

# Ashutosh Mukherjee

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[Github Page](#)

[Projects Website](#)

## Education

8/2016 – 6/2020	B.Tech in Mechanical Engineering <i>Punjab Engineering College, Chandigarh</i>	CGPA : 8.3/10
4/2014 – 3/2016	High School (10+2) <i>Bhavan Vidyalaya, Chandigarh</i>	Percent : 94.4%
4/2013 – 3/2014	Higher Secondary (10) <i>Bhavan Vidyalaya, Chandigarh</i>	CGPA : 10/10

## Research Experience

### Research Associate

September 2020 - Ongoing

*Thapar Institute of Engineering and Technology, Patiala, India*

### Dynamic Modelling and Control Design of Augmentative Lower Extremity Exoskeleton

- Dynamic modelling of a strength augmentation exoskeleton designed by Defence Bio-Engineering and Electro-Medical Laboratory (DEBEL), a branch of Defence Research and Development Organization (DRDO), India
- Validation of the developed kinematic and dynamic models in MSC ADAMS, a multi-body dynamics software
- Development of an optimal control strategy for exoskeleton actuators in order to ensure minimal effort by human wearer.

## Professional Experience

### Intern, Order Management and Assembly Department

January 2019 - June 2019

*Siemens Ltd., Vadodara, India*

- Developed a solver in C for allocation of jobs (processes) to different machines present in the shop floor in order to optimize the aggregate machining lead times
- Designed an induction heating apparatus for heating of rotor wheel discs of steam turbines
- Increased robustness of fixtures for machining of stator guide blade carriers of steam turbines
- Redesigned and fabricated a machining and blading stand for rotor wheel discs of steam turbines

## Other Relevant Experience

### Undergraduate Thesis Project

September 2019 - May 2020

#### 1. Development of a Test Rig for measuring propeller thrust

- Built a test stand acting as an alternative to the wind tunnel for measuring the thrust produced by a propeller mounted on it.
- Implemented Arduino Uno controlled circuits for driving the propeller motor using a brush-less DC motor and capturing and displaying the speed of the propeller using an IR sensor based tachometer.

## 2. Design and Analysis of a propeller for slow-flying Quad-copters

- Generated and modified propeller designs iteratively based on required flying conditions and propeller thrust using QMIL, a first order propeller design tool
- Used QPROP, a solver for calculating propeller performance to generate propeller efficiency and thrust curves for the designed propellers and reiterated the designing process until a design giving desirable propeller performance was achieved.
- Assisted in second order design validation using computational fluid dynamics (CFD) once the propeller design showed better performance than a market standard propeller.
- Developed a solver acting as an alternative to QPROP in MATLAB for calculating the performance characteristics of a propeller based on Blade Element Momentum Theory.

### Relevant Independent Projects

#### 1. Test Rig for measuring vibrations in beams

- Created a flexible multi-body system model of a test rig for measuring the vibrations of beams from harmonic centrifugal excitations due to eccentric masses rotating at high speeds using Hyperworks Motionview, a multi-body dynamics software.
- Carried out sensitivity studies on the amplitude of vibrations of the beams by varying different parameters of the model like eccentricity, beam end conditions and beam geometry

#### 2. Solver development for vibration analysis of a simple car

- Developed a simple car model as a 2 degree of freedom system to analyse its vertical dynamics in the form of bounce and pitch motions using MATLAB and Simulink
- Provided excitations to the model in the form of frequency independent harmonic forces and base excitations in the form of road bumps modelled as waves with constant wavelengths and amplitudes.
- Applied Fast Fourier transforms to analyse the natural frequencies and mode shapes of the system
- Optimized location of force application and amount of damping in the system for minimal excitations

### Technical Skills

Programming	Softwares	Miscellaneous
<b>1. Scripting Languages</b> <ul style="list-style-type: none"><li>• MATLAB</li><li>• Python</li></ul> <b>2. Programming Languages</b> <ul style="list-style-type: none"><li>• C</li></ul> <b>3. Markup Languages</b> <ul style="list-style-type: none"><li>• HTML</li><li>• LaTeX</li></ul>	<b>1. Multi-Body Dynamics</b> <ul style="list-style-type: none"><li>• MSC ADAMS</li><li>• Hyperworks Motionview</li></ul> <b>2. Finite Element Analysis</b> <ul style="list-style-type: none"><li>• ANSYS Workbench</li></ul> <b>3. Computer Aided Design</b> <ul style="list-style-type: none"><li>• SolidWorks</li><li>• Autodesk Fusion 360</li></ul>	<ul style="list-style-type: none"><li>• Simulink</li><li>• Arduino Uno</li><li>• QMIL, QPROP</li><li>• XFOIL</li><li>• Geometric Dimensioning and Tolerances (GD&amp;T)</li></ul>

### Additional Relevant Coursework Completed

1. **RWTHX, edX:** Machine Dynamics with MATLAB, RWTH Aachen University
2. **DelftX, edX:** Introduction to Aerospace Structures and Materials, TU Delft
3. **LouvainX, edX:** Modelling and Simulation of Multi-Body Systems, UCLouvain