

Vinod Raman

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<https://vinodkraman.github.io>

Education

University of Michigan

PhD Statistics

Thesis Advisor: Ambuj Tewari

Research Areas: Inference-time Scaling, Alignment, Privacy, Synthetic Data, Foundations of ML

Ann Arbor, MI

2021 - 2026

University of Michigan

BSE Computer Science, BSE Chemical Engineering

Thesis Advisors: Mahdi Cheraghchi, Sindhu Kutty, Andrej Lenert

Research Areas: Submodular Optimization, Bandits, Thermophotovoltaics

Ann Arbor, MI

2015 - 2020

Industry Experience

Google Research

Research Intern

Hosts: Matthew Joseph, Travis Dick, Umar Syed

New York City, NY

June - Sep. 2025

- Designed new private algorithms for domain discovery, top- k selection, and submodular maximization over unbounded domains. Algorithms achieve state-of-the-art privacy-utility guarantees.
- Evaluated capabilities of flagship LLMs (ChatGPT, Gemini, etc.) to perform basic arithmetic tasks.
- Designed and implemented novel LLM-based synthetic text generation pipeline, leading to 30% improvements in MAUVE score. Used JAX to scale method to generate thousands of new examples.
- Work led to a paper to be submitted to ICLR 2026.

Apple

Research Intern

Host: Satyen Kale

New York City, NY

Feb. - June 2025

- Designed and implemented adaptive allocation strategy for Best-of- N alignment for batch LLM inference.
- Proposed efficient methods for sample-dependent mass estimation.
- Research resulted in papers to be submitted to ICLR 2026 and ALT 2026.

Apple

Research Intern

Host: Kunal Talwar

Cupertino, CA

May - Aug. 2024

- Developed new differentially private algorithms achieving state-of-the-art privacy-utility tradeoffs for adversarial bandits and dynamic regret minimization.
- Research published in two papers at ICML 2025.

Awards & Fellowships

- ALT Outstanding Paper Award, 2025
- Apple Scholars in AI/ML PhD Fellowship, 2025
- Outstanding First-Year Ph.D. Student, 2022
- NSF Graduate Research Fellowship, 2022

Technical Skills: Python, C++, Java; PyTorch, JAX, TensorFlow, HuggingFace

Publications

*denotes equal contribution

1. J. Li*, **V.Raman***, A. Tewari. Generation through the lens of learning theory.
Conference on Learning Theory (COLT), 2025
<https://arxiv.org/abs/2410.13714>
2. A. Raman*, **V.Raman***. Generation from Noisy Examples.
International Conference on Machine Learning (ICML), 2025
<https://arxiv.org/abs/2501.04179>
3. C. Peale*, **V.Raman***, O. Reingold*. Representative Language Generation.
International Conference on Machine Learning (ICML), 2025
<https://arxiv.org/abs/2505.21819>
4. H. Asi*, **V.Raman***, A. Saha*. Tracking the Best Expert Privately.
International Conference on Machine Learning (ICML), 2025
<https://arxiv.org/abs/2503.09889>
5. H. Asi*, **V.Raman***, K. Talwar*. Faster Rates for Private Adversarial Bandits.
International Conference on Machine Learning (ICML), 2025
<https://arxiv.org/abs/2505.21790>
6. **V.Raman***, U.Subedi*, A.Tewari. The Complexity of Sequential Prediction in Dynamical Systems.
Oral at *Conference on Learning for Dynamics and Control (L4DC)*, 2025.
<https://arxiv.org/abs/2402.06614>
7. **V.Raman***, U.Subedi*, A.Tewari. A Unified Theory of Supervised Online Learnability.
Outstanding Paper Award at *Conference on Algorithmic Learning Theory (ALT)*, 2025.
<https://arxiv.org/abs/2307.03816>
8. **V.Raman**, A.Tewari. A Characterization of Multioutput Learnability.
Journal of Machine Learning Research (JMLR), 2024.
<https://arxiv.org/abs/2301.02729>
9. **V.Raman**, A.Tewari. Online Classification with Predictions.
Conference on Neural Information Processing Systems (NeurIPS), 2024.
<https://arxiv.org/abs/2405.14066>
10. S.Hanneke*, **V.Raman***, A. Shaeiri*, U.Subedi*. Multiclass Transductive Online Learning.
Spotlight at *Conference on Neural Information Processing Systems (NeurIPS)*, 2024.
11. **V.Raman***, U.Subedi*, A.Tewari. Smoothed Online Classification can be Harder than Batch Classification.
Conference on Neural Information Processing Systems (NeurIPS), 2024.
<https://arxiv.org/pdf/2405.15424>
12. **V.Raman***, U.Subedi*, A. Raman, A.Tewari. Apple Tasting: Combinatorial Dimensions and Minimax Rates.
Conference on Learning Theory (COLT), 2024.
<https://arxiv.org/abs/2310.19064>
13. **V.Raman***, U.Subedi*, A.Tewari. Online Learning with Set-Valued Feedback.
Conference on Learning Theory (COLT), 2024.
<https://arxiv.org/abs/2306.06247>

