ANKIT AGGARWAL

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Robotic Systems Development (MRSD); GPA: 4.17/4.00 — May 2026
Current Coursework – Controls, Autonomy, Motion Planning, State Estimation, Manipulation

Manipal Institute of Technology, MAHE — Manipal, India
Bachelor of Technology (B.Tech) – Mechatronics; GPA: 9.50/10.00 — June 2024
Coursework – Mechatronic Design and Assembly, Systems Engineering, Manufacturing, Circuitry

SKILLS

Core Competencies: Control Systems, Embedded Systems, Mechatronic Design, Systems Engineering
Programming Languages: Python, MATLAB, Julia, C++, Embedded C/C
Technologies/Frameworks: ROS2, Gazebo, RViz, MoveIt, Simulink, Git, Docker, Microcontrollers
Software: SolidWorks CAD, Ansys Workbench, CATIA, Fusion 360, Simplify3D, MuJoCo, MS Office
Certifications*: Certified SolidWorks Professional* – Mechanical Design (Dassault Systèmes, 2021).

PROJECTS

Lunar ROADSTER – Capstone Project — *Prof. William "Red" Whittaker* **|** Sep 2024 – Present

- Building an Autonomous **Moon-working Mechatronic Rover** capable of finding exploration routes and grooming the lunar surface to develop traversable surface trails using an actuated bulldozing mechanism (Website)
- Addressing problems of Lunar Localization, Navigation, and Manipulation using ROS2, Sensor Fusion, and Docker. Solving trajectory optimization problems for regolith manipulation using interior point methods in C++.

QuadraCat – Generating Optimal Jumping Trajectories for Quadrupeds — Jan 2025 – Present

- Generating a full-body trajectory for a Unitree Quadruped for vertical jumping onto a ledge. Employing hybrid trajectory optimization using DIRCOL, Jump Maps, IPOPT, and tracking using time-variant LQR/convex MPC in Julia.

Coffee Barista – Motion Planning for a Franka Arm for Dexterous Pouring — Jan 2025 – Present

- Engineering a collision-free motion plan to pour precise ratios of ingredients based on the customer's coffee order. The system localizes the customer's cup, picks ingredients, and pours based on closed-loop PID in Python.

Design and Simulation of 3-RPS, 3-RRS, and 3-UPU Parallel Manipulators — Aug 2022 – Dec 2023

- Performed Kinematic and Dynamic Modelling of Parallel Robots using Screw Theory, implemented in Mathematica, for application in the Biomedical and Aerospace Industry. (Publication)

Smart Auto-Cleaning Cradle System — Mar 2023 – Oct 2023

- Engineered an IoT-based Smart Baby Cradle System employing various sensors, STM32 microcontroller, and Raspberry Pi networked using 2.4GHz WiFi to aid infant care. (Publication)

WORK EXPERIENCE

Continuum Robotics Laboratory, University of Toronto — Toronto, Canada
MITACS Globalink Research Intern — Jun 2023 – Aug 2023

- Fabricated a portable Tendon Driven Continuum Robot (TDCR) as part of the OpenCR Project. Created **custom BLDC actuators** and optimized tendon routes using Fusion 360 and TI Launchpad under *Prof. Jessica Burgner-Kahrs*.
- Built a fully-actuated segment TDCR-based manual endoscope using tension-based and mechanical logic elements to **create reliable control** by eliminating digital latency.

Mars Rover Manipal, MAHE — Manipal, India
Technical Head / Mechanical Design Engineer — Nov 2021 – Jul 2023

- Directed all technical workflows (end-to-end) of a team of 40 engineering undergraduates from 5 disciplines, involved in over 10 cross-functional research & development projects and 7 international competitions.
- Engineered a Mars Rover Prototype for extra-terrestrial exploration comprising an on-board 6-DOF Robotic Manipulator with **Inverse Kinematic Control, a Custom 40:1 Cycloidal 3D-printed Gearbox, and a novel 5-bar Suspension System** to compete in the **University Rover Challenge 2022/2023** (Ranked 1st in Asia).
- Managed inter-subsystem collaborations, hardware/software inter-dependencies, prototyping, and system integration, creating a competitive, cheap, and reliable robot.

ST Microelectronics — Noida, India
Application Engineer Intern, System Research and Applications (SRA) Department — Dec 2021 – Jan 2022

- Designed a 4-wheel drive Mecanum Robot, integrated into an STM BLE P2P and Mesh Network for **manual and autonomous control**. Initiated multiple new robotics projects in the SRA team.
- Interfaced and troubleshooted MEMS Sensors using HAL, LL, and Register-level drivers of the STM32 Microcontroller.