

Name: Souparni Agnihotri
Degree: M.S.
Date of completion: Oct 2019
First position: Cerner Corporation.

Name: Rahul Singh
Degree: M.S.
Date of completion: Feb 2019
First position: Wells Fargo.

Name: Manaswi Podduturi
Degree: M.S.
Date of completion: Feb 2018
First position: Kingland Analytics.

Name: Jayganesb Rajaraman
Degree: M.S.
Date of completion: May 2018
First position: Rockwell Automation.

Name: Shen Fu
Degree: M.S. (co-advised with Daji Qiao)
Date of completion: Dec 2017
First position: Ph.D. student, Iowa State.

Name: Charlie Hubbard
Degree: M.S.
Date of completion: Dec 2017
First position: Hy-Vee Data Science.

Undergraduate students, Iowa State

Omar Taylor (LSAMP Fellow, 2016-2019.)
Andrew Whitehead (McNair scholar, 2018-2019.)
Luke Schoeberle (Honors Study, 2019.)
Yazan Okasha (Independent study, 2017-2018.)
Souparni Agnihotri (Independent study, 2016-2017.)

Senior Design/Capstone Project Teams

At Iowa State

Blake Roberts, Colton Goode, Lee Fulbel, Nikolas Moeller, "Real Estate Portfolio Optimization", 2018.
Alex Mortimer, Carter Scheve, Sam Howard, "Asset Management and Financial Factor Discovery", 2018.
Jose Candelario, Bradlee Stiff, Yifan Liu, Sam Park, "FollowMe: A Guided Autonomous Vehicle", 2017.
Cameron Cornick, Ashlyn Freestone, Yiru Gao, Wen-Chi Hsu, Zachary Snyder, "A Voice for Autism", 2016.
Daniel Kim, Ryan Ostwinkle, Johnny Panicola, Matt Ruebbelke, "Traffic Control Warning Lights", 2016.
Dillon Einck, Paul Gerlich, and Brian Shannan, "Machine Learning for Retinopathy Detection", 2015-2016.

ISU Future Faculty Program

Ardhendu Tripathy, Fall 2017.
Davood Hajinezhad, Fall 2016.

University Service

Committees served

At NYU

2022-	Tandon Representative, NYU HPC Committee
2022-	CSE/ECE Representative, NYU Tandon HPC Committee
2021-	CSE Inclusion and Diversity Committee
2021-22	Faculty Search Committee, NYU AI Initiative
2021-22	Faculty Search Committee, CSE Department
2021-22	ECE Inclusion and Diversity Committee
2021	ECE Sophomore Mentorship Program
2020-22	CSE Dept Rep., NYU Tandon Graduate Curriculum and Standards Committee
2020-21	ECE Graduate Committee

At Iowa State

2018-19	ECSEL Mentor
2018	Panelist, VPR New Faculty Orientation
2016-19	ECE representative, College of Engineering Honors Committee
2016-2017	CoE representative, Data Science Minor Committee
2016-19	Member, ECpE Graduate Admissions Committee
2016-17	Junior member, ECpE Promotion and Tenure Review Committee
2016	Member, ABET Accreditation Subcommittee
2015-2016	Member, ECpE Faculty Search Committee
2015	Member, Senior Design Committee
2015-19	Participant, EE/CprE 294 (Program Discovery)
2015-19	Participant, EE/CprE 394 (Program Exploration)
2015-19	Participant, Take Your Professor to Lunch (TYPTL) Program

Pre- Iowa State

2008-2009	President, Indian Students at Rice (ISAR)
2009-2010	Representative, Graduate Students Association (GSA), Rice University
2008-2010	Graduate Mentor, ECE Department, Rice University

Academic Community Service

Conference/workshop organization

2022	Lead organizer, AAAI '22 workshop on Design and Manufacturing (ADAM)
2019	Organizer, Midwest Big Data Summer School
2018	Organizer, Midwest Big Data Summer School
2017	Organizer, Midwest Big Data Summer School

Affiliations

2018-	Senior Member, IEEE
2021-	Member, ACM
2020-21	Member, AAAI
2021	Member, European Association for Signal Processing (EURASIP)
2018-	Senior Member, IEEE Signal Processing Society
2019-	Senior Member, IEEE Information Theory Society
2012-2018	Member, IEEE
2013-2018	Member, IEEE Signal Processing Society
2007–2012	Student member, IEEE

Mentoring

2021	Mentor, Learning Theory for All (LeT-All)
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K-12 Outreach

2021	Instructor, ESPI NYC
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Officer Positions

2019	IEEE Central Iowa SP/CAS/COMM Societies Joint Chapter Chair
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Associate Editorships

