

Arnav Gupta

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EDUCATION

University of Waterloo

Sept 2023 - Apr 2028

Honours BAsC in Mechatronics Engineering

TECHNICAL SKILLS

CAD & Simulation: SolidWorks (FEA), Ansys (CFD), Draftsight, AutoCAD, Blender

Hardware: ARM Cortex-M (STM32), ESP32, RS232, RS485, CAN, I2C, SPI, UART

Softwares & Languages: Altium, C, Python, MATLAB, Spotfire

EXPERIENCE

Hardware Engineer | Fourier Earth | Mountain View, CA

Jan 2026 - May 2026

- Spearheaded the R&D and build of an autonomous reverse osmosis (RO) system as part of a **PEM electrolysis** device
- validated RO for integration into commercial product by designing tests to define operating boundary of product including min/max supply pressure, operating duty cycle, and responsiveness to control logic
- Integrated multiple **4-20mA** sensors and variable speed motors around the RO and implemented HSM control logic in Python allowing full autonomous testing, guiding a decision on the viability of the subsystem
- Prototyped a custom sensor for detecting hydrogen in pure-oxygen environments, executing schematic design, component selection, and PCB layout in **Altium**, providing a cost-effective and internal alternative to OTS units

Firmware Developer | UW Orbital Student Design Team | Waterloo, ON

Sept 2025 - Present

- Implemented an **I2C** temperature sensor driver in **C** for the TI RM46 microcontroller, accessing register values containing the 11-bit two's complement temperature data for telemetry packets
- Developed a **FreeRTOS** thermal management system which services hardware interrupts from a temperature sensor with <1ms latency, utilizing software hysteresis to protect against premature safe-state signalling

 **Machine Designer** | Musashi Auto Parts | Arthur, ON

Sept 2024 - Dec 2024

- Redesigned 3 stations of a tie-rod assembly line in **SolidWorks**, developing a universal fixture utilizing springs for compliance and detent pins to accommodate variable part dimensions, reducing line changeover time by 5×
- Performed **FEA** stress and torque analysis of a deficient rotary pneumatic to configure a high-torque replacement, optimizing load distribution, resulting in a **15%** improvement in cycle time
- Drafted **30+** approved engineering drawings of parts, assemblies and weldments in **SolidWorks**, applying **DFMA** and **GD&T** principles to reduce manufacturing costs by 10% by optimizing tight tolerances on non-critical features
- Designed and implemented custom **EOAT** for FANUC robotic arms end-to-end, including **3D printing** prototypes in metal & ABS and validating grip force, resulting in \$500/unit savings as compared to commercial solutions

PROJECTS

Gesture Controlled Car | Bluetooth, C, ESP32

Jan 2025 - Feb 2025

- Designed a gesture sensing glove using flex resistive sensors and a 12-bit ADC to transmit bend angles via LoRaWAN and linearly map gestures to throttle commands
- Implemented closed-loop **PID** speed control using an ESP32 on brushless DC motors to maintain target velocity under varying loads with an TB6612FNG motor controller for **PWM** outputs

 **Autonomous Cup Stacking Robot** | C, 3D Printing

May 2024 - Aug 2024

- Engineered a cup stacking robot with an event-driven state-machine in **C**, that took inputs from ultrasonic, touch, and colour sensors to move a motor-driven claw along a two-axis gantry