PRUTHAK JOSHI

✉ pruthakjoshi@gmail.com   ⌨ pruthakjoshi.github.io   (+1)3106942856   (+91)9106804947

PROFESSIONAL SUMMARY

Mechanical Design Engineer with experience in robotic system design, CAD modeling, mechanical prototyping, and Design for Manufacturing (DFM). Proficient in SolidWorks, Fusion360, ANSYS, and CNC and sheet metal-based manufacturing processes. Successfully led end-to-end development of robotic arms focusing on cost efficiency, manufacturability, and performance. Demonstrated success in collaborative team environments and cross-functional R&D projects.

EDUCATION

University of California, Los Angeles (UCLA)   *Los Angeles, U.S.A.*
Master of Science in Mechanical Engineering, GPA: 3.97/4
Recipient of UCLA Division of Graduate Education Fellowship

Indian Institute of Technology (IIT) Bombay   *Mumbai, India*
B.Tech. + M.Tech. (Dual Degree) in Mechanical Engineering, GPA: 9.12/10
Specialization: Computer-Aided Design and Automation

WORK EXPERIENCE

Mechanical Engineer | **Reazon Human Interaction Lab** | **Reazon Holdings**   **January 2025 - Sept' 25**
Pioneer in researching and developing advanced human-computer interaction technologies and systems   *Tokyo, Japan*

- Designed the mechanical hardware for **OpenArm 01**, an open-source 7DOF humanoid robotic arm designed for physical AI research and deployment in contact-rich environments
- Engineered the complete setup (2 arms + 1 Pedestal) at a **total BOM cost of US$6,500**, achieving an exceptional price-performance ratio for real-world deployment
- Achieved a **nominal payload of 4.1 kg** and **peak payload of 6.0 kg per arm**, with a total **arm weight of just 5.5 kg**, exceeding typical payload-to-weight ratios in its class
- Applied advanced robotic design and **Design for Manufacturing (DFM)** principles, achieving a **24% reduction in production cost** while maintaining structural performance
- Created **URDFs** for integration with ROS-based control systems and robotic simulation stacks
- Optimized the hardware design through comparative analysis of **cost, manufacturability, and functionality**
- Designed and iteratively refined multi-version **end-effectors** compatible across robotic arm generations
- Generated detailed **Bills of Materials (BOMs)** for OpenArm assemblies specifying part numbers, material specifications, quantities, and supplier references to streamline procurement and fabrication
- Created comprehensive **mechanical assembly guides** using exploded-view diagrams and step-by-step instructions to support users during manufacturing and ensure consistency across hardware batches

Engineering Intern | **Reazon Human Interaction Lab** | **Reazon Holdings**   **June 2024 - Sept' 2024**
Pioneer in researching and developing advanced human-computer interaction technologies and systems   *Tokyo, Japan*

- Engineered the gripper of a teleoperated robotic bartender with optimized **110mm gripper span**
- Implemented a 4-bar mechanism driven by **lead screw**, reducing system footprint and increasing grip strength
- Designed TPU-based compliant pads to safely handle fragile glassware; tested under dynamic teleoperation
- Implemented a **velocity-regulated gripping algorithm**, ensuring secure yet gentle grasping, minimizing the risk of slippage or operator-induced overgrip

Design of MR-compatible Robotic System for Abdominal Interventions   **Sept' 2022 - June 2024**
Advisor: Prof. Tsu-Chin Tsao, Mechanical and Aerospace Engineering Department, UCLA   *Los Angeles, USA*

- Developed a 3-DoF MR-compatible robot for procedures inside a **70cm bore MRI** using RCM principles
- Used **linear guides and non-metallic bushings** to ensure smooth motion under MR constraints
- Developed a comprehensive testing setup to analyze force and motion transmission in low friction hydrostatic actuators, utilizing **precision linear motors, force sensors, and pressure sensors**
- Developed a liver motion phantom featuring **Arduino-controlled airflow systems** for actuation and **IR sensors** for motion tracking.

