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 – Inito Health Tech Pvt Ltd, Bengaluru, India | 🌐   *July 2023- Nov 2025*

<u>Patent (Filed): System and Method for Imaging a Test Strip,</u> 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

<u>Product Design</u>
- 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

<u>Production, Quality and Vendor Management</u>
- 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 | 🌐   *Jun 2022 – Jul 2023*

<u>Master's Thesis: Reinforcement Learning for Battery Charging Algorithms;</u> 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 ℃ - 40 ℃**
- 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*

<u>Obstacle Avoidance and Target Driven Guidance Algorithm;</u> 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   *Jul 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   *Jul 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