Hari Krishnan

Mechanical Engineer

Portfolio

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1 Experience

iRobot

Mechanical Engineering – Design and Prototyping

- Rapid prototyping - FDM.
- Mechanical Design - CREO, SOLIDWORKS.
- Optimized robot shell design to improve mobility.
- Developed fixtures – to improve prototype build times and quality.
- Developed multiple test metrics for standardizing robot performance
- Implemented skeleton based modeling techniques
- Product Data Management using PTC Windchill.

Pixsweet

Mechanical Engineering (Part Time) – Mechanical Design

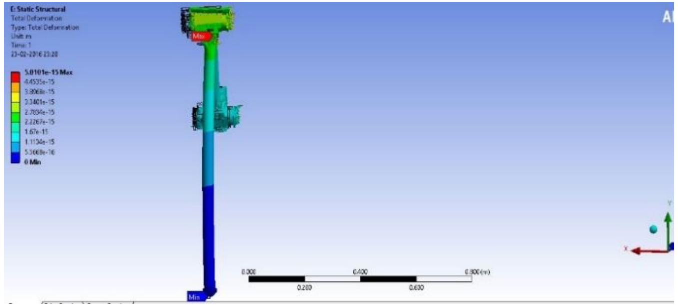
- Rapid prototyping - FDM , 3DP.
- Mechanical Design -SOLIDWORKS.
- Developed fixtures and mounts for the production unit.
- Helped develop injection systems for production line.
- Optimize 3D Printed designs to reduce prototype times and cost of generation.

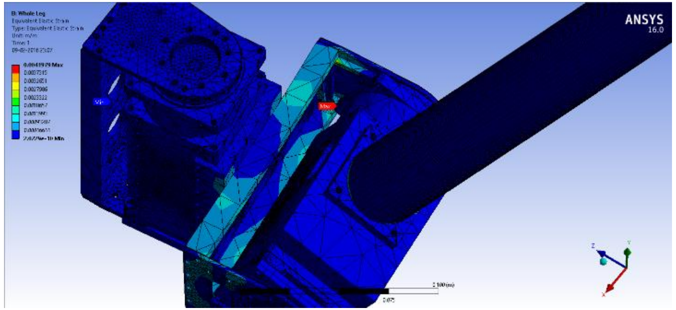
  Setting up of production system, basic electrical integration.

RoMeLa - UCLA

Robotics and Mechanism Laboratory (Current)

- Developing wall bracing/climbing hexapod robot.
- Designed and manufactured (3 axis CNC) brackets, motor-mounts.
- Optimized and redesigned robotic components based on FEA for improved strength using ANSYS and SOLIDWORKS.
- Worked with LabVIEW to introduce several robot capabilities. (recording motion, leap integration, PID variation).




B: Whole Leg
Time: 1
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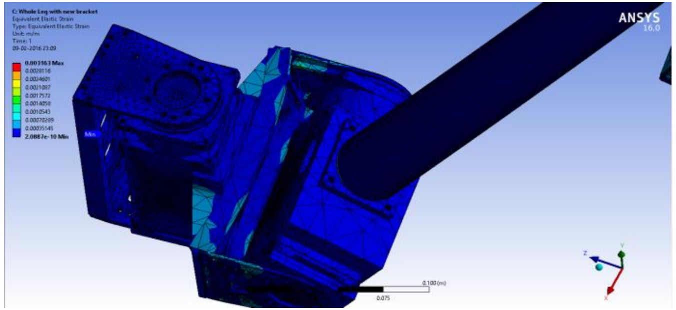
0.0027986
ANSYS
16.0


