Murtaza Nikzad

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Education

Davidson College Expected May 2027
Bachelor of Science in Computer Science; Minor in Neuroscience *Davidson, NC* Bonner Scholar — Alvarez Scholar
Coursework: NLP with Deep Learning — Catastrophic Forgetting in Neural Networks — Linear Algebra — Theory of Computation — Machine Reasoning — Bioinformatics

Skills

Programming Languages: Python, C++, JavaScript/TypeScript, SQL, Java, HTML/CSS
ML/AI: PyTorch, TensorFlow, CUDA, Reinforcement Learning, Computer Vision, Point Cloud Processing
Systems & Tools: Linux, Real-time Processing, WebSockets, REST APIs, Git, Docker, AWS, MongoDB, PostgreSQL

Publications

[1] "Forward versus Backward: Comparing Reasoning Objectives in Direct Preference Optimization" — **Murtaza Nikzad**, Raghuram Ramanujan — *arXiv, January 2026* — Paper
[2] "Transfer Learning with PointNet for Time Projection Chambers" — **M. Nikzad**, R. Doctor, M.P. Kuchera, R. Ramanujan, D. Bazin, Y. Ayyad — *Davidson Summer Research Symposium* — Poster

Research Experience

Machine Learning Research Intern May 2026 – June 2026
Horizon3.ai *San Francisco, CA*
- Built LLM agents for autonomous offensive security on the NodeZero platform: reinforcement learning, agent harnesses, and multi-turn tool use.

Undergraduate Researcher in Machine Learning May 2025 – May 2026
The Cleveland Clinic Foundation — PI: Stephen Jones *Cleveland, OH*
- Developed deep learning models predicting HIFU lesion outcomes with 85% accuracy across 100+ patients. Software informs neurosurgical treatment planning.
- Built web platform for quantitative tremor assessment in movement disorder patients, processing 100Hz accelerometer data with sub-200ms latency.
- Automated SOM seed selection for resting-state fMRI connectivity analysis. Reduced preprocessing time from 30 min to under 2 min per scan.

Independent Research Assistant August 2024 – Present
Davidson College — Advisor: R. Ramanujan *Davidson, NC*
- Designing self-play curricula for multi-turn, multi-tool agentic RL: a single model proposes and solves tasks, trained with GRPO on verifiable rewards. Extends [1].
- Implemented EWC and Active Sharpening for catastrophic forgetting; built Fisher Information Matrix from scratch.

PointNet Model Student Researcher May 2024 – August 2024
ALPhA Lab — Advisors: R. Ramanujan, M. Kuchera *Davidson, NC*
- Adapted PointNet for 3D point cloud classification of particle tracks in nuclear physics experiments. Achieved 89% accuracy and reduced pipeline processing time by 40%.

Work Experience

ML Engineer Intern July 2026 – Present
Frontline Education
- Working on GPU infrastructure, locally hosted agents, and inference cost optimization.

ML Engineer Intern July 2026 – Present
Forest Systems, Inc.
- Building AI-assisted testing infrastructure for financial software: LLM-generated synthetic test data and semantic assertion pipelines across Python and .NET services; document-extraction evaluation for private equity statements.

Projects

Gaudi June 2026
- 2D floor plan drafting with 3D extrusion and LLM furnishing. Planar-face-traversal room detection, CSG-free openings, generate-then-verify AI placement with a deterministic geometry validator. — Live — Demo — GitHub

Rover VLA — *HUD × YC RSI Hackathon* June 2026
- Fine-tuned SmolVLA to drive a rover to a person: MuJoCo sim demonstrations, Modal B200 training. 95% success on 20 held-out layouts, matching the scripted expert against a 0% random baseline. — Demo — GitHub

Artki — *Cal Hacks Chroma Prize* October 2025
- Built AI interior design platform using CLIP embeddings for taste learning and Claude-powered Three.js generation with ChromaDB vector search. — GitHub

Open Context — *HackHarvard Best AI Application* November 2024
- AI study platform with chat, OCR lecture transcription, and quiz generation over a Pinecone RAG pipeline. — Demo — GitHub