

# Abhimanyu Bhola

**Date of Birth:** 21 December 2000 | **Place of Birth:** Chandigarh, India | **Nationality:** Indian

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## EDUCATION

**Indian Institute of Technology Madras, Chennai, India**

*July 2018- July 2023*

Dual Degree Program – B. Tech in Engineering Design & M. Tech in Automotive Engineering

- **CGPA: 9.01/10**
- Graduated with the **2<sup>nd</sup> rank** in the class
- Relevant Courses: Mechatronics System Design, Design of Mechanical Systems, Physics of Measurement, Control Systems, Smart Sensing for IoT, Pattern Recognition and Machine Learning, Analog and Digital Electronics

## WORK EXPERIENCE

**Break**

*Nov 2025- Present*

- Currently on a break to focus on college applications, health, and explore the field of teaching to underprivileged children

**Design Engineer – Initio Health Tech Pvt Ltd, Bengaluru, India | **

*July 2023- Nov 2025*

**Patent (Filed): System and Method for Imaging a Test Strip.** Indian Patent Office Application No. 202511033059

- **Inventors:** Varun Akur Venkatesan, Purushottam Kadoo, **Abhimanyu Bhola**, Gautam Sharma, Siraj Issani, Rajesh Katreddy, Omkar Sanjay Karve
- An **imaging system** used to capture and analyse images from test strips, and provide quantitative hormonal insights

**Product Design**

- Led end-to-end design and validation of **7 components** in a test strip imaging system, in collaboration with data science and firmware teams, achieving **95% accuracy** in hormone measurements against laboratory benchmarks
- Designed and conducted **20+ experiments** during the development cycle to test and validate multiple designs based on **Blender Simulations**, using **SLA 3D printing** for prototyping and scaling up to **injection moulding** for production
- Improved reliability and precision of the device, **achieving detection of 2× fainter signals** compared to the older generation; while also incorporating a **UV LED to support Europium-based assays**
- Performed a detailed Design **Failure Modes and Effects Analysis (DFMEA)** on the imaging system, singling out key mechanical failure modes in the system; Made design changes for the highest risk failure modes

**Production, Quality and Vendor Management**

- Scaled up the in-house production **from 0 to a stable 300 units per week** by developing **assembly and quality control (QC) protocols**, and trained the quality and production engineers in these protocols
- Developed an **imaging test target for the End-of-Line QC** to ensure each device's reliability by experimenting with technologies such as **photolithography, and screen, pad, and digital printing technologies**
- Conducted on-site evaluations at 4 vendors across China to validate production of critical optical components including **cameras, first-surface mirrors, and beamsplitters**
- Developed and validated 10+ vendors across India and China to source plastic and optical components, and converted them to production vendors

**Battery Engineering Intern – Ather Energy, Bengaluru, India | **

*Dec 2021 – May 2022*



- Researched and conducted trials of laser welding for cell to busbar linkages by analysing **7 materials and 12 parameters** to meet pull force and resistance specifications
- Developed Python scripts to characterize and measure battery pack imbalances of Ather battery packs in the field, and performed an RCA of >15 imbalance battery packs by working with the cell engineering team

## RESEARCH EXPERIENCE

**Undergraduate Researcher – Virtual Proving Ground and Simulations Lab, IITM | **

*May 2022 – Jul 2023*

**Master's Thesis: Reinforcement Learning for Battery Charging Algorithms; Guide – Prof. R Krishna Kumar**

- Developed a model of an LFP cell in **MATLAB Simulink** to simulate the electrical, thermal, and aging characteristics after conducting an extensive literature survey on the modelling of Li-ion cells
- Designed a Proximal Policy Optimisation based RL algorithm in **MATLAB** for the fast charging of the cell, while ensuring **fast charging in an ambient temperature range of 10 °C - 40 °C**
- Achieved a **50% reduction** in charging time at the same ambient temperature when compared to 1C CCCV charging, **while maintaining a similar battery degradation**
- The abstract was selected for the **Cyber Physical Systems Summit 2023**, held at IIT Kharagpur (, )