RESEARCH EXPERIENCE

Smart Machining: Data Collection, Sensing, and Monitoring · **Dec 2022 - June 2024**

Advisor: Prof. Tsu-Chin Tsao, Mechanical and Aerospace Engineering Department, UCLA

- Integrated multi-sensor setup **(current, accelerometer, acoustic, camera)** with Haas TM2P CNC to monitor power and vibration
- Programmed and executed **G-code-based parametric machining** tests by varying spindle speed, feed rate, and depth of cut to systematically gather performance data
- **Analyzed datasets** to identify energy-efficient machining conditions, informing predictive control strategies
- Co-authored poster on sensor-based diagnostics presented at UCLA Smart Manufacturing Symposium 2023

Modeling and Characterization of a Soft Robotic Finger | **Master's Thesis** · · · · · · · · **May 2021 - June 2022**

Guide: Prof. Abhishek Gupta, Department of Mechanical Engineering, IIT Bombay

- Systematically researched and documented key manufacturing processes, actuation mechanisms, and sensing modalities in **soft robotics**
- Examined two kinematic models for a **3-link, 3-joint tendon-actuated** soft robotic finger
- Corroborated the trajectory of the finger through **image processing** and simulations in **MATLAB and Simulink**
- Experimentally verified the accuracy of the **RRR model** in predicting the fingertip position across various trajectories, resulting in a correlation of **0.9722 in the x-coordinate, and 0.9330** in the y-coordinate

Design and Development of Setup for Characterization of Liquid · · · · · · · · · · · · · · · · · · · **May 2019 - July 2019**
Bridge Separation

Guide: Prof. Prasanna Gandhi, Department of Mechanical Engineering, IIT Bombay · · · · · · · · · · · · · · · *Research Project*

- Optimized parallelogram compliant mechanism dimensions via iterative analysis to meet project specifications
- Analyzed the **adaptive setup** using **ANSYS** to get the tip displacement in the μm range for a mN load
- Developed the complete CAD model and generated fabrication drawings incorporating GD&T standards

LEADERSHIP AND MENTORING ROLES

Team Leader and Lead Mechanical Engineer | **IITB Mars Rover Team** · · · · · · · · · · · · · **April 2020 - April 2021**

- Led the team to **4th position in IRDC-2020** among 28 teams from 7 countries (best position to date)
- Raised funds and managed resources worth **INR 1.38 Million+** acquired through the institute STP Committee
- Designed a **3-link, 6-DOF** robotic arm capable of reaching heights upto 1.2m and lifting upto 5 kg weight
- Implemented **ANSYS** to perform **structural and multibody dynamics analyses** of the design and achieved a 30% weight reduction and 5% increase in strength by using carbon fiber links over Al and SS alloys
- Conducted safety-risk analysis of the rover for safe performance under extreme conditions during terrain traversal, autonomous equipment servicing, and extreme retrieval
- Coordinated the **procurement of components and led the assembly** of the mechanical, electrical, and biosciences subsystems thereby building the rover for student competitions

SCHOLASTIC ACHIEVEMENTS AND ACCOLADES

- Recipient of UCLA Division of Graduate Education Fellowship · **'22-'24**
- Secured All India Ranks of 425 among 170k+ candidates in JEE Advanced · **2017**
- Achieved an All India Rank of 191 among 1.2 million candidates in JEE Main · **2017**

TECHNICAL SKILLS

- **CAD & CAE Tools**: SolidWorks, Fusion 360, ANSYS, AutoCAD, OnShape
- **Programming**: MATLAB, Simulink, Python, C++, Arduino
- **Manufacturing**: CNC machining, 3D printing, Sheet metal fabrication, GD&T, BOM preparation
- **Simulation & Analysis**: FEA (structural and dynamic), Multi-body dynamics, Motion simulation
- **Other Tools**: ROS, URDF, G-code, LaTeX