

# PRUTHAK UTPAL JOSHI

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## Education

### University of California, Los Angeles

Master of Science in Mechanical Engineering, GPA: 3.9/4

**Present**  
Los Angeles, USA

### Indian Institute of Technology Bombay

B.Tech. + M.Tech. (Dual Degree) in Mechanical Engineering, GPA: 9.12/10  
Specialization: Computer-Aided Design and Automation

Mumbai, India

## Work Experience

### Engineering Intern | Reazon Human Interaction Lab - subsidiary of Reazon Holdings

**Present**

Pioneer in researching and developing advanced human-computer interaction technologies and systems

Tokyo, Japan

- Designed an end-effector with a gripping span of 110mm for a teleoperated 7-DOF robotic arm using SolidWorks
- Employed iterative design methodology to finalize a lead-screw-based 4-bar gripper to minimize the mechanical footprint while enhancing gripping strength and maneuverability
- Implemented 3D printed TPU-based adaptive gripper pads to increase the gripping surface area, enhancing operator confidence when manipulating objects of varying sizes, ensuring capability for precise and repeated leader-follower actions

### 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

- Designing, modeling, and prototyping a **3-DoF MR-compatible robot** for teleoperated abdominal interventions inside a **70 cm bore diameter** MRI machine using remote centre of motion mechanism and linear guides
- Characterizing a **hydrostatic actuation** and transmission network to create MRI-safe and low friction actuation
- Created a testing setup to characterize the force and motion transmission across actuators using **precision linear stages** with the aim to develop a model using parameters such as back pressure, tubing length, and amplitude and frequency of motion

### Engineering Intern - Seating Systems | Lear Corporation

**April 2020 - June 2020**

Global automotive technology leader in Seating and E-Systems | Ranked 147<sup>th</sup> in 2019 Fortune-500 rankings

Pune, India

- Delivered a **design guideline** by **benchmarking 10+ side valance designs** currently in practice using a2mac1
- Performed **calculations** for comparing the strain generated through bending and compression due to side and frontal impact loads in the ribbing patterns of the automotive side valance to arrive at a structure with optimal shape and dimensions
- Developed an Excel based calculator for calculating deformation in the ribs based on the input design variables

## Research Experience

### Smart Machining: Data Collection, Sensing, and Monitoring

**Dec' 2022 - June 2024**

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

- Conducting machining operations to gather vibration and power data across a spectrum of machining parameters, aimed at constructing a predictive model during drilling and milling procedures utilizing Haas TM2P CNC machine
- Poster: Chi Yitian, **Joshi Pruthak**, Panda Shivam, Korambath Prakashan, Tsao Tsu-Chin, Li Xiaochun, Jawed M.Khalid.  
**Smart Machining - Sensing and Monitoring. Smart Manufacturing Symposium; 2023 September 29**

### Modelling and Characterization of a Soft Robotic Finger | Master's Thesis

**May 2021 - June 2022**

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

- Examined two models for a **3-link, 3-joint tendon-actuated** soft robotic finger to formulate model-based control strategies
- 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
- Corroborated the dynamic behavior of the finger through **image processing** and **simulations in MATLAB and Simulink**

## 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 international 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 using **SolidWorks** a 3-link, 6-DOF robotic arm capable of reaching heights upto 1.2m and lifting upto 5 kg weights
- 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

## Scholastic Achievements and Accolades

- Secured an All India Rank of 425 among 0.17 million candidates in JEE Advanced **2017**
- Achieved an All India Rank of 191 among 1.2 million candidates in JEE Main **2017**

## Technical Skills

**Programming:** C++, Python

**Modeling and Analysis Software:** SolidWorks, ANSYS, ADAMS, Abaqus, Siemens NX, AutoCAD, Fusion 360

**Scientific Tools:** MATLAB, Simulink, GCode, Arduino