Aman Chulawala

PhD Candidate in Mechanical Engineering · Carnegie Mellon University

Pittsburgh, PA | +1 (412) 641-9293
aman.chulawala@gmail.com | farstryke21.github.io
github.com/FarStryke21 | linkedin.com/in/amanchulawala

> **Research Focus:** Robot Learning, Embodied Intelligence, Active Perception & Coverage Viewpoint Planning, 3D Computer Vision, and Sim-to-Real Robotic Systems.

EDUCATION

Carnegie Mellon University — PhD Candidate, Mechanical Engineering — Sep 2025 – Present
Computational Engineering and Robotics Lab (CERLAB) · Advisor: Prof. Kenji Shimada · PhD Qualifying Exams cleared Sep 2026 — Pittsburgh, PA

Carnegie Mellon University — MS, Mechanical Engineering (Research — Robotics & Controls) — Aug 2022 – May 2024
GPA: 4.0 / 4.0 · Thesis: Learning-Based Coverage Viewpoint Planning · Coursework: Robot Learning, 3D Vision, Planning, OCRL, Trustworthy AI — Pittsburgh, PA

University of Mumbai — BE, Mechanical Engineering — Aug 2018 – May 2022
GPA: 9.81 / 10.0 · Structural Head & Finance Lead, DJS Racing Formula Student — Mumbai, India

PUBLICATIONS

Potential Field-Based Continuous View Planning for Robotic Shape Reconstruction — IROS 2026
Abdulaziz Almusa, **Aman Manish Chulawala**, and Kenji Shimada
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Pittsburgh, PA, 2026.

RESEARCH EXPERIENCE

Graduate Research Assistant & PhD Candidate — Carnegie Mellon University (CERLAB) — Oct 2022 – Present
Advisor: Prof. Kenji Shimada · Full-time Researcher (Jun 2024 – Aug 2025), PhD Candidate (Sep 2025 – Present) — Pittsburgh, PA

- Conducting doctoral research in **robot learning and embodied intelligence**, bridging learned decision-making policies with 3D perception and physical hardware deployment.
- Pioneered the **CoverageEnv** suite of OpenAI Gym environments and trained a PPO-based viewpoint planning policy generalizing across unseen 3D objects, achieving **90% average surface coverage in 4 seconds** on the ABC dataset.
- Co-developed a **reprojection-based point-cloud registration quality metric** and surface inspection view-confidence score to verify alignment reliability before downstream execution.
- Engineered a kinematically redundant **UR5e robotic metrology & inspection pipeline** for additive-manufacturing post-processing, incorporating an OpenRAVE IKFast analytical solver and a **4 ms GPU-accelerated ray-casting kernel**.
- Built a cross-platform **WebXR teleoperation stack** (Android & Meta Quest) for remote velocity/pose manipulator control, and led a graduate team developing automated sealant delamination and crater defect inspection.

Undergraduate Researcher — University of Mumbai — 2020 – 2022
Advisors: Dr. K. N. Vijaya Kumar, Dr. Vinit Katira, Prof. Prasad Shirodkar, Dr. Frank Crasta — Mumbai, India

- Engineered a composite anti-intrusion plate (**Patent 379355-001**) and square frustum carbon-fiber impact attenuator (**Patent 381642-001**) for Formula Student vehicles, and developed fiducial-marker tracking for chassis torsional stiffness testing.
- Built a real-time respiratory monitoring and control system for a modular ventilation platform (Bachelor's thesis) and documented structural selection guidelines for carbon-fiber composites.

INDUSTRY EXPERIENCE

Robotic Systems Engineer (Intern) — Neocis, R&D Systems Integration — May 2023 – Aug 2023
Surgical robotics hardware validation and system integration — Miami, FL

- Designed a test station verifying actuator torque–current characteristics up to **50 N·m** with inline torque sensors, plus an automated validation suite measuring loaded actuator accuracy within **15 arcseconds**.
- Engineered an **80 N·m** torque-loading rig as a dynamometer replacement and contributed to an end-effector camera subsystem for self-calibration and guided surgical motions.

