

# Anand D. Sarwate

# Curriculum Vitæ

## CONTACT INFORMATION

Professor

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## RESEARCH INTERESTS

I am broadly interested in probability, statistics, and algorithms applied to problems in distributed systems, communications, and privacy and security.

## EDUCATION

1/06–7/08	<b>University of California, Berkeley</b> , (Berkeley, California USA) Ph.D., Electrical Engineering and Computer Sciences (awarded 12/2008) Designated Emphasis in Communication, Computation and Statistics Thesis: <i>Robust and adaptive communication under uncertain interference</i> Advisor: Professor Michael Gastpar
8/02–12/05	<b>University of California, Berkeley</b> , (Berkeley, California USA) M.S., Electrical Engineering and Computer Sciences (awarded 12/2005) Thesis : <i>Observation uncertainty in Gaussian sensor networks</i> Advisor: Professor Michael Gastpar
9/97–6/02	<b>Massachusetts Institute of Technology</b> , (Cambridge, Massachusetts USA) B.S., Electrical Science and Engineering (awarded 6/2002) B.S., Mathematics (awarded 6/2002) Minor in Music Minor in Theater Arts

## EMPLOYMENT

1/14–present	<b>Rutgers, The State University of New Jersey</b> , (Piscataway, New Jersey USA) <i>Professor (7/25–present), Associate Professor (7/20–6/25), Assistant Professor (1/14–6/20)</i>
10/11–12/13	<b>Toyota Technological Institute at Chicago</b> , (Chicago, Illinois USA) <i>Research Assistant Professor</i>
9/08–9/11	<b>University of California, San Diego</b> , (La Jolla, California USA) <i>Postdoctoral Researcher</i> Supervisors: Professors Alon Orlitsky, Tara Javidi, and Young-Han Kim

## AWARDS AND HONORS

Presidential Outstanding Faculty Scholar Award, 2025

IEEE Information Theory Society Distinguished Lecturer, 2024–2025  
Outstanding Engineering Professor, Rutgers School of Engineering, 2023  
Board of Trustees Research Fellowship for Scholarly Excellence, 2020  
A. Walter Tyson Assistant Professor Award, Rutgers School of Engineering, 2018  
NSF CAREER Award, 2015  
IEEE Senior Member  
NIPS Reviewer Award, 2013  
Demetri Angelakos Memorial Achievement Award, UC Berkeley Department of EECS, 2008  
Samuel Silver Memorial Scholarship Award, UC Berkeley Department of EECS, 2007  
National Defense Science and Engineering Graduate Fellowship, 2002–2005  
MIT : Laya and Jerome B. Wiesner Student Art Award, Joseph Everingham Award (Theater), Philip Lowe Memorial Award (Music)

## SELECTED PREPRINTS

*Preprints with published versions are omitted.*

- [1] Y. Wu, S. Wu, Y. Tao, Y. Li, and A. D. Sarwate. *Not only a helper, but also a teacher: Interactive LLM Cascade*. Tech. rep. arXiv:2509.22984 [cs.AI]. ArXiV, Sept. 2025. URL: <https://arxiv.org/abs/2509.22984>.
- [2] B. K. Dey, S. Jaggi, M. Langberg, A. D. Sarwate, and Y. Zhang. *Sliding Window Adversarial Channels*. Tech. rep. arXiv:2504.19773 [cs.IT]. ArXiV, Apr. 2025. URL: <https://arxiv.org/abs/2504.19773>.
- [3] N. Sathyavageeswaran, R. D. Yates, A. D. Sarwate, and N. Mandayam. *Timely Offloading in Mobile Edge Cloud Systems*. Tech. rep. arXiv:2405.07274 [eess.SY]. ArXiV, May 2024. URL: <https://arxiv.org/abs/2405.07274>.
- [4] E. Silk, S. Chakraborty, N. Dasgupta, A. D. Sarwate, A. Lumsdaine, and T. Chiang. *Minibatching Offers Improved Generalization Performance for Second Order Optimizers*. Tech. rep. arXiv:2307.11684 [cs.LG]. ArXiV, May 2023. DOI: [10.48550/arXiv.2307.11684](https://doi.org/10.48550/arXiv.2307.11684).
- [5] A. Engel, Z. Wang, A. D. Sarwate, S. Choudhury, and T. Chiang. *TorchNTK: A Library for Calculation of Neural Tangent Kernels of PyTorch Models*. Tech. rep. arXiv:2205.12372 [cs.LG]. ArXiV, May 2022. URL: <https://arxiv.org/abs/2205.12372>.
- [6] K. E. Nikolakakis, D. S. Kalogerias, and A. D. Sarwate. *Optimal Rates for Learning Hidden Tree Structures*. Tech. rep. arXiv:1909.09596v4 [stat.ML]. ArXiV, Mar. 2021. URL: <https://arxiv.org/abs/1909.09596>.

