

TRISTAN THAKUR

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EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY, College of Computing

B.S. in Computer Science

- Faculty Honors, Dean's List, Concentration in AI, Modeling, & Simulation

Atlanta, Georgia

May 2026

GPA: 4.0/4.0

SKILLS

Programming: C++, Python, Java, C, R, SQL, x86 Assembly, Bash

Tools: Linux, Git, Docker, Kubernetes, ROS, AWS, NumPy, PyTorch, Conda, Jupyter, MySQL, Conan, Poetry, Slurm, GDB

Languages: English (native), French (intermediate), Spanish (intermediate), Russian (beginner)

EXPERIENCE

SHIELD AI

Washington, DC

Autonomy Engineer Intern

June 2025 - August 2025

- Designed and deployed a hierarchical path-planning framework in C++ for Group 5 fixed-wing UAS, producing kinematically flyable trajectories $3.47\times$ faster with a $+22$ pp success rate at a 2.0 s horizon.
- Developed a comprehensive stress-testing suite to rigorously evaluate the path-planning algorithm in randomized, high-complexity environments, uncovering multiple failure modes in multi-dimensional state space navigation.
- Built parallelized batch-testing infrastructure to filter noise from performance metrics and enable statistical benchmarking of planner variants; identified point of diminishing returns, reducing real-time planning latency by 0.5s.
- Diagnosed a critical production bug in sampling bounds that blocked exploration in complex obstacle fields, and rapidly implemented a dynamic bounding algorithm adopted by 70+ engineers across the autonomy stack.

GEORGIA TECH RESEARCH INSTITUTE

Atlanta, Georgia

Machine Learning Engineer Intern

May 2024 - December 2024

- Developed an AutoML pipeline in Python using an evolutionary Neural Architecture Search (NAS) algorithm to automate the construction of state-of-the-art airborne object detection models, parallelizing computationally intensive model evaluations across GPU nodes on an HPC cluster.
- Trained a Kolmogorov-Arnold Network as a surrogate evaluator to accurately predict model performance, eliminating 1100+ hours of training computation for candidate architectures on 11 terabytes of high-speed aerial images.
- Compressed VGG-16 into a lightweight student classifier using knowledge distillation for the DoD AARO's fielded 'Gremlin' autonomous ISR system, retaining comparable accuracy with just 0.1% of the original parameters.

GEORGIA TECH STUDENT FOUNDATION INVESTMENTS COMMITTEE

Atlanta, Georgia

Head of Quantitative Research

January 2023 - December 2025

- Directed quantitative research for a \$2M+ AUM university endowment fund, developing systematic trading models, signal frameworks, and portfolio optimization tools.
- Developed a Gaussian Hidden Markov Model for latent market regime detection, modeling volatility clustering and transition dynamics using unsupervised EM-based training and state probability inference.
- Implemented a Kalman Filter for real-time intraday beta estimation and dynamic hedge ratio calibration across equity exposures.

GEORGIA TECH VERTICALLY INTEGRATED PROJECTS

Atlanta, Georgia

Undergraduate Researcher

April 2023 - December 2024

- Led a Google & BMW-sponsored AI research team developing an evolutionary algorithm for generating high-performance image classification neural networks, surpassing CIFAR-10 benchmarks by 3.5%.
- Engineered network branching mechanisms for residual/skip connections that increased classification F1 scores by 12%.
- Improved generated models' collective performance by 9.5% by integrated custom vision transformer layer with patch embedding & multi-headed self-attention into the architectural primitive set.

PROJECTS

Cellular Automata-LLM Ecological Policy Simulation Framework

August 2025 - December 2025

- Developed a hybrid Cellular Automata-LLM simulation integrating spatial diffusion modeling with autonomous GPT agents that generate adaptive eradication policies.
- Designed a closed-loop, RL-inspired control system enabling agents to reason over ecosystem states, optimize interventions, and coordinate across simulated landscapes.

Learning UAV State Estimation in GPS-Denied Environments

January 2025 - April 2025

- Engineered an award-winning LSTM-based system for full 12-DOF UAV state estimation without GPS.
- Built a multi-modal pipeline fusing PCA-reduced ResNet embeddings from monocular images with IMU and motor thrust data.
- Augmented model with prior state context at decoding to reduce drift, achieving a \sim 60% reduction in state-MAE.