# Arjun Rao

(984) 255-5951 | arjun@utexas.edu | linkedin.com/in/rao-arjun | github.com/raorjun

## EDUCATION

**The University of Texas at Austin**  Expected Graduation: May 2029
*B.S. Computer Science, Robotics Honors Program*  *Austin, TX*

## EXPERIENCE

**Undergraduate Researcher – Freshman Research Initiative**  January 2026 – Present
*Living with Robots Lab (Justin Hart)*  *Austin, TX*
- Developing navigation framework for the Scavenger Hunt problem, utilizing spatial partitioning to decompose multi-floor environments into searchable chunks.
- Implemented a probabilistic search algorithm that generates confidence scores for target locations and executes optimal path traversal to maximize discovery efficiency

**Vehicle Modeling Engineer**  September 2025 – Present
*Longhorn Racing Electric*  *Austin, TX*
- Implementing controls and calculating vehicle dynamics for small-scale RC simulation car for model validation.
- Validating models through track-day testing and driver feedback, refining simulation accuracy, and ensuring alignment with real-world vehicle performance.

**Backend Engineering Intern – Texas Momentum**  February 2026 – May 2026
*Tape Sports*  *Austin, TX*
- Architecting high-performance Fastify backend for agentic video platform, utilizing LLMs to automate sports mixtape sequencing and highlight detection.
- Engineering containerized microservices with Docker to orchestrate asynchronous video processing pipelines and scalable object storage via Backblaze B2.

**Software Engineering Intern**  June 2025 – August 2025
*Kadd Systems*  *Charlotte, NC*
- Self-directed learning to architect a cost-efficient, event-driven data pipeline on Kubernetes using KEDA and NATS to automatically scale processing jobs from zero, significantly reducing infrastructure costs.
- Developed and containerized a Python ETL processor with Docker that consumes NATS jobs, transforms data with pandas, and writes optimized Parquet files to a MinIO S3 store.

## PROJECTS

**MIT CRE[AT]E Challenge** | *Flutter, Python, Flask, Gemini-VLM*  January 2026 – April 2026
- Implemented real-time navigation system for the visually impaired, using Flutter, and Gemini VLM backend
- Engineered context-aware localization that correlates camera feeds with web-scraped floor plans and GPS data.

**Bob Dynamics** | *Modelica, Go, Vue, Vitepress, Google OR-Tools*  February 2026 – Present
- Engineered vehicle dynamics suite using Modelica and Google OR-Tools to execute constraint-based optimization for vehicle characterization and design-of-experiment.
- Wrote documentation and metrics platform using Vue and Vitepress, providing access to DOE results and standardized vehicle performance data.

**Persistent Homology-Guided Image Compression** | *Python, Ripser*  February 2025 – Present
- Designed a lossy image compression framework that applies persistent homology from topological data analysis (TDA) to preserve structurally meaningful features while removing insignificant frequencies.
- Combined Fourier transforms with homology-based ranking of frequency components to improve noise robustness, and co-authored a prepublication arXiv paper presenting experimental comparisons against JPEG.

## TECHNICAL SKILLS & HONORS

**Languages:** Python, C/C++, Java, Kotlin, MATLAB, Modelica, JavaScript/TypeScript, Dart
**Frameworks:** React, Vue, Fastify, ROS2, Flutter, TensorFlow, PyTorch
**Cloud & Infrastructure:** Docker, Kubernetes, KEDA, NATS, Backblaze B2, S3, Redis, Linux/Unix
**AI & Robotics:** VLM Integration, Sensor Fusion, OpenCV, PDDL, Control Systems
**Honors:** Robotics Honors Program, MIT BWSI Autonomous Race Winner, Chicago Robotics Invitational Winner, *FIRST* Young Mentor Award