Sayan Saha

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Education

University of Waterloo **Sep 2023 – Apr 2028**
Bachelor of Applied Science in Mechatronics Engineering *GPA: 89/100*

Experience

Systems Integration Engineering Intern **Sep 2025 – Dec 2025**
Heart Aerospace *Los Angeles, CA*

- Performed mechanical, electrical and software validation of the Heart X1 aircraft's flight actuator system
- Developed an actuator test bench with sensor telemetry, dynamic loading, and Python controls via Raspberry Pi
- Brought-up actuators by designing harnesses, tuning PID loops, and debugging CANopen/ModbusTCP controls
- Owned electrical/software work for 4 actuator vibration test campaigns, including data logging and fault analysis
- Led encoder-actuator integration by designing fixtures in SolidWorks and developing a calibration procedure
- Integrated a strain gauge with a Wheatstone bridge and amplifier, enabling actuator force readings via DAQ

Mechatronics Test Engineering Intern **Jan 2025 – Apr 2025**
ATS Corporation - Innovation Department *Cambridge, ON*

- Automated encoder edge-case testing using Python, C++, and Git, reducing test length from 16 hrs to 10 min
- Developed tests for root cause analysis of encoder accuracy errors using interferometry and magnetometry
- Performed load tests to determine payload ratings and safety factor specs for electromagnetic motion systems
- Analyzed wheel wear by testing different materials and motion profiles; isolated P-V value as the key factor
- Designed a 3D-printed jig using SolidWorks to validate wheel wear measurements, enabling 5 µm accuracy

Hardware Engineering Intern **May 2024 – Aug 2024**
DropLab *Toronto, ON*

- Designed a 3-layer STM32 breakout PCB for microfluidic pump and regulator control using Eagle PCB Design
- Implemented I2C, SPI, and UART protocols, enabling closed-loop pump control with pressure sensor feedback
- Assembled PCBs with SMT/THT soldering and tested signal integrity using a multimeter and oscilloscope
- Created drawings for medical devices using Solidworks and fabricated prototypes with FDM 3D printing
- Developed an environmental isolation chamber using Fusion 360, SLA 3D printing, and machining

Student Teams and Research

Team Captain | *SAE Aero Design Team* **May 2026 - Present**

- Leading all engineering and business functions for a team of 35 students to compete in SAE Aero Design
- Built a SIL simulation using MATLAB/Simulink to validate CV pipeline for precision landings using ArduPilot
- Designed full aircraft assemblies in SolidWorks with 50+ parts for CNC milling, laser cutting, and 3D printing
- Optimized airfoil lift/drag using XFLR5 and Ansys Fluent CFD; validated results through flight testing
- Analyzed wing loading with hand calculations to identify areas for reinforcement, minimizing deflections by 90%
- Fabricated a carbon fiber landing gear using wet layups and 3D-printed molds, reducing weight by 43%

Research Assistant | *Laboratory for Emerging Energy Research* **Jan 2025 - Present**

- Designed a lunar regolith blade mill for reduced gravity environments and tested it onboard a parabolic flight
- Developed magnetic separation techniques for regolith, improving yields from previous methods by over 30%
- Conducted regolith combustion experiments; analyzed reactants and products using x-ray diffraction

Skills

Mechanical: SolidWorks, Fusion 360, AutoCAD, Ansys, 3D printing, laser cutting, machining, composite layups
Hardware: Altium, Eagle, soldering, oscilloscope, multimeter, STM32, Arduino, Raspberry Pi
Software/Protocols: Python, C++, MATLAB, Simulink, Git, CANopen, Modbus TCP, I2C, SPI, UART