## JOURNAL AND ARCHIVAL CONFERENCE PAPERS

- [1] M. Vargas, R. Cannon, A. Engel, A. D. Sarwate, and T. Chiang. “Understanding generative AI output with embedding models”. In: *Science Advances* 11.48 (Nov. 2025).

- [2] Y. Wu, Y. Li, Z. Dong, N. Sathyavageeswaran, and A. D. Sarwate. “Learning to Help in Multi-Class Settings”. In: *The Thirteenth International Conference on Learning Representations (ICLR 2025)*. Apr. 2025. URL: <https://openreview.net/forum?id=NCgTbt2j1F>.
- [3] S. Banerjee, T. Marrinan, R. Cannon, T. Chiang, and A. D. Sarwate. “Measuring training variability from stochastic optimization using robust nonparametric testing”. In: *IEEE Journal of Selected Topics in Signal Processing* (2025), pp. 1–16. doi: [10.1109/JSTSP.2025.3583140](https://doi.org/10.1109/JSTSP.2025.3583140).
- [4] K. Rootes-Murdy, S. Panta, R. Kelly, J. Romero, Y. Quidé, M. J. Cairns, C. Loughland, V. J. Carr, S. V. Catts, A. Jablensky, M. J. Green, F. Henskens, D. Kiltchewskij, P. T. Michie, B. Mowry, C. Pantelis, P. E. Rasser, W. R. Reay, U. Schall, R. J. Scott, O. J. Watkeys, G. Roberts, P. B. Mitchell, J. M. Fullerton, B. J. Overs, M. Kikuchi, R. Hashimoto, J. Matsumoto, M. Fukunaga, P. S. Sachdev, H. Brodaty, W. Wen, J. Jiang, N. Fani, T. D. Ely, A. Lorio, J. S. Stevens, K. Ressler, T. Jovanovic, S. J. van Rooij, L. M. Federmann, C. Jockwitz, A. Teumer, A. J. Forstner, S. Caspers, S. Cichon, S. M. Plis, A. D. Sarwate, and V. D. Calhoun. “Cortical similarities in psychiatric and mood disorders identified in federated VBM analysis via COINSTAC”. In: *Patterns* (May 2024), p. 100987. doi: [10.1016/j.patter.2024.100987](https://doi.org/10.1016/j.patter.2024.100987).
- [5] A. W. Engel, Z. Wang, N. Frank, I. Dumitriu, S. Choudhury, A. Sarwate, and T. Chiang. “Faithful and Efficient Explanations for Neural Networks via Neural Tangent Kernel Surrogate Models”. In: *The Twelfth International Conference on Learning Representations*. Vienna, Austria, May 2024. URL: <https://openreview.net/forum?id=yKksu38BpM>.
