

## Industrial Experience

May'17- **BMS Evaluation for future products**

Jun'17 *Ather Energy Pvt. Ltd*

- Designed **firmware architecture** to incorporate the new Analog Front Ends with existing functionality
- Configured the development kit with Ather's PXI setup to test accuracy at temperature & voltage ranges
- Interfaced with vendors and studied **6 BMS** solution available in market for electric 2 wheeler application
- Interacted with various teams (BMS, Product management, Vehicle intelligence, System integration) to assign weightage of parameters like accuracy, design, flexibility, cost and reliability
- Developed a **decision matrix** to decide the best suited product based on the above parameters

## Engineering Experience: IIT Bombay Racing Team

*Faculty Advisor: Prof. Amber Shrivastava, Department of Mechanical Engineering, IIT Bombay*

A 3-tier cross-functional team of 60+ students to build an electric vehicle for **Formula Student UK**, an international race car design competition organized by Institution of Mechanical Engineers

Jul'17

-Jul'18 **Chief Electrical Officer**

- Lead the entire electrical subsystem with focus on Electrical Power-train and Low Voltage subdivisions
- Responsible for design event & all dynamic events accounting for **82.5%** of total competition points
- Secured **2nd rank** in Formula Bharat and **12th rank** in Formula Student, UK design events
- Electrical System Officer of the team, responsible for the scrutineering process, safety of the car and any activity concerning high voltage electrical system at the competition
- Devised annual targets of the team's electrical sub-system based on marginal utility and resources
- Managed the expenditure and allocation of subsystem budget of **Rs. 2.5 million**
- Involved in drafting of project proposal which won FS award '18 worth **£3000** (8 out of 85 teams)
- Brokered deal with PCB Power and TE Connectivity to sponsor components worth **Rs. 300K**

Jul'16

-Apr'17 **Design Engineer**

- Lead designer of the Electrical Powertrain involving **Li-ion batteries**, BMS (Battery Management system), Motors, Motor Controllers and other peripheral circuitry
- Designed the BMS to monitor cell voltages, temperatures to enhance battery performance and safety
- Achieved cost saving of over **Rs 100k** through modular design and in-house manufacturing
- Conceptualised and implemented on-board passive balancing for the first time in the team's history
- Designed 400V battery pack with 96 lithium-ion pouch cells, having capacity of **7.8 kWh**

Sep'15-

Jul'16 **Junior Design Engineer** | Battery and BMS subsystem

- Assembled the **400VDC** Battery pack and gained experience in handling highly sensitive Li-ion cells
- Closely involved during and in preparation for the main scrutineering event at Formula Student, UK

## Academic Credentials

2016-17 Awarded **Institute Technical Color** for exemplary performance in Institute technical activities

2014 Secured **All India Rank 896** in IIT-JEE advance 2014 amongst 1,30,000 aspirants

2014 Selected for Kishore Vaigyanik Protsahan Yojana (**KVPY**) Scholarship

2012 Secured **International rank 13** in International Maths Olympiad(IMO) and **International rank 35** in National Science Olympiad (NSO)

## Projects

- Jul'18- **Energy Harvesting using Mechatronics Nanogenerators**| Dual Degree Project  
Present *Supervisor: Prof. Dinesh Kabra, Department of Physics, IIT Bombay*
- Studying **piezoelectric effect** in novel non lead halide perovskites through extensive literature review and experimentation for their fundamental as well as applied properties
  - Characterizing the performance of piezo devices for different frequency, force and load settings
  - Designing and fabricating an electrodynamic shaker based setup for above requirements
  - Creating a LABView based interface for data acquisition and control of the setup
- Aug'16- **Study of Thermoelectric Effects in Molecular Semiconductors**  
Nov'16 *Supervisor: Prof. Dinesh Kabra, Department of Physics, IIT Bombay*
- Studied thermo-electric effect and charge transportation in Molecular Semiconductors
  - Prepared a detailed report comparing thermoelectric properties of organic and inorganic semiconductors
- May'15- **The Virtual Mouse**  
Jun'15 *Institute Technical Summer Project 2015, Student Technical Activities Body*
- Created a glove like device, to perform mouse functions like clicking, dragging and scrolling
  - Implemented self developed algorithm on an Arduino board to control mouse functionality
- Mar'16- **A Study of Sloshing Modes**| Course Project  
Apr'16 *Supervisor: Prof. Kundu Tapanendu, Department of Physics, IIT Bombay*
- Derived and solved the equations for sloshing modes of a rectangular tank using **Euler and Laplace equations** and experimentally verified their existence
  - Plotted the amplitude of the liquid inside a rectangular container using MATLAB and Image Processing
- Mar'18- **Synthesis of Gold Nanoparticle and their optical properties**| Course Project  
Apr'18 *Supervisor: Prof. Muhammad Aslam, Department of Physics, IIT Bombay*
- Synthesized gold nanoparticles by Turkevich method to study optical properties using UV-Vis spectroscopy
- Mar'18- **Study on three layer plasmons**| Course Project  
Apr'18 *Supervisor: Prof. Anshuman Kumar, Department of Physics, IIT Bombay*
- Studied and derived dispersion relation for plasmonic waveguides and spherical shells

## Positions of Responsibility

- Jul'18- **Teaching Assistant**| **Microprocessors lab**  
present *Course instructor Prof Pradeep Sarin, Department of Physics, IIT Bombay*
- Providing academic help and guidance to 40+ students in their lab assignments and projects
- Jul'17- **Institute Student Mentor**  
Apr'18 *Institute Student Mentorship Programme, IIT Bombay*
- Selected on basis of overall performance as part of team of 83 mentors from among 310 applicants
  - Mentoring and guiding a batch of 12 freshmen in their academic and extracurricular endeavors
- Jul'15- **Technical Secretary**| *Hostel 9 Council, IIT Bombay*  
Apr'16
- Upgraded hostel technical inventory and ensured participation in institute General championship
  - Awarded **Hostel Technical Color** for exceptional contribution to hostel technical scenenario

## Software Skills

- Language C++, Embedded C, Arduino,  $\text{\LaTeX}$
- Software LABView, MATLAB, EAGLE, Solidworks, AutoCAD, and LTSpice(circuit simulator), Microsoft Project

## Key Courses Undertaken

- Physics Condensed Matter Physics, Physics of Nanostructures and Nanoscale devices, Photonics, Physics of Quantum devices, Electricity and Magnetism, Advance Laboratory Techniques in Nanoscience
- Electronics Sensors in Instrumentation, Signals and Systems, Power Electronics, Digital Systems, Introduction to Electronics, Microprocessor lab, Analog Electronics lab, Digital Electronics lab
- Electrochemical Energy storage