C: Whole Leg with new bracket
Equivalent Elastic Strain
Type: Equivalent Elastic Strain
Unit: m/m
Time: 1
09-02-2016 23:09
0.0028116
0.0024601
0.0021087
0.0017572
0.0014058
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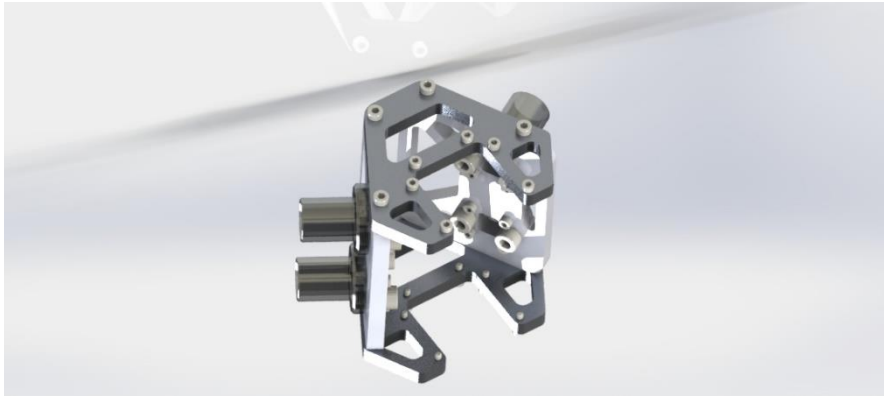
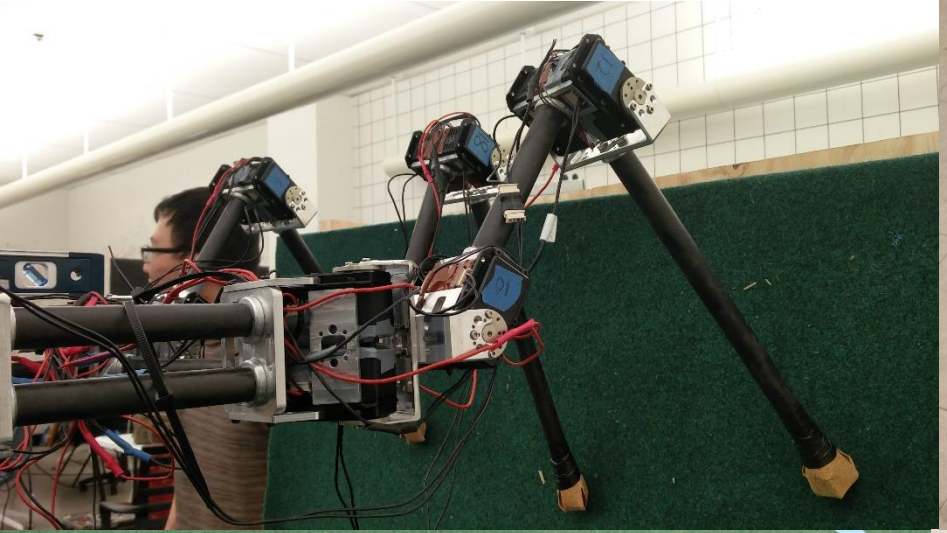
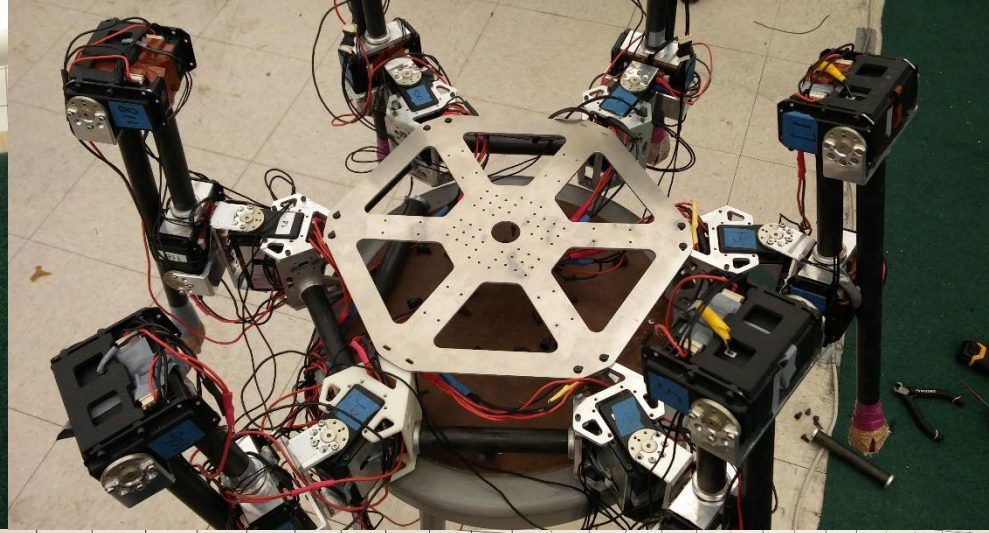
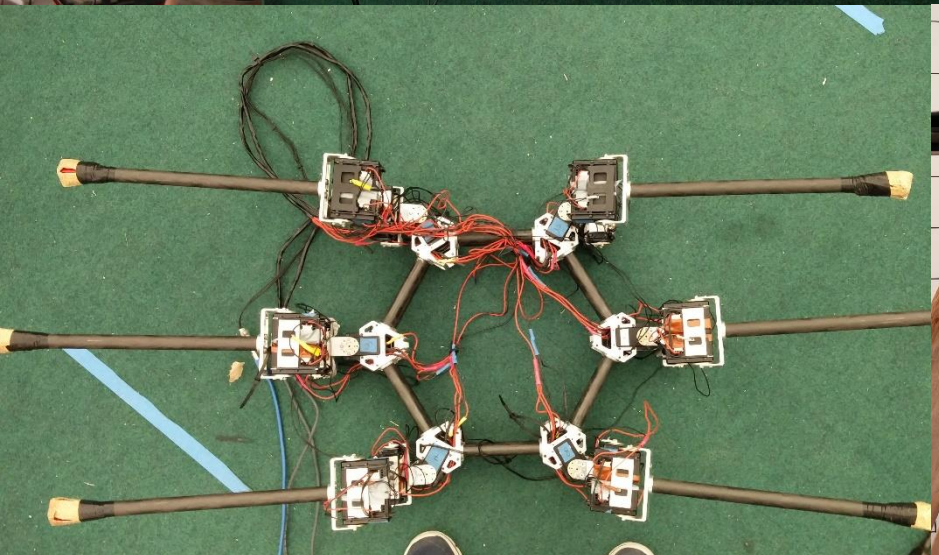
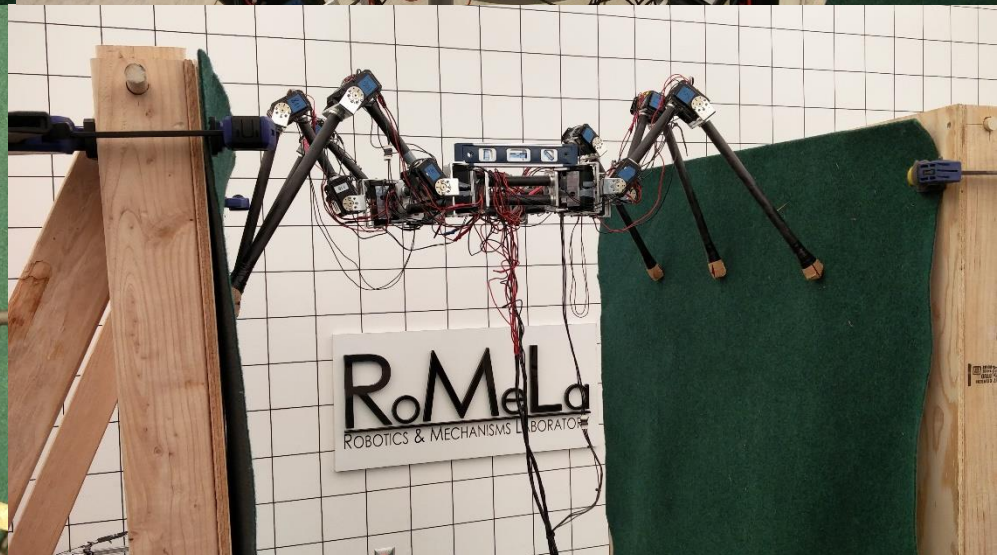
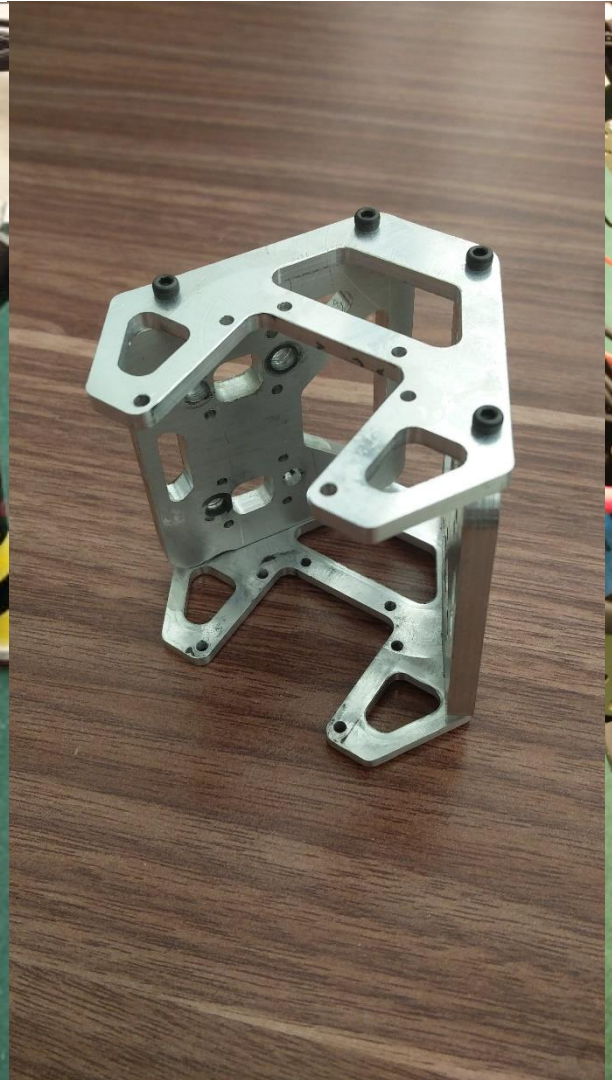