- [6] A. D. Sarwate, F. P. Calmon, O. Kosut, and L. Sankar. “An Information Theorist’s Tour of Differential Privacy”. In: *IEEE BITS the Information Theory Magazine* (to appear 2024). doi: [10.1109/MBITS.2025.3625155](https://doi.org/10.1109/MBITS.2025.3625155).
- [7] Z. Wang, A. Engel, A. Sarwate, I. Dumitriu, and T. Chiang. “Spectral Evolution and Invariance in Linear-width Neural Networks”. In: *Advances in Neural Information Processing Systems 36 (NeurIPS 2023)*. Curran Associates, Inc., Dec. 2023. URL: <https://openreview.net/forum?id=gpqBGyKeKH>.
- [8] S. Costanza-Chock, K. Rose (editor), K. Henne, S. Mhlambi, and A. Sarwate. “Critical AI and Design Justice: An Interview with Sasha Costanza-Chock”. In: *Critical AI* 1–2.1 (Oct. 2023). doi: [10.1215/2834703X-10734036](https://doi.org/10.1215/2834703X-10734036).
- [9] B. Taki, A. D. Sarwate, and W. U. Bajwa. “Structured Low-Rank Tensor Models for Logistic Regression”. In: *Transactions on Machine Learning Research* (Aug. 2023). URL: <https://openreview.net/forum?id=qUxBs3Ln41>.
- [10] D. Martin, S. Basodi, S. Panta, K. Rootes-Murdy, P. Prae, A. D. Sarwate, R. Kelly, J. Romero, B. T. Baker, H. Gazula, J. Bockholt, J. A. Turner, N. B. Esper, A. R. Franco, S. Plis, and V. D. Calhoun. “Enhancing collaborative neuroimaging research: introducing COINSTAC Vaults for federated analysis and reproducibility”. In: *Frontiers in Neuroinformatics* 17 (June 2023). doi: [10.3389/fninf.2023.1207721](https://doi.org/10.3389/fninf.2023.1207721).
- [11] N. Tasnim, J. Mohammadi, A. D. Sarwate, and H. Imtiaz. “Approximating Functions with Approximate Privacy for Applications in Signal Estimation and Learning”. In: *Entropy* 25.5 (May 2023), p. 825. doi: [10.3390/e25050825](https://doi.org/10.3390/e25050825).
- [12] R. Islam, K. N. Keya, S. Pan, A. D. Sarwate, and J. R. Foulds. “Differential Fairness: An Intersectional Framework for Fair AI”. In: *Entropy* 25.4 (Apr. 2023). ISSN: 1099-4300. doi: [10.3390/e25040660](https://doi.org/10.3390/e25040660).

