

VRAJ PARIKH

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EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

Integrated Masters of Technology in Mechanical Engineering
CGPA 7.56

Kharagpur, IN
July 2014 – May 2019(*Expected*)

PRAKASH HIGHER SECONDARY SCHOOL

AISSCE, AISSE (CBSE)
AISSCE: 94% Overall, 98% in Sciences
AISSE: CGPA 10.0

Ahmedabad, IN
June 2003 – May 2014

PROJECTS

ELECTRO-PNEUMATIC QUICK SHIFTING FOR FSAE CAR

System Analysis, Design & Manufacturing Coordinator

TeamKART, IIT Kharagpur
July 2015 – January 2016

- *Design Efficiency:* 1500 shifts at 1000psi tank pressure. *Shift Time:* 143 milliseconds. *Working Pressure:* 200 psi
- Designed *In-house filling system*, First team in India to do so; *Costs one-tenth* one most *commercially available quick shifting systems*, offering similar levels of performance; *Adaptable* line pressure and flow rate up to 600 psi
- *Custom Electronic Control Unit*, implementing *Tunable shift time* & compatible with *flat (CUT) shifting systems*
- *Manufactured*, Rigorously *tested* and *implemented* on K3 (*The FSAE Car for the Season 2015-17*). Images [Here](#)

ECCENTRIC DIFFERENTIAL MOUNTS FOR DREXLER FSAE DIFFERENTIAL

Chief Designer and Analysis Engineer

TeamKART, IIT Kharagpur
February 2016 - Present

- *Weight:* 525gms, *Material:* Aluminum 7075 T6 Alloy, *Minimum FOS:* 2.6, *Chain Length Adjustable* up to 2.5cms
- Designed & analyzed a *revolutionary* mechanism for *Integrated Chain tensioning* within the Differential Mounts
- Significantly *reduced the weight using numerical Optimization Techniques* from 4.6kgs to 525gms maintaining the structural integrity of the system, *Optimized surface contours* for easy manufacturing, [Link](#) to Documentation

LOW-COST AUTONOMOUS BICYCLE

Control Systems Team Member

LBS Hall Of Residence, IIT Kharagpur
January 2015 – April 2015

- Developed a low cost mechanically balanced autonomous e-bicycle that could avoid obstacles and follow GPS coordinates to arrive at a given location on the receipt of a text message, while following lanes wherever possible
- Developed *obstacle avoidance system* using three ultrasound sensors to create *obstacle map* and hence avoid them
- Also worked on developing the *SMS decoding API* to be used for getting the GPS coordinates of the target point
- The team won *Gold* at the *Hardware Modelling Competition 2015* & *KPIT Sparkle 2015* for the same [project](#)

COMPREHENSIVE FITNESS TRACKER FOR THE ELDERLY

Control Systems Team Member

IEEE SMB Hackathon, IIT Kharagpur
August 2015 – Present

- Developed a pair of smart cards to make a remote comprehensive fitness tracker for the elderly people to monitor their pulse, posture and facilitate indoor mapping. Also implemented remote alarm modules in case of emergency
- Worked on the *pedometer and indoor mapping module*, developed a *signature algorithm* for accurate indoor tracking
- *This project has been offered a place in the commercial market by a renowned senior living construction firm*

PUBLICATION

Low-Cost Autonomous navigation and Control of a Mechanically Balanced Bicycle with Dual Locomotion Mode
Ayush Pandey et al. IEEE Transport Electrification Conference (ITEC), June 2015.

INTERNSHIP

UNCOORDINATED SUPPLY CHAIN MANAGEMENT SIMULATOR

Guide: Prof. Sanjay Verma, Information Systems, Indian Institute of Management Ahmedabad

IIM Ahmedabad, IN
June 2016 – July 2016

- Developed a web based simulator for *monitoring the flow of orders and inventory* in an *uncoordinated supply chain* in the form of an online multi-team web game, used to demonstrate the concept of *Bullwhip Effect*
- Designed the front end of the same using *Bootstrap* and back-end using *My SQL*, hosted on institute server
- *Game mechanics* work similar to that of the *Beer Game* developed at *Massachusetts Institute of Technology*

POSITIONS OF RESPONSIBILITY

TECHNOLOGY ROBOTIX SOCIETY

Autonomous Events & Administrative Head

Technology Students Gymkhana, IIT Kharagpur
February 2016 – Present

- As a head of the *University Robotics Society*, am responsible for the conduction of various events to *promote robotics culture* in the campus of *IIT Kharagpur* as well as in other *institutions in the east to northeast India*.
- Leading a 3 tier team of *50+ members* to ensure the *execution of an intensive yearlong timeline* for conduction of in-house events (11 Events) as well as the *execution of ROBOTIX 2017*, the *largest robotics fest in the country*
- Responsible for *managing workshops* conducted by the society in other colleges, *structured 3 workshops* till date
- Responsible for *Structuring, Prototyping and conducting* the *Autonomous Robotics events* in *ROBOTIX 2017*

KHARAGPUR AUTOMOBILE RACING TEAM (KART)

