

# John R. Mitchell IV

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## Education

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### Georgia Institute of Technology | Atlanta, GA

Bachelor of Science in Electrical Engineering, GPA 4.0  
Concentrations: Circuit Technology, Signal Processing & AI

Fall 2022 – Present  
Expected Graduation: Fall 2025

### Georgia Gwinnett College | Lawrenceville, GA

Transfer student

Fall 2019 – Spring 2022

## Skills

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**Electrical Tools:** Common benchtop tools, Spectrum Analyzer, Network Analyzer, FieldFox Analyzer, Fine-pitch SMD soldering

**Shop Tools:** Woodworking power tools, Metalworking tools, Machine tools, FDM and SLA 3D printers

**Hardware:** STM32, TI TIVA, ESP32, AVR MCUs, CAN-FD, Ethernet, Niche audio ICs, X-Microwave, Minicircuits

**Software:** Kicad, LTSpice, STM32 HAL, ESP-IDF, Arduino, Bash, git, Linux systems, Fusion 360, Blender, Adobe Photoshop, Illustrator

**Languages:** Python, MATLAB, Embedded C, C++, VHDL, HTML/CSS

## Experience / Activities

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### Georgia Tech Research Institute (GTRI) | Sensors and Electromagnetic Applications Laboratory (SEAL)

Summer 2023

#### RF Systems Engineering Intern

- Wrote analysis scripts for RF phased array direction finding system to determine incident wave angle precision and accuracy.
- Contributed to the system design of an IRAD project, drawing schematics and working with technicians during assembly.
- Worked with X-Microwave and Minicircuits modules to build RF systems.
- Antenna and RF amplifier measurement with FieldFox and further analysis with custom MATLAB scripts.

### Georgia Tech Solar Racing

Fall 2022-Present

#### Electrical Team Member, Former Auxiliary Systems / Telemetry Team Lead

- Lead team and mentored recruits on Aux and Telemetry projects, taught PCB assembly/soldering fine packages down to 0.5mm QFN, circuit design, and programming TI Tiva and ESP32 microcontrollers.
- Develop hardware and software for high bandwidth network using CAN-FD/ethernet for fast polling sensors throughout the car.
- PCB layout and design in Kicad: GPIO for driver input; Sensor for positional and movement data; Telemetry for GPS, LTE, RF communications; Battery Management System; Battery current sensing and more.
- Circuit design: Low power LED headlights, battery pack current sense differential amplifier, I2C level shifting, general ESD input protection and EMI mitigation.

### The Hive Makerspace | Georgia Tech

Spring 2023-Spring 2024

#### Peer Instructor

- Provides guidance on soldering, circuit design, embedded systems, 3d printing, laser cutting, and machine shop use to visitors with varying skill levels.

### Undergraduate Research | Georgia Gwinnett College (GGC)

Spring 2022

#### Student Researcher

Individual research investigating novel method of improving surface quality of MSLA 3D printers.

- Conducted interdisciplinary project with Information Technology and Chemistry departments.
- Developed multiple algorithms and custom slicer software to apply z-axis dithering to randomize layer-line error.
- Wrote proposal for purchasing MSLA 3D printer for school and maintained printer in chemistry research lab setting.

### Sonic Doodle | Lilburn, GA

2017 – 2022

#### Founder / Designer

Custom built boutique guitars and effects pedals

- Designed boutique guitar and bass effects pedals. Analog distortions, wave shapers, and phasors; digital delays and chorus.
- Repaired and provided maintenance for guitar and bass pedals and amps. (Mechanical hardware, electronics, woodworking)

## Projects

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### Modular Synthesizer

2021 – Present

Building a modular music synthesizer from scratch.

- Custom digital XY wave table oscillator with 1 Volt/Octave input accurate to 2 cents over 8 octaves using AVR microcontroller.
- Custom all analog Low Frequency Oscillator (LFO), Voltage Controlled Amplifier (VCA), and Voltage Controlled Filter (VCF).
- Custom real-time 2<sup>nd</sup> order “Mass-Damper-Spring” simulation envelope generator module using STM32 microcontroller.
- Designed to Eurorack specifications, introducing limitations on physical size, maximum power, and control voltages.
- Further details and photographs of the project can be found on my website: [john4.net/projects](http://john4.net/projects)

## Relevant Coursework (Condensed)

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Completed Courses: Electromagnetics, Microelectronic Circuits, Intro to Digital Signal Processing, Digital Design Lab

Current Courses (Fall 2024): Antenna Design, Electromagnetics and Microwave Applications, Analog Electronics, Signals and Systems