2021-	Frontiers in Signal Processing
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Area Chair Positions

2023	International Conference on Learning Representations (ICLR)
2022	AAAI Conference on Artificial Intelligence (AAAI)
2021	AAAI Conference on Artificial Intelligence (AAAI)
2021	International Conference on Learning Representations (ICLR)
2020	International Conference on Machine Learning (ICML)
2020	Asilomar Conference (Machine Learning Track)

Conference Session Chair Positions

2019	IEEE GlobalSIP 2019
2017	IEEE GlobalSIP 2017
2017	Asilomar Conference on Signals, Systems, and Computers
2016	International Conference on Signal Processing and Communications (SPCOM)

Proposal Panels

2022	Swiss National Science Foundation (SNSF)
2019-22	National Science Foundation (NSF)
2017	Israeli Science Foundation (ISF)
2016	German-Israeli Foundation for Scientific Research and Development

Book Proposal Reviews

2020	Cambridge University Press
2019	McGraw Hill
2017	Society for Industrial and Applied Mathematics (SIAM)

Technical Program Committees

2023	ICLR Workshops Selection Committee
2022	International Conference on Signal Processing and Communications (SPCOM)
2022	Machine Learning and Systems (MLSys)
2022	Educational Advances in Artificial Intelligence (EAAI)
2022	ICLR Workshops Selection Committee
2021	Uncertainty in Artificial Intelligence (UAI)
2021	ICLR Workshops Selection Committee
2020	NeurIPS Workshops Selection Committee
2020	ICML Workshops Selection Committee
2020	Neural Information Processing Systems (NeurIPS)
2020	AAAI Conference on Artificial Intelligence (AAAI)
2020	International Conference on Signal Processing and Communications (SPCOM)
2019-now	IEEE Signal Processing Theory and Methods (Affiliate Member)
2019	International Joint Conferences on Artificial Intelligence (IJCAI)
2019	National Conference on Communication (NCC)
2019	AAAI Conference on Artificial Intelligence (AAAI)
2018	International Conference on Machine Learning (ICML)
2018	IEEE International Conference on Computational Photography (ICCP)
2018	International Conference on Signal Processing and Communications (SPCOM)
2016	International Conference on Artificial Intelligence and Statistics (AISTATS)
2016	International Conference on Signal Processing and Communications (SPCOM)
2015	International Joint Conferences on Artificial Intelligence (IJCAI) - ML Track
2013	IEEE GlobalSIP Symposium on New Sensing and Statistical Inference Methods

Reviewer

Artificial Intelligence
Artificial Intelligence and Statistics (AISTATS)
ACM-SIAM Symposium on Discrete Algorithms (SODA)
ACM Symposium on Principles of Distributed Computing (PODC)
ACM Computing Surveys
Applied Computational and Harmonic Analysis
Cambridge University Press
European Symposium on Algorithms (ESA)
EURASIP Journal on Advances in Signal Processing
IEEE Conference on Acoustics, Speech and Signal Processing (ICASSP)
IEEE Conference on Information Processing and Sensor Networks (IPSN)
IEEE Conference on International Transportation Systems (ITSC)
IEEE International Symposium on Information Theory (ISIT)
IEEE Journal on Selected Topics in Signal Processing
IEEE Open Journal on Signal Processing
IEEE Security and Privacy Magazine
IEEE Signal Processing Letters
IEEE Signal Processing Magazine
IEEE Transactions on Education
IEEE Transactions on Cyber-Physical Systems
IEEE Transactions on Geoscience and Remote Sensing
IEEE Transactions on Information Theory
IEEE Transactions on Image Processing
IEEE Transactions on Knowledge and Data Engineering
IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Robotics
IEEE Transactions on Signal Processing
IEEE Transactions on Systems, Man and Cybernetics
IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing
International Conference on Learning Representations (ICLR)
International Conference on Machine Learning (ICML)
International Journal on Applied Control and Signal Processing
Journal of Computational and Graphical Statistics
Journal of Optics
Mathematical Reviews
Neural Information Processing Systems (NeurIPS)
Neural Computation (NECO)
Pattern Recognition
PLOS One
Sampling Theory and Applications (SampTA)
SIAM Journal on Computing
SIAM Journal on Imaging Sciences
Signal Processing with Adaptive Sparse Structured Representations (SPARS)
Symposium on Theoretical Aspects of Computer Science (STACS)
Transactions on Machine Learning Research (TMLR)