

VINAY SAMUEL

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EDUCATION

University of Maryland, College Park 2025 - 2026
Masters of Science in Computer Science GPA: 4.00

Carnegie Mellon University 2021 - 2025
Bachelor of Science in Statistics and Machine Learning

WORK EXPERIENCE

Scale AI San Francisco, CA
Machine Learning Research Intern May 2026 - Present

- Leading research on **self-improving deep research coding agents** for enterprise applications.
- Designing **unsupervised skill acquisition framework** where agents generate synthetic skills to guide environment exploration, then apply accumulated skills to incoming user tasks — enabling zero-shot generalization to novel enterprise coding problems
- Architecting **continual skill refinement** mechanism that allows agents to acquire and update skills during live user interactions, creating a self-improving loop without requiring supervised labels

RESEARCH EXPERIENCE

University of Maryland CLIP Group College Park, MD
Research Engineer, Advised by Prof. Mohit Iyyer Jan 2026 - May 2026

- Designed **REDIPO**, an offline **DPO** data construction pipeline to recover distributional diversity in post-trained LLMs while preserving alignment, achieving up to **134% improvement** in response diversity (NoveltyBench distinct-k) across 3 model families
- Engineered **marginal diversity scoring** via embedding-based cosine similarity and quality-bounded preference pair construction to isolate diversity signal from quality thereby preventing DPO from collapsing to quality-only optimization
- Fine-tuned **Qwen3-4B, OLMo-3-7B, and LLaMA-3.1-8B** with **LoRA** and **DPO**; improved **safety** (lowest HarmBench ASR on all models) while maintaining instruction-following quality (MTBench, IFEval)

Stanford NLP Group Palo Alto, CA
Research Scientist, Advised by Prof. Diyi Yang June 2024 - Feb 2025

- Built **Co-Gym**, an interactive platform for **human-AI collaboration** across travel planning, literature reviews, and data analysis - achieving **86% win rate in travel planning** vs. autonomous baselines
- Developed **production-ready Related-Works generation system** enabling dynamic interaction between researchers and LLM agents for automated literature synthesis

CMU LTI Pittsburgh, PA
Lead ML Research Scientist, Advised by Prof. Daphne Ippolito May 2024 - May 2025

- Engineered novel **control framework** for precise attribute control in LM generation (word count), achieving up to **58.54% improvement** in constraint satisfaction
- Scaled model training pipeline using **LoRA and full fine-tuning** of LLaMA-3-8B with **Accelerate, DDP, and DeepSpeed** - reducing training time by **60%**
- Curated **50k instruction-tuning dataset** for benchmarking controllable generation for model evaluation

Princeton NLP Group

Lead ML Research Scientist, Advised by Prof. Karthik Narasimhan

Princeton, NJ

Mar 2024 - Jan 2025

- Built the **PersonaGym evaluation platform** and PersonaScore metric for **LLM persona agent evaluation** - deployed by **30+ researchers** for model assessment
- Benchmarked **10 State-of-the-Art LLMs** across 200 personas with 10K evaluation questions, identifying key performance gaps
- Optimized **prompt engineering pipeline** reducing evaluation cost by **70%** while maintaining accuracy

SELECTED PUBLICATIONS

- **[LLM]** Vinay Samuel, Yapei Chang, Mohit Iyer. [Recovering Diversity Without Losing Alignment: A DPO Recipe for Post-Trained LLMs Under Review](#) [Paper]
- **[Agents]** Yijia Shao, Vinay Samuel, Yucheng Jiang, John Yang, Diyi Yang. [Collaborative Gym: A Framework for Enabling and Evaluating Human-Agent Collaboration](#). ICLR 2026 [Paper]
- **[LLM]** Vinay Samuel, Harshita Diddee, Yiming Zhang, Daphne Ippolito. [CIE: Controlling Language Model Text Generations Using Continuous Signals](#). EMNLP Main 2025 [Paper]
- **[Agent]** Vinay Samuel, Henry Peng Zou, Yue Zhou, ..., Ameet Deshpande, Karthik Narasimhan, Vishvak Murahari. [PersonaGym: Evaluating Persona Agents and LLMs](#). EMNLP Findings 2025 [Paper]
- **[LLM]** Vinay Samuel, Yue Zhou, Henry Peng Zou. [Towards Data Contamination Detection for Modern Large Language Models: Limitations, Inconsistencies, and Oracle Challenges](#). COLING 2025 [Paper]
- **[Evaluation]** Yiming Zhang, Harshita Diddee, ..., Vinay Samuel, Barry Wang, Daphne Ippolito. [NoveltyBench: Evaluating Language Models for Human-like Diversity](#). COLM 2025 [Paper]
- **[Multimodal LLM]** Henry Peng Zou, Vinay Samuel, Yue Zhou, Weizhi Zhang, Liancheng Fang, Zihe Song, Philip S. Yu, Cornelia Caragea. [ImplicitAVE: An Open-Source Dataset and Multimodal LLMs Benchmark for Implicit Attribute Value Extraction](#). ACL Findings 2024 [Paper]
- **[Data Generation]** Vinay Samuel, Houda Aynaou, ..., Aman Chadha. [Can LLMs Augment Low-Resource Reading Comprehension Datasets? Opportunities and Challenges](#). ACL SRW 2024 [Paper]

SKILLS

- **Research:** LLMs, Multimodal Learning, NLP, Agent, Semi-Supervised Learning, Retrieval Augmented Generation (RAG), Reinforcement Learning, Question Answering, LM Controllability, Evaluation, Fine-tuning, Model Parallelization, Data Preprocessing, Data Analysis, GPU, CPU, Self-Improvement
- **Languages and Platforms:** Python, PyTorch, R, LaTeX, MATLAB, Colab, Git, Bash, SQL, C++, Triton
- **Soft Skills:** Self-Motivated, Team-Spirited, Leadership, Critical Thinking, Collaborative, Analytical, Problem Solver, Strong Communicator

COURSES

- **LLM & Agent:** Large Language Models, AI Problem Solving and Representation
- **Machine Learning:** Introduction to Machine Learning, Convex Optimization, Introduction to Deep Learning
- **Natural Language Processing:** Advanced Natural Language Processing
- **Systems:** Systems for Machine Learning