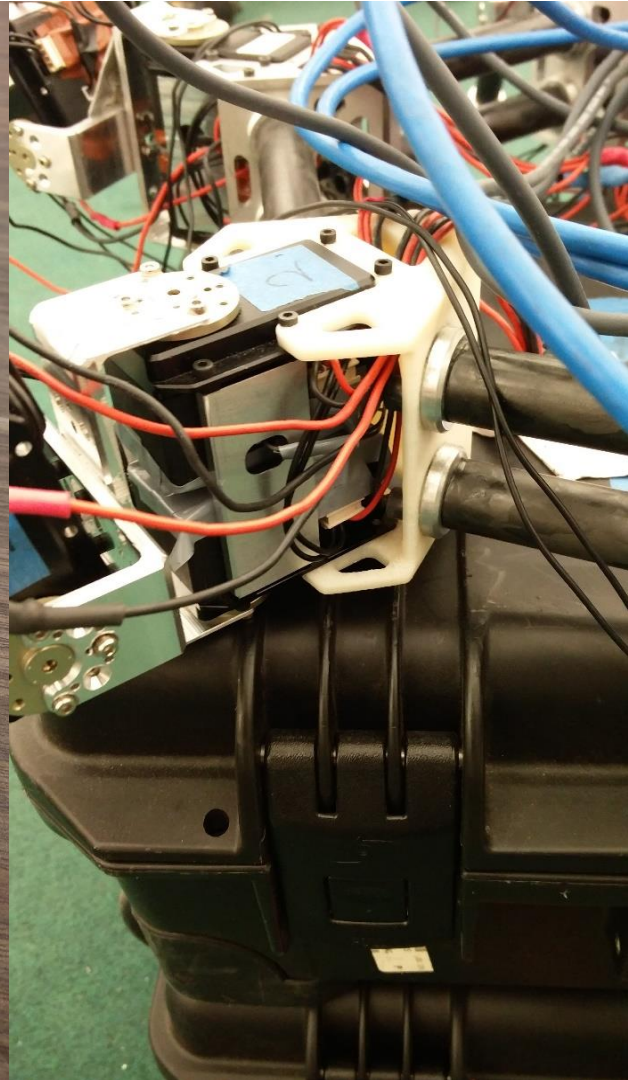


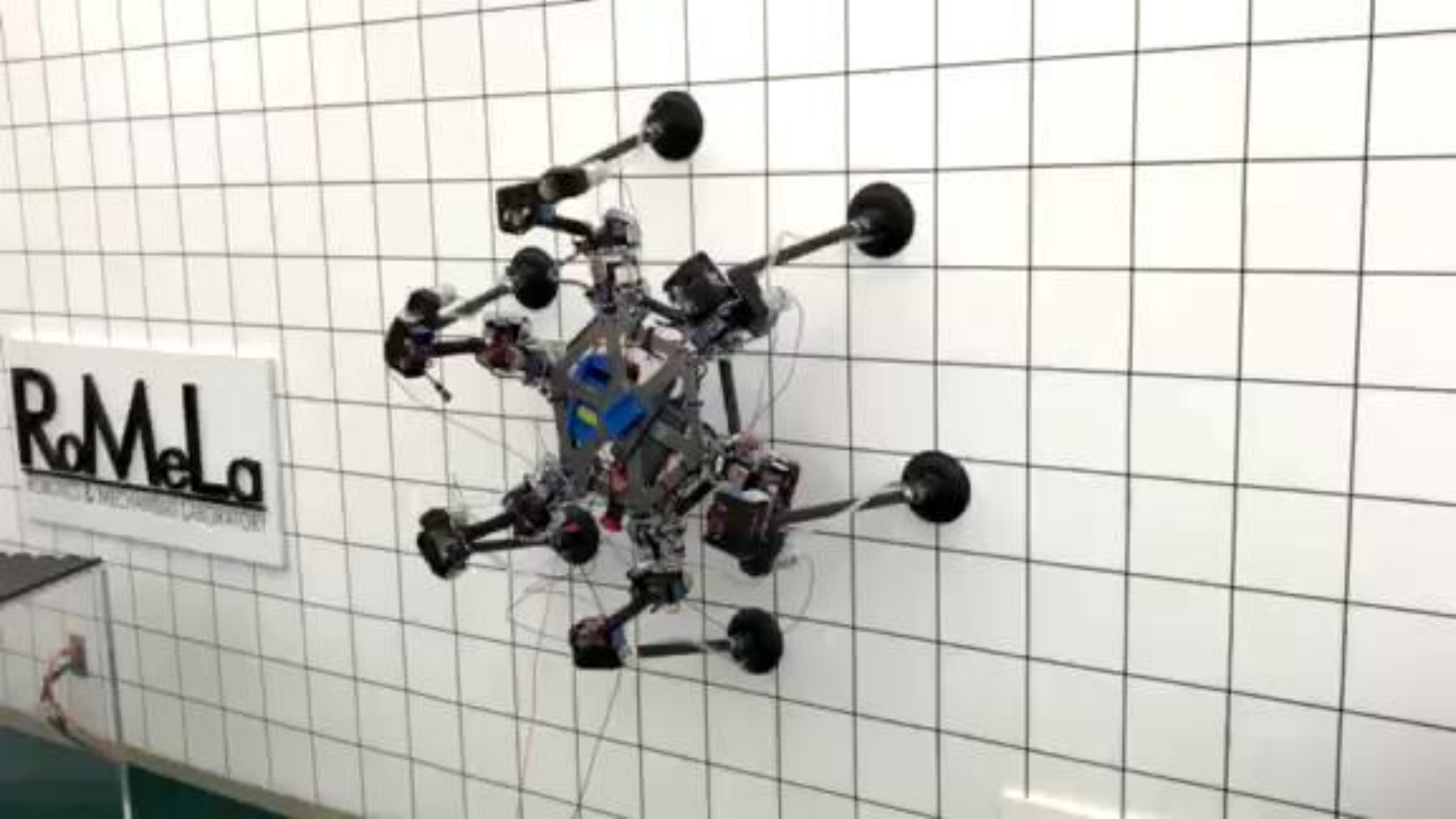





RoMeLa
ROBOTICS & MECHANISMS LABORATORY

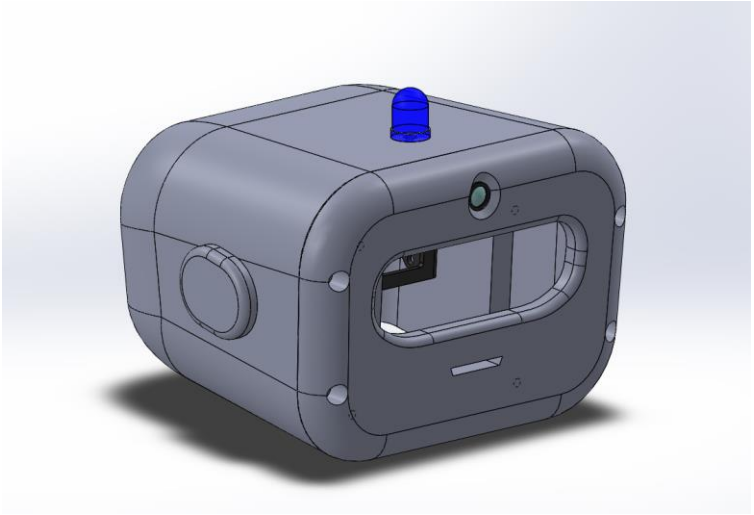


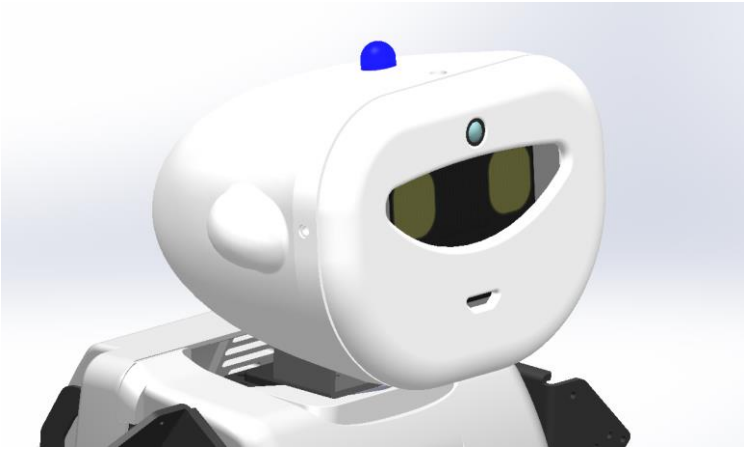


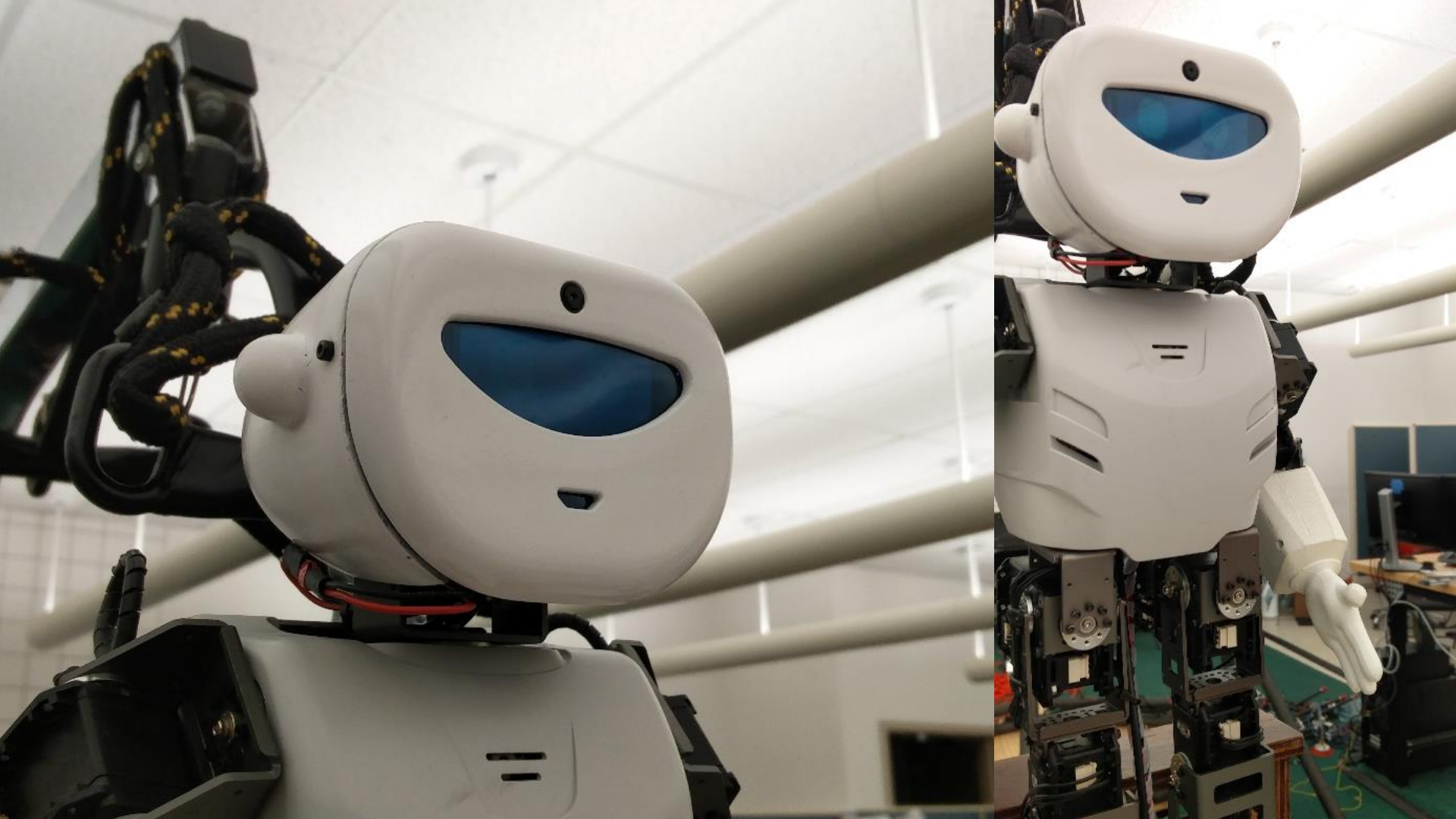

RoMeLa

L.A.R.A – Luskin Robot

- Redesigned (surfacing) and built the outer head of the UCLA LUSKIN concierge robot (LARA),
- Reduced weight by half.
- Improving integration of electronic components and strength against drops.



