

Ashutosh Mukherjee

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[Projects Website](#)

[Github](#)



Education

| | | |
|------------------|---|-----------------|
| 10/2021 – 4/2024 | M.Sc. Computer-Aided Conception of Machines in Mechanical Engineering <i>RWTH Aachen</i> | CGPA : 1,6 |
| 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% |

Work Experience

Master Thesis Student/Working Student

October 2023 - Ongoing

Rheinmetall Technology Centre - New Technologies, Rheinmetall AG, Neuss, Germany

- Development of a localization algorithm for a swarm of GPS-denied UAVs using Ultra-wideband (UWB) sensors.
- Embedding the developed localization algorithm into Arducopter, an open-source auto-pilot for UAVs, in order to facilitate verification of the algorithm through flight tests.
- Development of a simulation model of an integrated flight control system for a single UAV, including a flight controller, 6 degree-of-freedom UAV dynamic model, IMU, Magnetometer, Barometer and GPS sensor models and an Extended Kalman Filter for attitude estimation.

Werkstudent (Working Student)

June 2022 - September 2023

Rheinmetall Technology Centre - New Technologies, Rheinmetall AG, Neuss, Germany

- Development of a mathematical model for the force analysis of a flexible electrostatic synchronous actuator based on the concept of *Method of Moments*, a discretization technique for electric fields.
- Maintenance of the developed mathematical model code-base, making use of software engineering principles like object orientation, version control and comprehensive code documentation

Project Assistant

October 2022 - April 2023

Institut für Getriebetechnik, Maschinendynamik und Robotik (IGMR), RWTH Aachen

- Scripting Multi-Body simulation models of a standard mountain bike in Simpack using the *Semi-Analytical Approach* where the multibody model partly depends on real-time sensing of loads on the actual bike.
- Setting up co-simulation between Simpack and Simulink in a closed loop simulation for stabilizing the multibody model of the bike excited by the measured loads.
- The work in this project culminated in a mini-thesis worth 9 ECTS, which can be accessed [here](#).

Research Assistant

Thapar Institute of Engineering and Technology, Patiala, India

September 2020 - July 2021

- Dynamic modeling of a strength augmentation exoskeleton designed by *Defence Bio-Engineering and Electro-Medical Laboratory (DEBEL)*, India
- Reduced-order modeling of Human and Lower Extremity Exoskeleton in the form of a coupled multi-body system.
- Development of a Computed Torque Control algorithm for strength augmentation.
- All published work output from this project can be referred from *Conference Presentations and Publications* section.

Teaching Assistant

Thapar Institute of Engineering and Technology, Patiala, India

February 2021 - June 2021

- Teaching Assistant for the graduate level course *Modern Control of Dynamic Systems*, which covers basic and advanced topics in linear systems theory like state-space representations, canonical forms, controller and observer design using pole-placement, and some concepts of optimal control theory.
- Helped set mid-term examinations and quizzes, and grade them as part of assistantship duties.

Technical Skills

| Programming | Computational Techniques |
|--|---|
| <ol style="list-style-type: none">1. Scripting Languages<ul style="list-style-type: none">• MATLAB & Simulink• Python2. Programming Languages<ul style="list-style-type: none">• C++• Java3. General<ul style="list-style-type: none">• Object-Oriented Programming• Version Control using Git | <ol style="list-style-type: none">1. State Estimation using Extended-Kalman Filters2. Strapdown Algorithms for Inertial Navigation3. Sensor Fusion4. Regression and Classification using Neural Networks5. Multi-Body Dynamics6. Finite Element Analysis (Static and Dynamic)7. Method of Moments in Electrostatics |

Conference Presentations and Publications

1. Chander, S., Mukherjee, A., Singla, A., Shivling, V. (in press). Enhanced Euler-Lagrange Formulation for Analyzing Human Gait with Moving Base Reference, *ASME Journal of Mechanisms and Robotics*, [DOI](#)
2. Chander, S., Mukherjee, A., & Singla, A. (2023, July). *Estimation of Ground Reaction Force for Coupled Dynamic Modelling and Control of the Lower-Limb Exoskeleton*, AIR 2023: Proceedings of the 2023 6th International Conference on Advances in Robotics, July 2023, Article No.: 37, Pages 1-8, [DOI](#)
3. Chander, S., Mukherjee, A., Shivling, V., & Singla, A. (2022, October 16-20). *Modelling and Validation of Human Gait Dynamics using Modified Euler-Lagrange Approach* [Paper Presentation], 6th Joint International Conference on Multibody System Dynamics and 10th Asian Conference on Multibody Dynamics, New Delhi, India, [URL](#)