**Researcher – Young Research Fellow Program, IITM | **

*Sep 2020 – Jun 2021*


**Obstacle Avoidance and Target Driven Guidance Algorithm; Guide – Prof. Satadal Ghosh**

- Designed a Hybrid **Obstacle Avoidance and Target Driven Guidance algorithm** in a 2D field for unmanned vehicles, incorporating proportional navigation and acceleration-velocity obstacle algorithms

- Simulated the UAV in a MATLAB environment with constant velocity obstacles and observed a **5% reduction in the time taken to reach the target** over other classical aerospace approaches

## PROJECTS

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**Team Anveshak** – Centre for Innovation, IITM, Chennai, India |  *Feb 2019 – May 2020*

- Developed a **rocker-bogie suspension** using carbon fibre linkages, customising the link lengths using MATLAB to minimize chassis vibration when travelling over a sine wave
- Designed and developed a new wheel for an autonomous rover, and achieved a **5% weight reduction** by using custom 3D printed TPU tyres, while making the wheel **10% larger**
- Designed a **modular, low-cost onboard science laboratory** for collection and analysis of soil samples for presence of bio-markers
- Achieved **5<sup>th</sup> position** in Indian Rover Challenge 2020, and ranked 8<sup>th</sup> in the design review phase of International Rover Challenge 2020, qualifying for the finals

**Anti-Lock Brake System Modelling** – Course Project: Vehicle Dynamics *Jan 2021 – May 2021*

- Developed a State-Space model based on vehicle and tyre parameters in MATLAB and a bicycle model in Simulink
- Designed PID and Bang-Bang controller for **Anti-lock Braking System (ABS)** for the bicycle model
- Evaluated yaw rate response and lateral acceleration response with Mimuro Plot with varying tyre parameters

**Sliding Mode Control for Tractor Hitch Control** – Course Project: Controls of Automotive Systems *Nov 2021*

- Modelled the electro-hydraulic system of a tractor in a controller-canonical form derived from a given transfer function
- Reduced chattering by implementing a sliding mode control with a super-twisting algorithm

**IoT Based Interactive Game** – Course Project: Smart Sensing for IoT *July 2021 – Nov 2021*

- Developed a virtual tennis game for Windows using Unity, which used an Android phone as a tennis racket by utilising the IMU sensor data
- Developed a random forest model to classify gestures into four different types of shots as input for the game

**Case Study: Use of Mobile Robotics in Industries** – Course Project: Industry 4.0 and Smart Sensing *May 2023*

- Conducted a case study on the application of multiple types of automated mobile robotics across varying industries, analysing their implementation, cost, and impact

## TECHNICAL SKILLS

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**Software:** SolidWorks, Simulink, ImageJ, Blender

**Languages:** Python, MATLAB, C, C++, Mathematica

## POSITIONS OF RESPONSIBILITY AND VOLUNTEER WORK

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**Teaching Assistant** – Electromagnetic Compatibility (EMC) for Product Design *July 2022 – Nov 2022*

- Instructed undergraduate students in operating oscilloscopes and analysing electronic signals as part of the EMC laboratory; evaluated lab assignments and provided feedback to students

**Department Legislator & Placement Coordinator** – Dept. of Engineering Design, IITM *July 2020 – May 2021*

- Acted as a representative for the student body of the Dept. of Engineering Design
- Resolved student-wide concerns as a legislator in the Student Legislative Council, including establishing a COVID-19 grievance committee
- Coordinated with **5+ companies** to organize sessions on the relevance of Automotive Engineering, **resulting in internship and full-time hiring opportunities for students**

**Voice Recording Books for the Visually Challenged** – National Service Scheme, IITM *Sep 2018 – May 2019*

- Voice recorded 2 books as initiative for distribution among the visually challenged community in Chennai

## MISCELLANEOUS

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### Scholastic Achievements

- GRE: Quantitative Reasoning- 168/170, Verbal Reasoning- 159/170, Analytical Writing- 4.0/6
- Secured a rank of 2318 (top 0.2%) in JEE Main 2018, and a rank of 3486 (top 1.5%) in JEE Advanced 2018
- Received the Kishore Vaigyanik Protsahan Yojana (KVPY) Scholarship in 2017, with a rank of 1226

### Interests

- Lego, Swimming, Running, Motorcycling, Gaming, Football, Cricket