# Pruthak Utpal Joshi

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## Education

**University of California, Los Angeles** — **Present**
*Master of Science in Mechanical Engineering, GPA: 3.9/4* — *Los Angeles, USA*

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

## 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*

- 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 $147^{th}$ 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