14. **V.Raman***, U.Subedi*, A.Tewari. Online Infinite-Dimensional Regression: Learning Linear Operators. *Conference on Algorithmic Learning Theory (ALT)* 2024.
<https://arxiv.org/abs/2309.06548>
15. A.Raman, **V.Raman***, U.Subedi*, I.Mehalel*, A.Tewari. Multiclass Online Learnability under Bandit Feedback. *Conference on Algorithmic Learning Theory (ALT)* 2024.
<https://arxiv.org/abs/2308.04620>
16. **V.Raman***, U.Subedi*, A.Tewari. On Proper Learnability between Average- and Worst-case Robustness. *Conference on Neural Information Processing Systems (NeurIPS)* 2023.
<https://arxiv.org/abs/2211.05656>
17. **V.Raman***, U.Subedi*, A.Tewari. On the Learnability of Multilabel Ranking. **Spotlight** at *Conference on Neural Information Processing Systems (NeurIPS)* 2023.
<https://arxiv.org/abs/2304.03337>
18. S.Hanneke*, S.Moran*, **V.Raman***, U.Subedi*, A.Tewari. Multiclass Online Learning and Uniform Convergence. *Conference on Learning Theory (COLT)* 2023.
<https://arxiv.org/abs/2303.17716>
19. **V.Raman**, A.Tewari. Online Agnostic Multiclass Boosting. *Conference on Neural Information Processing Systems (NeurIPS)* 2022.
<https://arxiv.org/abs/2205.15113>
20. **V.Raman**, T.Burger, A.Lenert. Design of thermophotovoltaics for tolerance of parasitic absorption. *Optics Express*, 27(22):31757–31772, 2019.
<https://doi.org/10.1364/OE.27.031757>

Works In Submission

1. **V.Raman**, V.Feldman, S.Kale, K.Talwar, A.Tewari. Estimating the (Un)seen: Sample-dependent Mass Estimation.
In Submission, 2025
2. Y. Kalayci*, **V. Raman***, S. Dughmi. Pandora’s Box vs. Best-of- N for Inference-time Optimization.
In Submission, 2025
3. S. Xie, **V. Raman**, S. Zhou. Transductive and Learning-Augmented Online Regression.
In Submission, 2025
4. **V. Raman**, T. Dick, M. Joseph. Missing Mass for Differentially Private Domain Discovery.
In Submission, 2025
5. **V. Raman**, H. Asi, S. Kale. AdaBoN: Adaptive Best-of- N Alignment.
In Submission, 2025
<https://arxiv.org/abs/2505.12050>
6. S. Somerstep, **V. Raman***, U. Subedi*, Y. Sun. Learning to Choose or Choosing to Learn: Best-of- N vs. Supervised Fine-Tuning for Bit String Generation.
In Submission, 2025
<https://www.arxiv.org/abs/2505.17288>

Selected Talks

1. A Unified Theory of Supervised Online Learning. *ALT*, 2025.
2. Generation through the lens of learning theory. *Apple MLR Reading Group*, 2025.
3. Apple Tasting: Combinatorial Dimensions and Minimax Rates. *COLT*, 2024.
4. Trichotomies in Online Learnability. *Apple MLR Reading Group*, 2024
5. Multiclass Online Learnability under Bandit Feedback. *ALT*, 2024.
6. Multiclass Online Learning and Uniform Convergence. *University of Michigan EECS Theory Seminar*, 2024.
7. On Classification-Calibration of Gamma-Phi Losses. *COLT*, 2023.