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- [18] F. Cangialosi, N. Agarwal, V. Arun, J. Jiang, S. Narayana, A. Sarwate, and R. Netravali. “Privid: Practical, Privacy-Preserving Video Analytics Queries”. In: *Proceedings of the 19th USENIX Symposium on Networked Systems Design and Implementation (NSDI ’22)*. Apr. 2022. URL: <https://www.usenix.org/conference/nsdi22/presentation/cangialosi>.
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- [27] D. M. Bittner, A. E. Brito, M. Ghassemi, S. Rane, A. D. Sarwate, and R. N. Wright. “Understanding Privacy-Utility Tradeoffs Using Differentially Private Online Active Learning”. In: *Journal of Privacy and Confidentiality* 10.2 (June 2020). doi: [10.29012/jpc.720](https://doi.org/10.29012/jpc.720).
- [28] M. Ghassemi, Z. Shakeri, A. D. Sarwate, and W. U. Bajwa. “Learning Mixtures of Separable Dictionaries for Tensor Data: Analysis and Algorithms”. In: *IEEE Transactions on Signal Processing* 68.1 (Jan. 2020), pp. 33–48. doi: [10.1109/TSP.2019.2952046](https://doi.org/10.1109/TSP.2019.2952046).
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## THESES

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## RESEARCH SUPPORT

NSF	TIP-2509233 : \$200,000, 8/15/2025–7/31/2027 <b>Planning: AI Ready: STAIRWAI to COSMOS: Sensor-enabled Testbed for Advancing Innovative Research in Wireless+AI</b> PI: Anand D. Sarwate, Co-PIs: Yingying Chen, Jorge Ortiz, Ivan Sekar, Bo Yuan This is a planning grant for a center on Wireless + AI.
PNNL	PNNL-642052 : \$70,000, 9/1/2022–6/30/2024 <b>Statistical Interference Generates Knowledge for Artificial Learners (SIGNAL)</b> PI: Anand D. Sarwate This project uses statistical techniques to understand the variability of training ML/AI models.
NSF	CNS-2148104 : \$1,000,000, 5/1/2022–4/30/2025 <b>RINGS: REALTIME: Resilient Edge-cloud Autonomous Learning with Timely Inferences</b> PI: Anand D. Sarwate, Co-PIs: Dipankar Raychaudhuri, Waheed Bajwa, Roy D. Yates This project studies how to design real-time operation, online decision-making, and offline training of real-time ML-based applications that are resilient to data, application, user, and system changes.
NIH	2R01DA040487 : \$623,113, 9/30/2020–6/30/2025 <b>COINSTAC 2.0: Decentralized, Scalable Analysis of Loosely Coupled Data</b> PI: Vince Calhoun (Georgia State), subcontract to Rutgers (PI: Anand D. Sarwate) This is a continuation of the COINSTAC project (see below) to develop a system for automated and privacy-sensitive statistical analyses of data from neuroimaging researchers studying the same condition at different sites.
NSF	CCF-1910110 : \$499,976, 10/1/2019–9/30/2022 <b>CIF: Small: ESTRELLA: Exploiting Structure in Tensors for Representation, Estimation, and Limits of Learning Algorithms</b> PI: Anand D. Sarwate, Co-PI: Waheed Bajwa This project pursues a comprehensive theory to simplify the measurement, storage, and statistical modeling of tensor-structured data.
NSF	CCF-1909468: \$250,000, 10/1/2019–9/30/2022 <b>CIF: Small: Collaborative Research: Between Shannon and Hamming</b> PI: Anand D. Sarwate, Co-PI: Michael Langberg (U. Buffalo) This proposal studies fundamental coding strategies communication over channels in which the interference lies between the average and worst-case models.
NSF	SaTC-1617849: \$500,000.00, 9/1/2016–8/31/2020 <b>TWC: Small: PERMIT: Privacy-Enabled Resource Management for IoT Networks</b> PI: Anand D. Sarwate, Co-PI: Narayan Mandayam