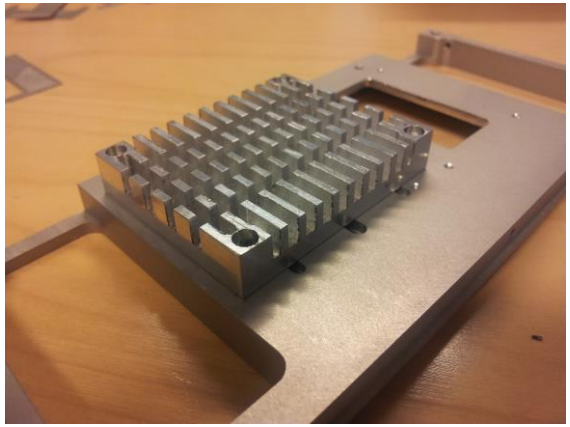


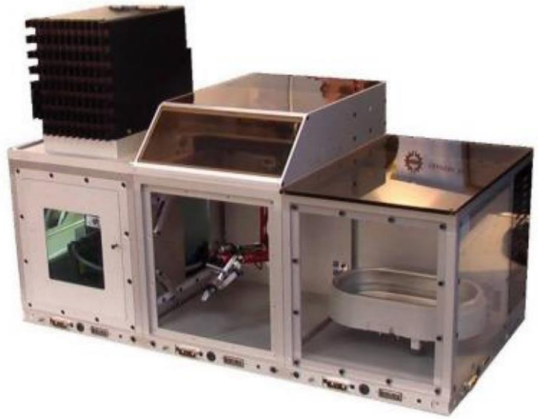


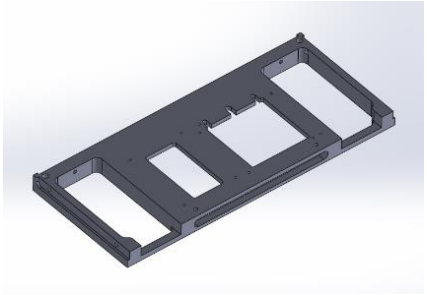
Micro Factory Module

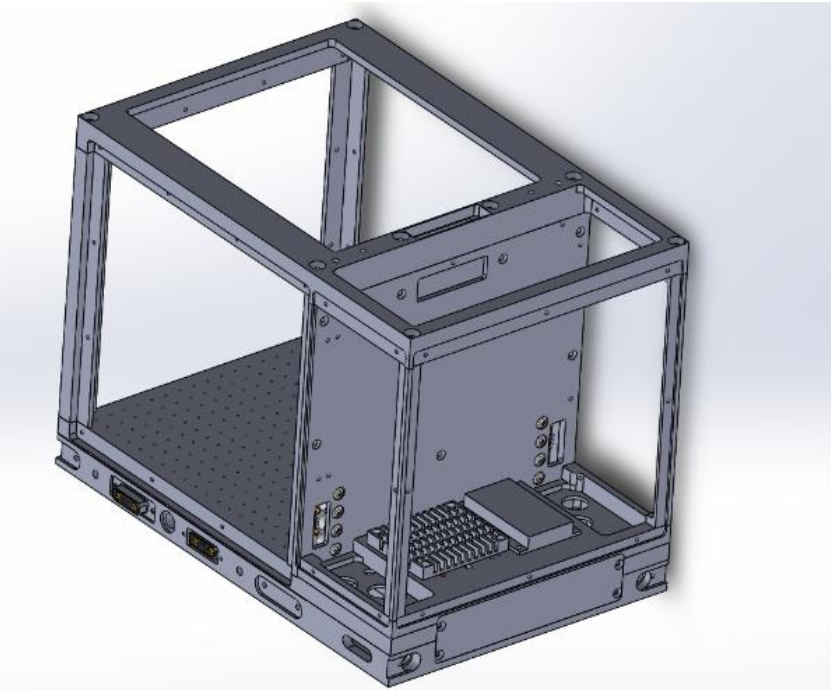
Tampere University of Technology | Finland | 2014

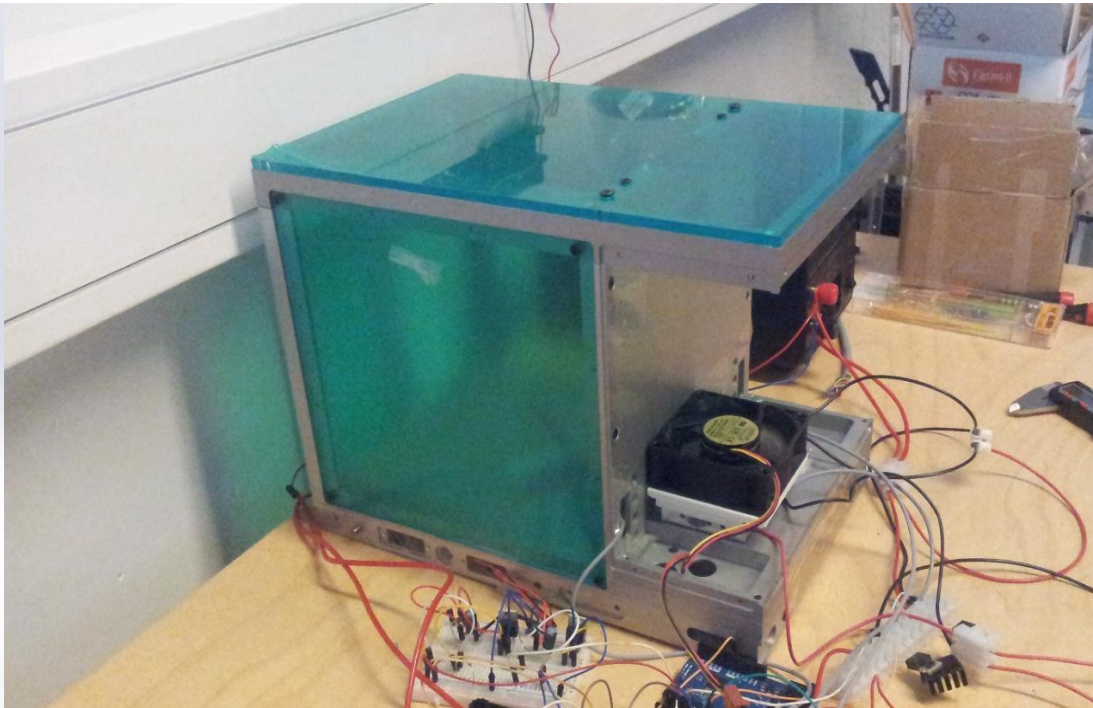
- Designed and fabricated the TUT Microfactory prototype (miniaturized production system)
- Incorporating HEPA filters, fans for air flow, achieving overall control and significantly reducing cost using an Arduino Microcontroller.
- Designed and fabricated enclosures, heat sinks and other major components using CATIA
- Implemented PID control to maintain the temperature, humidity and airflow within the work chamber.







