

Ojas Mediratta

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EDUCATION

Georgia Institute of Technology Atlanta, GA
M.S. Robotics | Specialization in Artificial Intelligence, Perception, and Controls *Expected May 2027*
Coursework: *Artificial Intelligence, Machine Learning, Computer Vision, Deep Learning, Deep Reinforcement Learning, Linear and Nonlinear Control Systems*

Georgia Institute of Technology Atlanta, GA
B.S. Computer Engineering | Graduated with High Honors *May 2025*
Coursework: *Data Structures & Algorithms, Digital System Design, Circuit Analysis, Prototyping Intelligent Devices, Embedded Systems Design, Fundamentals of Machine Learning, Network Security, Cybersecurity*

EXPERIENCE

Graduate Research Assistant Aug 2024 – Present
Georgia Institute of Technology - Contextual Computing Group Atlanta, GA

- Conducted field robotics research in collaboration with Georgia Aquarium and the Wild Dolphin Project nonprofit, contributing to real-time dolphin communication research initiatives and enrichment for captive cetaceans.
- Engineered a custom bone-conduction headset for underwater use by researchers, enabling clear audio playback for real-time dolphin vocalization translation and two-way communication between researchers and dolphins.
- Developed and optimized tools for dolphin vocalization analysis using autocorrelation, waveform reconstruction, and spectrogram visualization in Python, enabling researchers to accurately mimic essential sounds for testing.

Graduate Teaching Assistant May 2025 – Present
Georgia Institute of Technology - College of Computing Atlanta, GA

- Served as a teaching assistant for *Mobile and Ubiquitous Computing* and *Prototyping Intelligent Devices*; graduate-level, project based courses on embedded systems, firmware development, and edge machine learning.
- Guided 6–8 student teams in developing mobile-based prototypes and custom microcontroller projects, providing mentorship on report authorship that contributed to higher project success rates and more polished deliverables.
- Hosted office hours and asynchronous feedback sessions, guiding students through technical and research hurdles.

PROJECTS

Cetacean Research AUV | *ESP32, Android, C++, Python, TensorFlow, DSP* Aug 2024 – Present

- Built an autonomous underwater vehicle (AUV) controlled by dolphin vocalizations, enabling responsive, hands-free operation. Successfully deployed in 15+ controlled pool trials and 4 open-water trials in the Atlantic Ocean.
- Programmed an Android app to enable real-time acoustic control of the AUV, using a DSP pipeline with autocorrelation dolphin click detection and Goertzel algorithms to detect tone patterns from hydrophone input.
- Designed and fabricated parts in Fusion, iterating rapidly for waterproofing and durability for field deployment.
- Engineered and fabricated custom PCBs for ESP32 and internal electronics, tightening integration of inner layout.
- Programmed multi-threaded ESP32 firmware with PID-based closed loop control, stabilizing a 4-DOF underactuated vehicle at depths up to 7 m.

Hand-Wired Mechanical Keyboard | *C++, Arduino, Fusion 360* Aug – Dec 2024

- Engineered a fully custom 55-key mechanical keyboard with hand-wired switch matrix, diodes, and enclosure; delivered a functional prototype from concept to finished hardware in 6 weeks.
- Programmed with custom QMK firmware in C, enabling multi-layer keymaps and OLED live status display.
- Validated hardware–firmware integration through continuity testing and debounce optimization, ensuring reliable key scanning and smooth user interaction through keys and a rotary encoder.

Smart Guitar Effects Processor | *C, C++, Arduino, Fusion 360, DSP* May – Aug 2024

- Built a guitar-mounted audio effects controller using C++ on the Teensy 4.1 for analog to DSP via ADC.
- Implemented 6 effects, including drive, chorus, octave, and reverb, mimicking real-world guitar pedals.
- Designed a physical UI with LCD, improving usability and enabling real-time effect switching for live performance.

SKILLS

Hardware & Protocols: Arduino, Raspberry Pi, ESP32, ARM, I2C, UART, SPI, Serial, USB, PWM
Software: C, C++, Java, MATLAB, Python, Pandas, Pytorch, TensorFlow, Android, Kotlin, ROS2
Developer Tools: VSCode, Arduino IDE, Android Studio, Fusion 360, KiCAD, Git, Docker
Lab Tools: Oscilloscope, Multimeter, Soldering, 3D Printing, CNC Mill, Laser Cutter, Logic Analyzer
Advanced Topics: Firmware Programming, Control Systems, Computer Networking, PCB Design, Embedded ML