	This proposal studies how privacy, utility, and bandwidth affect each other in networked data collection and information processing systems.
Verisign	<p>Gift: \$25,000, 11/2015</p> <p><b>Differential Privacy, Multi-target Search, and Anomaly Detection</b></p> <p>PIs: Rebecca Wright, Anand D. Sarwate Gift through DIMACS Center to work on applied and theoretical privacy.</p>
DHS	<p>Subcontract from CICCADA: \$125,000, 10/1/2015–6/30/2016</p> <p>PIs: Rebecca Wright, Anand D. Sarwate</p> <p><b>DPAD: Differentially Private Anomaly Detection</b></p> <p>This work seeks to understand how and when we can safely detect anomalies in private data.</p>
NSF	<p>CCF-1525276: \$160,000.00, 9/1/2015–8/31/2017</p> <p><b>CIF: Small: Active data screening for efficient feature learning</b></p> <p>PI: Waheed Bajwa, Co-PI: Anand D. Sarwate</p> <p>This proposal develops methods for screening samples to use for dictionary learning algorithms to balance representation accuracy and computational efficiency.</p>
NIH	<p>1R01DA040487-01A1: \$692,575, 07/01/2015–04/30/2020</p> <p><b>COINSTAC: Decentralized, Scalable Analysis of Loosely Coupled Data</b></p> <p>PI: Vince Calhoun (Georgia State), subcontract to Rutgers (PI: Anand D. Sarwate)</p> <p>This proposal is to develop a system for automated and privacy-sensitive statistical analyses of data from neuroimaging researchers studying the same condition at different sites.</p>
NSF	<p>CCF-1453432: \$540,000.00, 7/1/2015–6/30/2020</p> <p><b>CAREER: Privacy-preserving learning for distributed data</b></p> <p>PI: Anand D. Sarwate</p> <p>This proposal develops key design principles for making practical privacy-preserving distributed learning algorithms and validate them in collaboration with neuroimaging researchers. The results will identify new challenges for information processing and machine learning in general distributed systems.</p>
DARPA/Navy	<p>N66001-15-C-4070: \$1,013.723, 3/15/2015–3/14/2020</p> <p><b>Jana: Ensuring Secure, Private and Flexible Data Access</b></p> <p>PI: David Archer (Galois, Inc.), subcontract to Rutgers (PI: Rebecca Wright, co-PIs: Anand D. Sarwate, David Cash)</p> <p>This project is about building a secure database system that uses secure multiparty computing and privacy-preserving algorithms to hold and process queries on data held by multiple parties.</p>
ARL	<p>CTA on Robotics: \$125,526, 4/16/2014–4/15/2015</p> <p>Subaward from General Dynamics to Rutgers (PI: Waheed Bajwa, Co-PIs: Athina Petropulu, Anand Sarwate)</p> <p><b>Active Feature Learning and Classifier Training for Object Recognition</b></p> <p>This work was to develop active learning approaches for feature learning for object recognition in rich data such as video. Subaward from General Dynamics.</p>

NSF	CCF-1218331: \$208,426, 9/1/2012–4/30/2014 <b>CIF: Small: Collaborative Research: Inference by social sampling</b> PI: Tara Javidi (UCSD), Co-PI: Anand D. Sarwate This work investigates communication and networking paradigms that can enable a network of individual agents to collaboratively estimate distributions over high dimensional spaces, even when individual observations are severely limited in accuracy, space, or time.
AcademyHealth	EDM Forum: \$5,000, 11/2011 PI: Xiaoqian Jiang (UCSD), co-PIs: Anand D. Sarwate (TTI-Chicago), Lucila Ohno-Machado (UCSD) <b>Review of Technologies to Protect Patient Privacy When Sharing Data for Comparative Effectiveness Research</b> Commissioned paper for a systematic review of privacy-preserving methods for sharing data for medical research.

#### EDITORSHIPS

10/21–ongoing	Associate Editor, IEEE Transactions on Information Theory
1/20–ongoing	Consulting Associate Editor, IEEE Open Journal of Signal Processing (OJSP)
1/15–12/18	Associate Editor, IEEE Transactions on Signal and Information Processing over Networks

#### PROFESSIONAL SERVICE

2021–2026	Member, Board of Governors, IEEE Information Theory Society
2017–2022	Member, Machine Learning for Signal Processing Technical Committee, IEEE Signal Processing Society
1/15–1/19	Online Editor, IEEE Information Theory Society
01/14–12/14	Online Associate Editor, IEEE Information Theory Society
10/08–12/10	Member, Student Committee, IEEE Information Theory Society
2007–2009	Member, Ad Hoc Committee on Online Content and Services, IEEE Information Theory Society

#### CONFERENCE AND WORKSHOP ORGANIZATION

2024	Co-Organizer, DIMACS Workshop on Modeling Randomness in Neural Network Training
2024	Tutorials Co-Chair, 2024 IEEE International Workshop on Machine Learning for Signal Processing (MLSP 2024)
2023	Finance Chair, 2023 North American School of Information Theory (NASIT 2023)

