Anakha Ganesh

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Massachusetts Institute of Technology **Cambridge, MA**

Masters of Engineering in Computer Science and Engineering (Concentration - Artificial Intelligence) *Anticipated August 2026*

Bachelor of Science in Mathematics (18) and Computer Science and Engineering (6-3), GPA: 4.8/5.0 *December 2025*

- **Relevant Coursework:** Deep Learning, Algorithms for Inference, Statistical Learning Theory, Computer Vision, Stochastic Processes, Advanced Complexity Theory, Distributed Computer Systems Engineering

RESEARCH EXPERIENCE

MIT Computer Science & Artificial Intelligence Laboratory, Graduate Researcher | MA **January 2026 - Present**

- Designing zeroth-order (gradient-free) optimization methods for objectives defined by black-box functions with noisy outputs.
- Built and open-sourced simulation environments to benchmark zeroth-order methods, characterize bias-variance tradeoff, and evaluate performance and convergence in policy parameter space.
- Leading the interface with industry clients to translate business requirements into constrained optimization formulations.

MIT Center for Brains, Minds, and Machines, Graduate Researcher | MA **September 2025 - Present**

- Investigating the effect of edge of stability on learning and training distribution dynamics (NeurIPS 2026 submission in progress).
- Built on open-source repository to define metrics to track curvature of loss landscape and performance of data distribution.
- Designed and implemented causal interventions to show that the constraint of the edge of stability selectively amplifies the learning of distinct parts of data distribution.
- Leveraging agentic tools (i.e. autoresearch) to systematically identify high-signal experiments and dynamically investigate them.

MIT Computer Science & Artificial Intelligence Laboratory, Undergraduate Researcher | MA **September 2024 - May 2025**

- Evaluated Sybil, a deep learning model for lung cancer prediction from CT scans, via designing experiments to test whether the model's predictive performance is driven by nodule detection or broader radiological features.
- Analyzed attention maps over segmented lung images to determine whether model attention localizes to regions predictive of future cancer occurrence, and tested statistical significance.

WORK EXPERIENCE

Walleye Capital, Quantic Team, Quantitative Researcher Intern | MA **June 2025 - August 2025**

- Developed and validated alpha factors using statistical analysis and cross-sectional regression on large-scale financial datasets.
- Engineered risk models for portfolio optimization, leveraging diffusion factor models to impute data for short time series.
- Designed stress tests across synthetic data distributions to evaluate covariance matrix estimation accuracy under data imputation.

Amazon, Software Development Engineer Intern | WA **June 2024 - August 2024**

- Reduced manual labor by 50% by automating drug tests lifecycle management for Amazon People Experience and Technology.
- Created database, API, event driven, and client notification architecture to scale with large numbers of concurrent requests.
- Utilized cloud technologies such as AWS DynamoDB, Cloud Development Kit, API Gateway and Javascript and Java languages.

Copenhagen Energy Trading, Trading Analyst Intern | Copenhagen, Denmark **June 2023 - August 2023**

- Lifted profit margins by developing an ML model to predict the value of power auction profiles for UK National Grid.
- Improved prediction accuracy by deploying an ML ensemble model which stacked statistical and classification ML models.

PUBLICATIONS

- Doré, H., Eisenberg, A.R., Junkins, E.N., Leventhal, G.E., **Ganesh, A**., Cordero, O.X., Paul, B.G., Valentine, D.L., O'Malley, M.A., & Wilbanks, E.G. "Targeted Hypermutation of Putative Antigen Sensors in Multicellular Bacteria." *Proc. Natl. Acad. Sci. U.S.A.* 121(9), 2024.
- Pérez Castro, S., Peredo, E.L., Mason, O.U., Vineis, J., Bowen, J.L., Mortazavi, B., **Ganesh, A.**, Ruff, S.E., Paul, B.G., Giblin, A.E., & Cardon, Z.G. "Diversity at Single Nucleotide to Pangenome Scales among Sulfur Cycling Bacteria in Salt Marshes." *Applied and Environmental Microbiology* 89(11), 2023.

TECHNICAL SKILLS

- *Languages:* Python, Javascript, Java, PostgreSQL
- *ML/Scientific Computing*: Pytorch, Numpy, Pandas, Pyomo, Gurobi, XGBoost, Matplotlib, Scipy, wandb
- *Infrastructure & Tools:* AWS (DynamoDB, CDK, API Gateway), Git, Claude Code, Linux, Golang, SSH (remote compute infra)
- *Spoken Languages:* English, Malayalam, Spanish

SELECTED AWARDS

- 2021 Regeneron International Science and Engineering Fair (ISEF), 4th place, Computational Bio & Bioinformatics