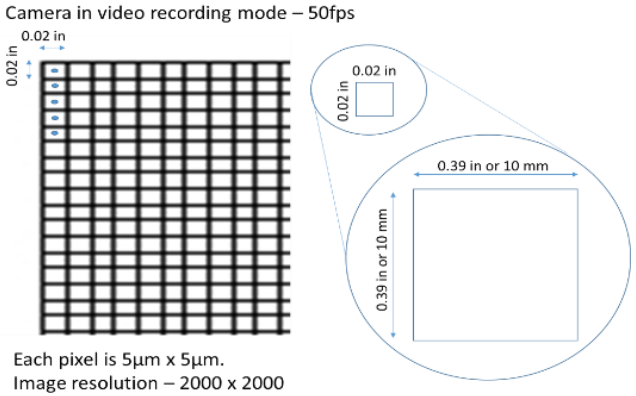


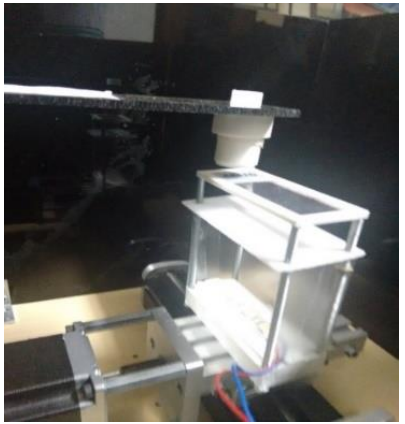


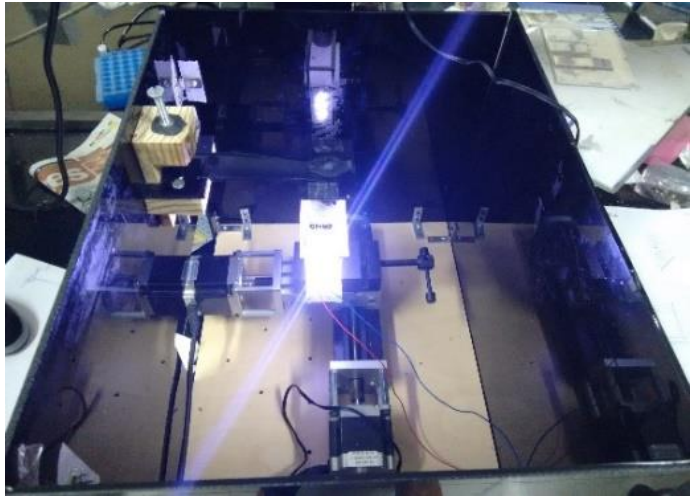
DRISHTI : Digital Microscopic System

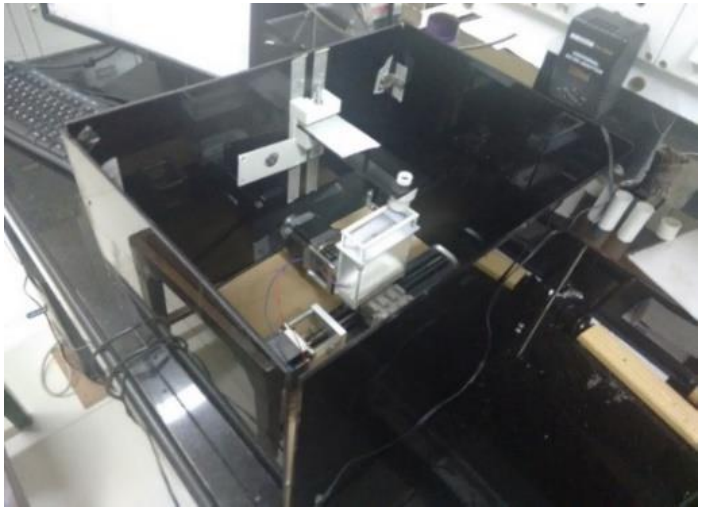
Tata Centre for Technology and Design | India | 2015

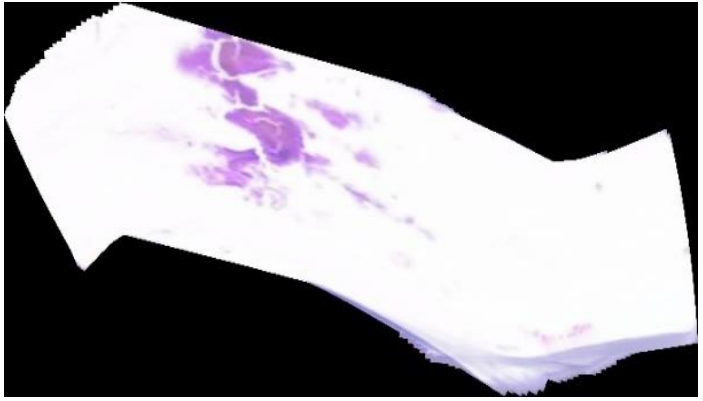
- Prototyped Digital Microscopic Device for scanning cancerous cells at source point.
- Fabricated XY CNC Router, enclosures and lens arrangements mainly using 3D Printing.
- Developed system controls using Arduino, Linux CNC and worked with Open CV (python) to manipulate and stitch together the captured images.
- Worked on 3 prototype iterations.







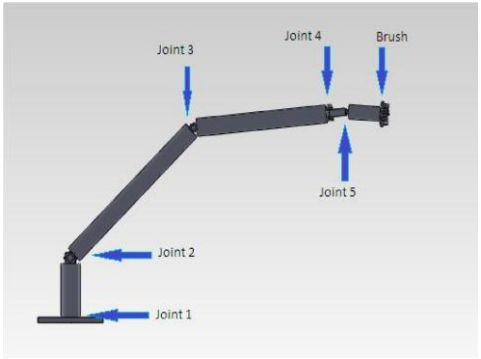


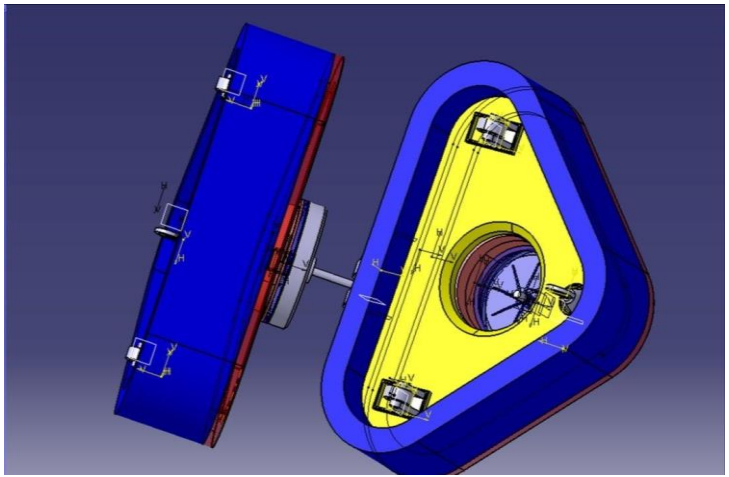


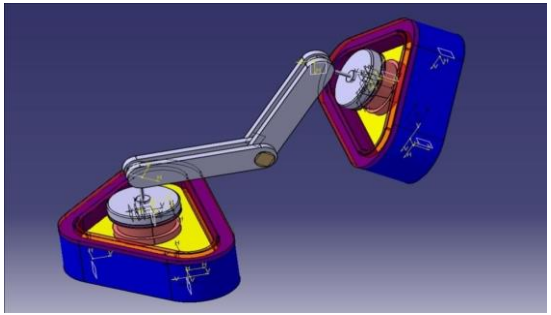
Manipulators & Glove Box Cleaner Concept

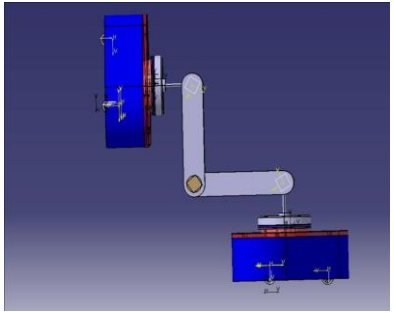
Atomic Research Centre (Department of Atomic Energy)| India | 2012

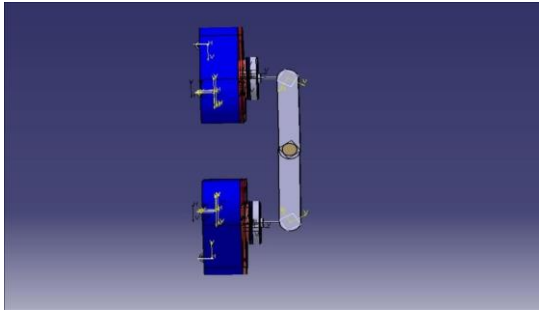
- Developed MATLAB simulations to quantify the error involved in motion from the Master to slave side in Articulated Master Slave Manipulators.
- Design Analysis of Master Slave manipulators and suggested design improvements to reduce position error.
- Developed conceptual designs of cleaning bots and mechanisms which can be used for expired radioactive Glove Boxes.











