

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 2nd 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 my college applications, health, and to participate in some volunteer work

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 2x 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**

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

- 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 **5th position** in Indian Rover Challenge 2020, and ranked 8th 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

Software: SolidWorks, Simulink, ImageJ, Blender
Languages: Python, MATLAB, C, C++, Mathematica

POSITIONS OF RESPONSIBILITY AND VOLUNTEER WORK

- Math Teacher** – Shikshantar, Mumbai Nov 2025 – Present
- Teaching Math to underprivileged students of Class 9 in Mumbai
- 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

- 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