John R. Mitchell IV

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Education

Georgia Institute of Technology | Atlanta, GA *Aug 2022 – Present*
Bachelor of Science in Electrical Engineering, GPA 3.92 *Expected Graduation: December 2025*
Concentrations: Circuit Technology, Telecommunications

Georgia Gwinnett College | Lawrenceville, GA *Aug 2019 – May 2022*
Transfer student

Skills

Electrical Tools: Spectrum Analyzer, Network Analyzer, FieldFox Analyzer, Logic Analyzer
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: Cadence Virtuoso, Kicad, LTSpice, Bash, Git, Fusion 360, Blender, Adobe Photoshop, Illustrator
Languages: Python, MATLAB, Embedded C, C++, VHDL, HTML/CSS

Experience / Activities

Texas Instruments | mmWave Radar Sensors *Summer 2025*
RF/Analog IC Design Intern

- Contributed to the design of 80 GHz automotive radar self-test monitoring system
- Designed and implemented a space-efficient, asymmetric RF combiner and splitter using a novel approach for impedance transformation, ensuring optimal matching and enhancing system performance
- Developed the signal path and decoder for a QPSK mixer carrier signal, using quick to implement analog and digital design techniques to remove carrier signal glitches

Georgia Tech Research Institute (GTRI) | Sensors and Electromagnetic Applications Laboratory (SEAL)
RF Systems Engineering Intern *Summer 2023*

- Wrote analysis scripts in MATLAB for RF phased array direction finding system to determine incident wave angle precision and accuracy.
- Contributed to the system design and later testing of an IRAD project, drawing schematics and working with technicians during assembly, and running comprehensive testing
- 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 *Sept 2022 – Present*
Electrical Team Member, Former Auxiliary Systems / Telemetry Team Lead

- Led 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.
- Developing system design for high bandwidth network using CAN-FD for fast polling sensors
- Currently support all electrical sub-teams as a cross-functional advisor, guiding resolution of complex circuit and system issues.
- PCB layout and design in Kicad: “GPIO board” for driver input; “Sensor board” for vehicle dynamics data; “Telemetry board” for GPS, LTE, RF communications; Battery Management System; Battery current sensing
- Circuit design problem solving for: Low power LED headlights, battery pack current sense differential amplifier, I2C level shifting, High/Low voltage isolation, improving general signal integrity, ESD input protection, and EMI mitigation and more.

The Hive Makerspace | Georgia Tech *Jan 2023 – May 2024*

Peer Instructor

- Provided guidance on soldering, circuit design, embedded systems, 3d printing, laser cutting, and machine shop use.

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 and mask layer-line quantization 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

Wireless Motion-Powered Vibration Sensor for Wind Turbines | ECE Senior Design *Aug 2024 – May 2025*

- RF communications lead, supported IMU data capture, high efficiency power conversion, and energy harvester construction
- Developed power-efficient method for wirelessly transmitting high polling rate IMU data over 30 meters
- Achieved approximately 3mW average power consumption for the device while transmitting

Snap Detector Group Project | ECE Digital Design Lab *Spring 2023*

Group project where we developed a finger "snap detector" on a Altera FPGA

- Developed a three-stage DSP solution using the ratio of two FIR filters and a state machine to reduce false positives caused by transient noises.
- Wrote Python scripts to simulate the DSP algorithm before implementing it in VHDL for hardware.
- Achieved reliable snap detection across varying volumes, even during direct speech into the microphone.

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 2nd order "Mass-Damper-Spring" simulation envelope generator module using STM32 microcontroller.
- Further details and photographs of the project can be found on my website: john4.net/projects

Relevant Coursework (Condensed)

Completed Courses: Analog Electronics, Analog VLSI – from Theory to Tapeout, Wireless Communications
Current Courses: Analog Integrated Circuits, Electromagnetic Applications, Intro to Automation & Robotics