Akshay Manglik

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Education

2021–2025 B.A. in Computer Science and Economics, Columbia University
Minor in Mathematics
GPA: 4.01/4.33, Major GPA: 4.07/4.33
Courses: Machine Learning, High Performance Machine Learning, Artificial Intelligence, Natural Language Processing, Real Analysis, Algorithms, Probability Theory, Quantum Computing, Machine Learning & Causality, Linear Algebra, Data Structures, Game Theory and Political Theory

Research Experience

2023–2024 AlQuraishi Lab, Columbia University
• Adapted AlphaFold2 for single sequence protein structure prediction.
• Analyzed scaling laws for data composition, model size, and data size.

2022–2023 Schrauwen Lab, Columbia Irving Medical Center
• Conducted differential DNA methylation analysis using R to analyze epigenetic factors in epilepsy. Analyzed 750K+ DNA regions.
• Used de novo assembly packages to analyze long-read genomic sequences.

2022–Present Dynamic Perception & Memory Lab, Columbia
• Analyzed fMRI and language data to understand neural and semantic representations generated by the method of loci memory technique.
• 2nd author of preprint. Presented findings at OHBM 2023.

2019–2021 Quantitative Imaging and AI Lab, Stanford
• Developed first deep learning architecture for ocular melanoma diagnosis. Improved state-of-the-art accuracy by 11% using CNNs.

Industry Experience

2024 AI Engineering Intern, PayPal
• Developed NLP vector search system for regulatory compliance. PayPal intends to patent system.
• System projected to save $10M+/year through false positive reduction.

2023–2024 Research Intern, Johns Hopkins Applied Physics Lab
• Researched techniques to extract heart rate from drone video footage. Investigated architectures and data augmentations for robustness.
• Developed segmentation and labeling pipeline using pretrained vision transformers to augment supervised training of wound detection algorithms.

Teaching Experience

2024-Present	Incoming Course Assistant, Columbia University • Spring 2025 Course Assistant for "Neural Networks and Deep Learning" graduate-level topics course taught by Prof. Rich Zemel.
2021-2024	Assistant Debate Coach, The Harker School • Coached 20+ nationally-ranked students to debate core issues in politics, economics, and philosophy. Students have won major national championships. • Adjudicated 100+ debate rounds at national tournaments.
2021–2021	Debate Instructor, Victory Briefs Institute • Taught students argumentative concepts for 3-week remote debate camp. Developed curricula, and led advanced seminars on rhetorical theory.

Independent Research and Projects

1. **Test-Time Optimization Scaling Laws** (2024–Present)
   Course project supervised by Dr. Kaoutar El Maghraoui (IBM Research). Investigating scaling behavior of test-time search, sampling, and prompting methods, across model families, model sizes, training data levels, and types of reasoning, using "Observational Scaling Laws" framework for 5+ benchmarks. Developing metrics for cost-aware inference strategy selection.

2. **Belief State Space Models** (2024–Present)
   Independent collaboration with Alex Lamb & John Langford (Microsoft Research NYC). Extending "Belief State Transformers" bidirectional training objective to selective state space models, as evaluated on star graph problem.

3. **Evaluating the Robustness of Self-Adaptive Robust Attention (SARA)** (2024–Present)
   Analyzed SARA's ability to identify high-level visual features for text-focused captioning under adversarial perturbation; conducted the first assessment of SARA on image captioning tasks; studied data efficiency of SARA uptraining. Course project supervised by Krzysztof Choromanski, a co-author of the original SARA paper (DeepMind, Columbia University).

Publications and Posters

Publications	[1] Jiawen Huang, **Akshay Manglik**, Nick Dutra, Hannah Tarder-Stoll, Taylor Chamberlain, Robert Ajemian, Qiong Zhang, Kenneth A. Norman, and Christopher Baldassano. *Binding items to contexts through conjunctive neural representations with the Method of Loci.* bioRxiv Preprint, 2024. [2] **Akshay Manglik**. *On Bias: Moral Intuitions, Rationalizations, and Adversarial Disagreement.* Gadfly Magazine. 2022.
Posters	Organization for Human Brain Mapping Annual Meeting (Montreal, 2023) Cornell Norman Kretzmann Undergraduate Philosophy Conference (2024) Columbia Undergraduate Research Symposium (2022) Columbia Undergraduate CS & Data Science Research Fair (2022)

Technical Skills

Languages	Python, Java, C, Javascript, Typescript, Bash, SQL
ML/AI	PyTorch, TensorFlow, Keras, CUDA, Triton, Langchain, Huggingface, Pandas
Cloud & Web	GCP, AWS, Firebase, BigQuery, Docker, React.js, Flask

Honors and Awards

2021–Present	Dean's List (6 semesters), Columbia University
2024	Second Place, Columbia Healthcare Ventures Fast-Pitch Competition ($2000 prize)
2024	Ellison Scholars Shortlist
2022	Laidlaw Scholar (1 of 25 selected, provided over $8000 in funding)
2022	Data Science Institute Scholar (1 of 10 selected)
2021	National Merit Scholar
2021	National Debate Champion (NDCA Champion, TOC Semifinalist)
2021	Certificate of Special Congressional Recognition (climate change diplomacy policy work)
2020	Certificate of Special Congressional Recognition (homelessness policy work)