Product Design Engineer (Intern) — RoboSlog, R&D Product Development — Aug 2021 – Oct 2021
First R&D intern for automated smart-home hardware startup — New Delhi, India

- Architected an IoT communication package serving as the foundation for three commercialized products and designed the control loop and CAD assembly for an automated locking mechanism.

SELECTED PROJECTS

Autonomous Driving Under Adversarial Perception Attacks — CMU 24-784 (Prof. Ding Zhao) Spring 2024

- Trained a Soft Actor-Critic (SAC) driving policy in the CARLA simulator and evaluated closed-loop robustness against targeted adversarial perception perturbations.

6-DoF Pose Estimation via Stable Diffusion & 3D Vision Pipelines — CMU 16-825 (Prof. Shubham Tulsiani) Spring 2024

- Leveraged Stable Diffusion intermediate features for occluded 6-DoF object pose estimation, and implemented 3D Gaussian Splatting, differentiable Neural Radiance Fields (NeRF), and diffusion models from scratch in PyTorch.

Autonomous Mobile Inspection & Mapping Platform — CMU SLAM (Prof. Michael Kaess) Fall 2023 - Spring 2024

- Deployed a ROS 2 mobile base combining LiDAR SLAM Toolbox, Navigation2, Adaptive Monte Carlo Localization (AMCL) survey routines, and visual-servo target tracking.

Assistive Mobile Manipulator for Cargo Vessels — CMU 24-778 (Prof. Cameron Riviere, Prof. Zeynep Temel) Spring 2023

- Built a 5-DoF HEBI mobile manipulator integrating YOLOv8 + Hough-transform perception, eye-in-hand visual servoing, and ROS motion control for autonomous shipboard inspection tasks.

Lifelong Multi-Agent Planning & Warehouse MARL — CMU 16-782 & 16-831 (Prof. Maxim Likhachev, Prof. Deepak Pathak) Fall 2023

- Implemented lifelong Conflict-Based Search (CBS) for continuous multi-agent routing and built a Gymnasium-MiniGrid centralized MARL benchmark comparing learned policies directly against classical MAPF planners.

TEACHING

Teaching Assistant, *DIY: Design and Fabrication* — CMU (Prof. Kenji Shimada) Spring 2024, 2025, 2026

Teaching Assistant, *Mechatronics* — CMU (Prof. Victoria Webster-Wood) Fall 2023

Teaching Assistant, *Numerical Methods in Engineering* — CMU (Prof. Jessica Zhang) Spring 2023

PATENTS

Composite Anti-Intrusion Plate for Formula Student Vehicles — Indian Patent No. 379355–001 University of Mumbai

Square Frustum Impact Attenuator for Formula Student Vehicles — Indian Patent No. 381642–001 University of Mumbai

TECHNICAL SKILLS

Programming	C++, Python (Advanced); Rust, C#, Java (Intermediate)
ML & 3D Vision	PyTorch, Open3D, PCL, OpenCV, Stable-Baselines3, Gymnasium, CUDA, cuDNN, cuBLAS, Eigen, Boost, NumPy
Robotics & Sim	ROS 1 & 2, NVIDIA Isaac Sim / Omniverse, Drake, Gazebo, PyBullet, SolidWorks, Blender, MATLAB, ANSYS
Systems & Comms	Docker, Linux, Git, NVIDIA Jetson, Unity, WebRTC, ZeroMQ, EtherCAT, CAN Bus, Protobuf, Arduino, PSoC
Hardware	Universal Robots (UR5e, UR10e), KUKA iiwa, Denso VS series, HEBI actuated arms, Schunk Powerball

SERVICE & LEADERSHIP

Business Plan Mentor, DJS Racing Formula Student (former Structural Head, Finance Lead & Test Driver) 2022 - Present

Organizing Staff, International Symposium on Academic Makerspaces (ISAM) 2023

Mentor, Carnegie Mellon University Mentorship Program 2023

Reviewer, International Conference on Intelligent Manufacturing and Automation 2021