

Sai K. Machiraju

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Education

Georgia Institute of Technology | Atlanta, GA

Expected Graduation: Dec. 2025

Bachelor of Science in Electrical Engineering, GPA 4.00/4.00

Activities: ECE Research, Georgia Tech Competitive Robotics, Head of Marketing for Debate Club, Junior Business Analyst for Consult Your Community

Skills

Programming: C/C++, MATLAB, Python (Certified), C#, SQL (Certified), R, PHP, Java

Hardware: Microcontrollers (ARM, AVR), Raspberry Pi, FPGAs, Electrical Testing Equipment, Analog/Digital Electronics, PCB Design

Software: KiCad, SolidWorks (certified), Microsoft Office

Communication: Technical Documentation, Data Visualization, Presentations, Video Demos, Blogs (Personal Site: saimachi.dev)

Experience

Robotics & Intelligent Construction Automation Laboratory (RICAL) | Atlanta, GA

Apr. 2024 – Present

Embedded Systems Engineer Intern

- Design, implement, and evaluate motion tracking algorithms deployed on an ESP32 microcontroller as part of a commercial partnership between Georgia Tech and a construction technology firm
- Synthesize multiple Digital Signal Processing algorithms, including finite impulse response filters, Kalman filters, & particle filters to perform localization within 1 m accuracy
- Refactored a C codebase developed by a former PhD student to use modern C++ features, including object-oriented design and smart pointers

RoboNav | Georgia Tech Competitive Robotics

Sep. 2023 – May 2024

Electrical Engineer

- Designed and implemented power electronics and embedded systems for Georgia Tech's University Rover Challenge (URC) submission
- Fabricated science module PCB with microcontroller, Ethernet interface, I2C circuitry, and stepper motor drivers using the KiCad EDA suite
- Tuned closed-loop PID control system for brushless locomotion motors
- Nominated as electrical team lead at the end of my freshman year; did not accept due to time constraints

Relevant Coursework

Programming HW/SW Systems: Fundamentals of embedded development using the ARM Mbed platform through C/C++

Introduction to Digital Signal Processing: Sampling & aliasing; FIR & IIR filtering; MATLAB implementations of common filters

Electromagnetics: Applications of Maxwell's Equations; Transmission line behavior modeling; Polarization

Signals & Systems: Linear systems and signals; Fourier and Laplace transforms, convolutions, input-output responses, stability

Feedback Control Systems: Analysis and design of control systems; Graphical design techniques

Projects

Drone Flight Controller PCB

Sep. 2024

Design a PCB with an STM32 microcontroller, IMU, barometer, power supply, and motor interfaces for a UAV.

- Use KiCAD EDA tool to draw schematic and route PCB connections
- Follow PCB design best practices, including capacitive decoupling, establishment of a common ground plane, and minimization of electromagnetic interference from high-frequency lines (e.g., crystal oscillators)
- Schematic: <https://saimachi.dev/wp-content/uploads/2024/09/Drone-Controller-Schematic.pdf>

Mini Rover Challenge | Georgia Tech Competitive Robotics

Sep. 2023 – Jan. 2024

Implemented power electronics and control systems for a Bluetooth-controlled, four-wheeled rover with an arm, the training project for RoboNav.

- Led team of three electrical engineers to design Arduino-based robot controls that enabled greater dexterity than competitors
- Designed and tested control algorithm to convert joystick inputs to motor power outputs
- Oversaw integration of electrical and mechanical subsystems
- Authored Preliminary Design Review and Conceptual Design Review presentations to seek technical feedback from experienced peers