2

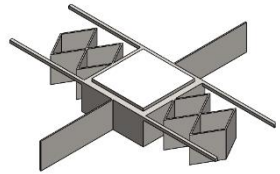
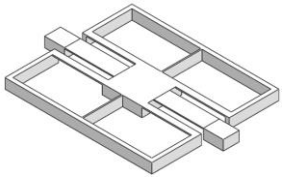
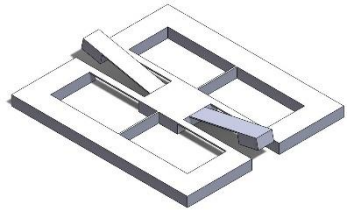
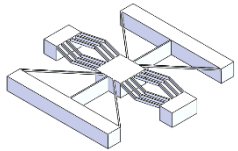
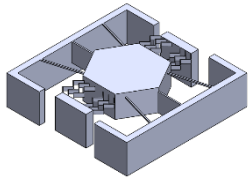
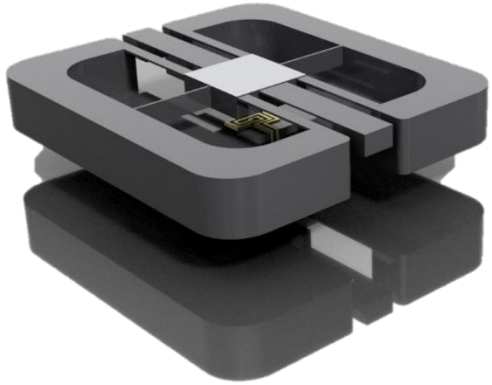
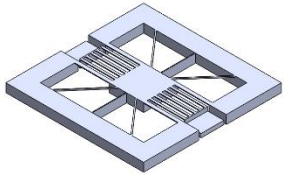
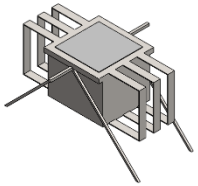
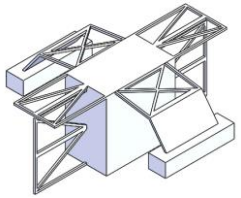
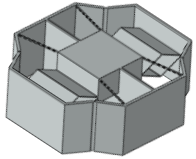
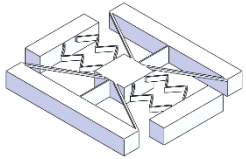
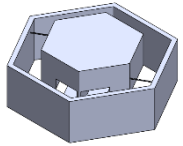
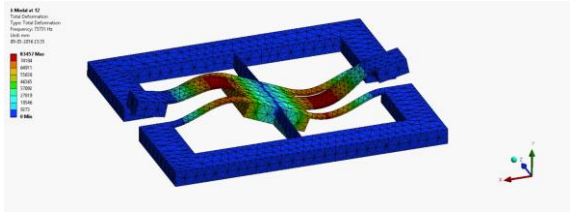
Projects

Micro Mirror Flexures

Compliant Mechanism and Design | UCLA

Designed a Flexure based Micro Mirror System - driven at resonant frequencies for precision applications using Solidworks

Frequency analysis conducted using ANSYS WB.
Frequency range

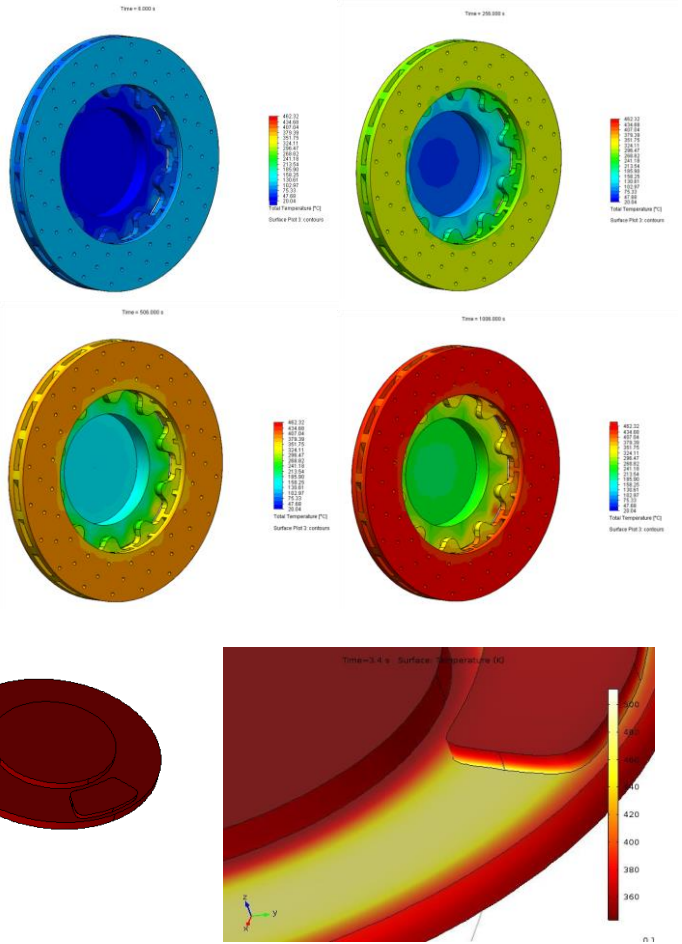














Disc Brake Analysis and Design Optimization

Mechanical Design for High Temperature | UCLA

- Modelled and simulated the mechanical and thermal effects on an automobile disc brake during braking using COMSOL.

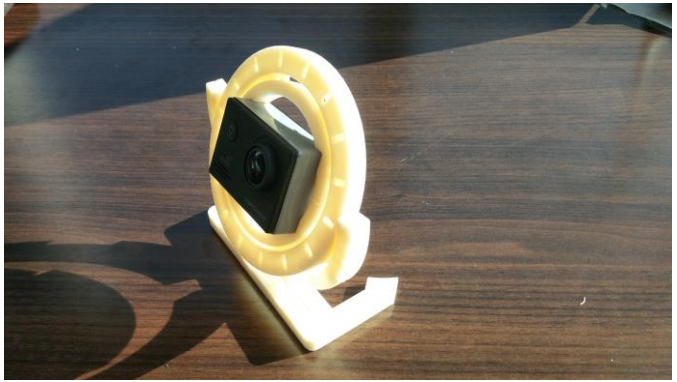
- Optimized vane profiles for maximum cooling using Solidworks design study and co-simulation using COMSOL.

