

SAPTAK DAS

🏠 Downingtown, PA 📞 (267) 652-1755 ✉️ saptak.das625@gmail.com 🇺🇸 U.S. Citizen
🌐 [linkedin.com/in/saptak-das1729](https://www.linkedin.com/in/saptak-das1729) 🐙 github.com/Saptak625 🌐 saptakdas.vercel.app

EDUCATION

Georgia Institute of Technology | Atlanta, Georgia

August 2024 – May 2027

Bachelor of Science in Aerospace Engineering | Dean's List | Sidney Goldin Scholarship | BSMS Honors Program GPA: 3.96/4.00

Relevant Coursework: Control System Analysis and Design, Spacecraft Flight Dynamics, Dynamics and Bifurcations, Aerodynamics

RELEVANT EXPERIENCE

Sandia National Laboratories

Albuquerque, New Mexico

R&D Intern – Hypersonic Guidance, Navigation, and Control

June 2025 – May 2026

- Investigated **multi-agent intercept dynamics** for hypersonic and extra-long-range surface-to-air missile applications
- Trained GNC **deep reinforcement learning** policies with **PyTorch Proximal Policy Optimization (PPO)** on **NVIDIA A100/H100 GPU HPC nodes** in an aerodynamics simulation environment, **raising multi-agent intercept success by 30%** over ProNav control

Georgia Tech Experimental Rocketry (GTXR)

Atlanta, Georgia

President

July 2025 – July 2026

- Optimized fin geometry and ignition delay for apogee via **ant-colony/genetic optimization** subject to 20+ flutter, stability, and manufacturing constraints in a custom 6-DOF RocketPy environment, evaluating **250,000+ designs** in four days on GT PACE HPC
- Modeled aerodynamics and rigid-body dynamics to characterize **inertial roll coupling** and set sustainer fin cant for intentional spin stabilization; flight data validated the strategy above and below the dangerous coupling frequency
- Generated **three-sigma recovery-dispersion regions** from **2000 Monte Carlo runs** to plan launch-day recovery logistics
- Led verification and validation (PDR, CDR, tolerance analysis, integration testing) and system-level trades for a **100-member** team; Mach 'N' Roll reached a club-record **31,850-ft apogee**

Avionics Engineer

August 2024 – May 2026

- Developed and validated a **quaternion strapdown attitude estimator** that determines in-flight rocket tilt and gates sustainer ignition; wrote bare-metal IMU/barometer/GPS drivers (SPI, I2C, UART, CAN, DMA, interrupts) for an **STM32** flight computer

Georgia Tech Ramblin' Rocketry – Guidance, Navigation, and Controls

Atlanta, Georgia

Control Systems Engineer

August 2024 – May 2025

- Derived linearized state-space models of a thrust-vane TVC rocket across **200+ flight trim points** for gain-scheduled control design; automated trim-point refinement and A/B-matrix generation, eliminating **100+ hours** of manual analysis
- Developed, tuned, and tested **LQR** controllers in closed-loop MATLAB simulation; implemented in C for **STM32** flight controller
- Prototyped **Extended Kalman Filter (EKF)** state estimation in simulation; developed a **QUEST** launch-pad attitude estimator

PROJECTS

DHC-2 Beaver Multi-Loop Autopilot | Simulink, MATLAB

June 2026

- Developed a **multi-loop Simulink autopilot** (speed, bank angle, sideslip suppression, altitude hold) with nested **PID** channels using anti-windup and saturation, and an **ILS glide-slope** controller holding a 2.5-degree descent
- Determined trim at 80 and 90 kts, evaluated step responses, and built a **quadruplex sensor-voting** algorithm with outlier detection and automated disconnects for hard-over, soft-over, and oscillatory failures

CHIMERA | Deep Reinforcement Learning, PyTorch

May 2026

- Built a **deep RL** agent that learned 4-player Cinch trick-taking card game via **multi-agent self-play** using **PPO with GAE** (actor-critic, residual MLP policy/value networks); **beat experienced human players** despite never playing humans during training

F1Tenth Autonomous Racing | Georgia Tech Dynamics and Control Systems Lab

August 2024 – May 2025

- Built a 1/10-scale racecar autonomy stack (ROS, 2D LiDAR, SLAM with loop closing, offline racing-line optimization, Adaptive Monte Carlo Localization, adaptive-lookahead pure pursuit) on NVIDIA Jetson Orin achieving **10+ successful time-trial laps**

RESEARCH & PUBLICATIONS

Modeling and Stability Analysis of Inertial Roll Coupling in Supersonic Sounding Rockets

June 2026

AIAA Aerospace Research Central – Published June 18, 2026

- Modeled inertial roll coupling with rigid-body dynamics, linear aerodynamic restoring moments, and coupled pitch–yaw equations; identified a **bounded roll-rate instability region** and benchmarked against classical formulations

Georgia Tech Nonlinear Computational Aeroelasticity Lab – Software Developer, NASA ULI IMOCAS

September 2024 – May 2026

- Validated atmospheric-boundary-layer simulations with **Mann and Dryden turbulence models** for urban rotorcraft trajectories

CEREAL, Georgia Tech – Undergraduate / Incoming Graduate Research Assistant

August 2026 – Present

- Developing real-time C++/CUDA **Lattice Boltzmann** rotorcraft simulation with in-loop control systems on A100 GPU cluster

SKILLS

Controls & GNC: LQR, PID, EKF, QUEST, attitude estimation, trim linearization, gain/phase margin, sensor voting, deep RL

Dynamics & Simulation: Simulink, MATLAB, RocketPy, rigid-body dynamics, Monte Carlo, genetic optimization, HPC (Slurm)

Programming: Python, C, C++, PyTorch, CUDA, ROS, Docker, Linux, Git, embedded C (SPI/I2C/UART/CAN, DMA, interrupts)