2022	Online Platform Co-Chair, 2022 IEEE International Symposium on Information Theory (ISIT 2022)
2019	Technical Program Chair, 2019 North American School of Information Theory (NASIT 2019)
2019	Chair, Simons Center Workshop on Privacy and the Science of Data Analysis, Simons Institute for Theoretical Computer Science
2018	Co-Organizer, Algorithmic Challenges for Protecting Privacy for Biomedical Data, Institute for Pure and Applied Mathematics (IPAM)
2016	Co-Organizer, Program on the Nexus of Information and Computation Theories: Secrecy and Privacy, Institute Henri Poincaré

#### PROGRAM COMMITTEES (LAST 5 YEARS)

2024	Technical Program Committee, 2024 IEEE International Symposium on Information Theory (ISIT 2024)
2023	Technical Program Committee, 2023 IEEE International Symposium on Information Theory (ISIT 2023)
2022	Technical Program Committee, Workshop on the Theory and Practice of Differential Privacy (TPDP 2022)
2022	Technical Program Committee, 2022 IEEE International Symposium on Information Theory (ISIT 2022)
2022	Technical Program Committee, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2022)
2021	Technical Program Committee, 2021 IEEE International Symposium on Information Theory (ISIT 2021)
2021	Technical Program Committee, 2021 IEEE International Symposium on Information Theory (ISIT 2021)
2021	Technical Program Committee, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021)
2020	Technical Program Committee, Workshop on the Theory and Practice of Differential Privacy (TPDP 2020)
2020	Technical Program Committee, IEEE International Workshop on Machine Learning for Signal Processing (MLSP 2020)
2020	Technical Program Committee, NeurIPS 2020 Workshop on Privacy Preserving Machine Learning - PriML and PPML Joint Edition
2020	Technical Program Committee, ICLR 2020 Workshop on Trustworthy ML
2020	Senior Area Chair, Conference on Learning Theory (COLT 2020)

2020	Technical Program Committee, 2020 IEEE International Symposium on Information Theory (ISIT 2020)
2020	Technical Program Committee, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2020)

#### PEER REVIEWING

IEEE Transactions : Information Theory, Signal Processing, Automatic Control, Information Forensics and Security, Communications, Wireless Communications, Vehicular Technology, Computational Biology and Bioinformatics, Parallel and Distributed Systems, Smart Grid, Network Science and Engineering, Signal and Information Processing over Networks, Dependable and Secure Computing

IEEE Journal of Selected Areas in Information Theory, IEEE Journal of Selected Areas in Communication, IEEE Journal of Selected Topics in Signal Processing, IEEE Open Journal of Signal Processing, IEEE Signal Processing Magazine, IEEE Signal Processing Letters, IEEE Communications Letters,

Journal of Machine Learning Research (JMLR), Machine Learning

Journal of the American Statistical Association (JASA), Statistical Science, Mathematical Statistics and Learning

Journal of Privacy and Confidentiality

Bernoulli, Random Structures and Algorithms, Queueing Systems : Theory and Applications

Problems of Information Transmission, Entropy

IEEE/ACM Transactions on Networks, ACM Transactions on Sensor Networks, EURASIP Journal on Wireless Communications and Networking, IEEE Open Journal of Signal Processing

SIAM Journal on Matrix Analysis and Applications (SIMAX)

AMS Mathematical Reviews

*Conferences* : ISIT (2007–2024), ITW (2008, 2010, 2013–2022), ICASSP (2024), MLSP (2023), EUSIPCO (2018), SPAWC (2018), GlobalSIP (2015–2017), CAMSAP (2017), DSLW (2022), Asilomar (2024) COLT (2011, 2012, 2020), STOC (2010), SODA (2015), NIPS (2012–2016), ICML (2012–2016), AISTATS (2012, 2013, 2017–2019), TPDP (2024, 2018, 2020), ICC (2012), Infocom (2012), Globecom (2007, 2009), WiOpt (2015), DCOSS (2015), PIMRC (2007) CDC (2009, 2012), ACC (2013, 2024), ACM Richard Tapia Celebration of Diversity in Computing Poster Track (2019),

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