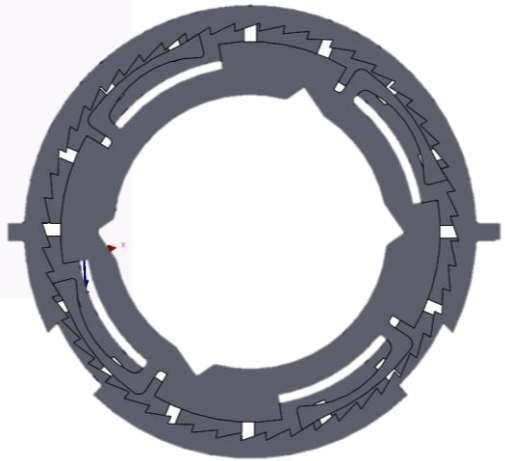


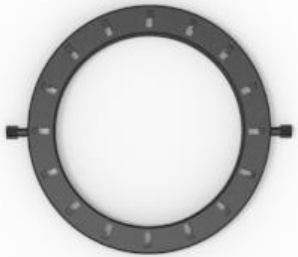
GoPro Mount

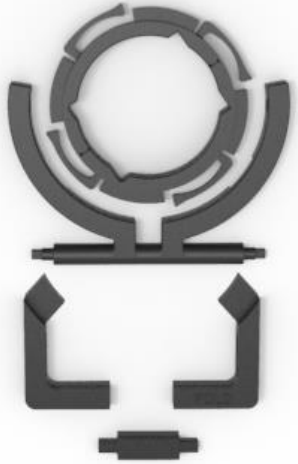
Rapid Prototyping and Product Design | UCLA

- Designed and prototyped a complete mechanical GoPro mount printed as a one-shot assembly.
- Developed 3 iterations, based on consumer feedback .
- Patenting process of the fourth iteration .





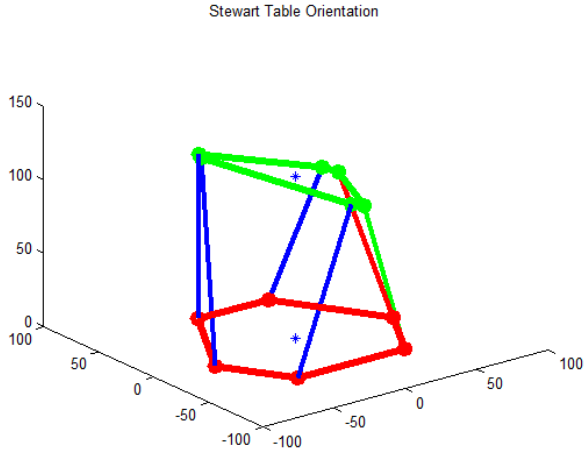


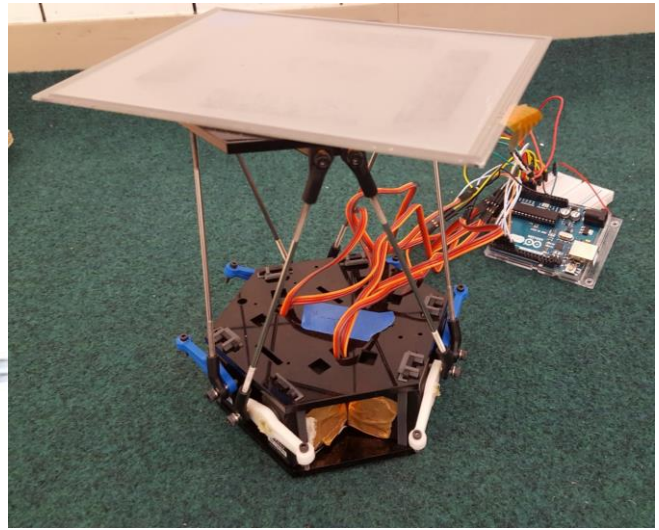


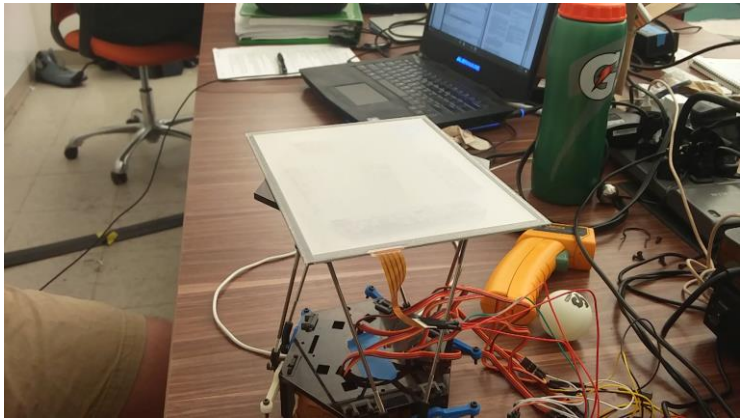
Design and Control of Stewart Platform Mechanism

Robotics Control | UCLA

- Rotary based Stewart platform with PID balance control and trajectory generation.
- Low cost alternative to industrial platforms and future use in Robotic head actuation and animatronics.



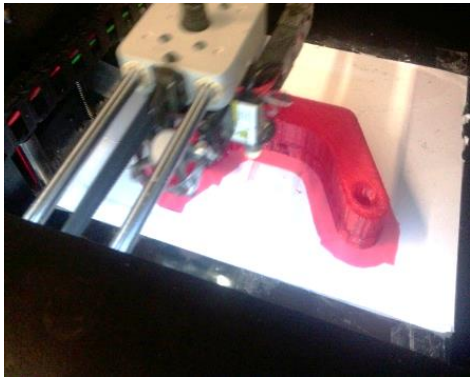


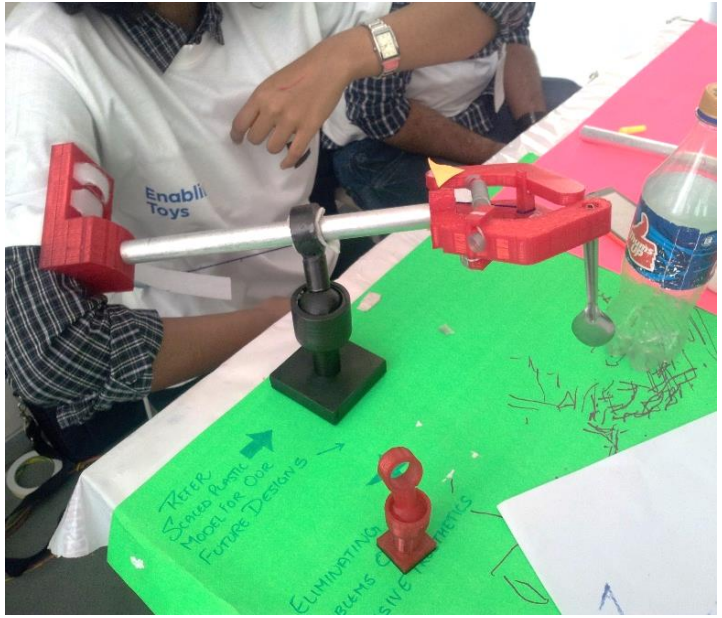


MIT Media Lab – Design Innovation

Designed and developed initial prototypes of a cheap , affordable and completely mechanical prosthetic arm for double amputees.

Working with various school for the disabled in Gujarat , the project was completed as a part of the MIT Media Lab Design Innovation Project.






SHIVANANDA MAHILA SEVASHRAM SOCIETY'S BALIKASHRAM, SGS

THANK YOU