Chief Transmission Engineer/ Transmission Team Head

Department of Mechanical Engineering, IIT Kharagpur
February 2016 - Present

- Responsible for *design, analysis and manufacturing the powertrain system for K4*, the *fifth FSAE car* of TeamKART, which would *represent the institute at Formula Student 2018/19*, the largest of its kind in the world
- KART is a *research project* under the guidance of *Prof. A R Mohanty, Dept. Of Mechanical Engineering*, aimed at developing low-cost, optimized, weekend racing vehicles to resemble the Formula One cars at a prototype level
- Raised *INR 10,00,000 (USD 15,000)* in sponsorship, the *largest contribution by anyone in the history of the team*

CENTRE FOR EXCELLENCE IN ROBOTICS

Student Coordinator

IIT Kharagpur
July 2015 – Present

- CFER is an institute body aimed at bringing all the robotics projects in the institute under a single roof to promote exchange of ideas, faster workflow and more contribution to literature; has been funded by the MHRD
- Act as the *point of contact* between the *Robotics research groups* and the *authorities of the institute*; also coordinate with Journals, Conferences and publication houses to facilitate the faster flow of research to literature/conference
- Also involved in the *Structuring of the budget* allocation to *Robotics research groups*. Budget *INR 5Cr (USD 739,000)*

INITIATIVE

MAKERSPACE, TECHNOLOGY ROBOTIX SOCIETY

Founding Head and Grand Wizard

Technology Students Gymkhana, IN
July 2016 – Present

- Conceptualized the *first Makerspace* of IIT Kharagpur, a *community-based open source hardware hacking lab* to make prototypes of selected hardware implementations; as well as a meeting ground for open software projects
- Convinced the institute to provide *INR 2 Lakh (USD 3000)* for the *procurement of instruments* for the same
- Developed an *online Internet of Things based inventory management framework* for managing the users as well as inventory of this lab autonomously, hence *solving the biggest problem of manning the lab at all points of time*
- Initiated the first Makerspace project and organized a *large online idea hunt* for the second slot of the projects; organized a *money flow system* so as to provide financial support to the undertaken projects. [Here](#) is the proposal

TEACHING & MENTORSHIP

IEEE WINTER WORKSHOP AND K.R.A.I.G.

Mentor & Course Designer

Technology Students Gymkhana, IN
October 2015 – Present

- At Kharagpur Robotics & Artificial Intelligence Group, have *been teaching basic concepts of manual and autonomous hobby robotics* at seminars with an *attendance of 150+ freshmen and sophomores* of IIT Kharagpur.
- Also designed the comprehensive coursework for these yearlong seminars, which is used till date. [Documentation](#)
- Mentored a Group of 30 freshmen and sophomores in December 2015, for a weeklong IEEE sponsored Winter Workshop whose problem statement dealt with making a robot which can mimic human movements.
- Taught intermediate autonomous robotics and basics of control theory; Links here to [images](#) and [documentation](#)

SKILL SET

EMBEDDED SYSTEMS: AVR and Arduino, Raspberry Pi and Similar, IoT, Sensor Integration, Communication Protocols
LANGUAGES & ENVIRONMENTS: C++, C, Python, ROS, OpenCV, bash, MATLAB (Control Systems), Git
MODELLING & ANALYSIS: SolidWorks, ANSYS, MATLAB (Fluid Dynamics), iNSPiRE (Hyper Works Package), EES
HOBBY: Adobe AfterEffects, Adobe Illustrator, Android App Development, HTML & CSS, Audacity

COURSE WORK

IIT KHARAGPUR

Completed

Fluid Mechanics

Thermodynamics

Introduction to Flight Vehicle Controls

Transform Calculus

Basic Electronics

Dynamics

Kinematics of Machines

Programming And Data Structures

Ongoing

Materials Engineering

Heat Transfer

Casting Forming & Welding

Globalization & Culture

Mechanics of Solids

ONLINE

Completed

Control of Mobile Robots (*Coursera*)

Machine Learning (*Coursera*)

ACHIEVEMENTS

OLYMPIADS

Conducted by HBCSE & TIFR

Class IX to XII

July 2011 – May 2014

- 2011 – 12: Only candidate from Gujarat region of class IX to clear RMO; Missed IMO-TC by 6 Marks
- 2013: Finished in top 1% in National Standard Examination in Astronomy; Got Selected for INMO & INAO
- 2014: Finished in top 1% in National Standard Examination in Physics & Astronomy; selected for INAO & INPhO

ENTRANCE TESTS

National Entrance Tests for University Admissions

Class XII

May 2014 – July 2014

- Got selected for Indian Statistical Institute, for its B. Math. Course; In the top 30 from over 40,000 applicants
- 98% percentile score in JEE Mains 2014, Score: 235/360, Placed 15th in Gujarat State merit list (ACPC)
- 98.9% percentile score in JEE Advanced 2014, All India Common Merit List Rank 1636.

COMPETITIVE HOBBY ROBOTICS

Fun Hardware Implementations in Small Competitions

Undergraduate Years

July 2014 – Present

- Appreciation in Freshers Robosoccer Challenge 2014, by Technology Robotics Society
- Appreciation Award in the Manual Robotics Category in NSSC 2014, for the event Conveyer
- Appreciation Award in the Autonomous Robotics Category in NSSC 2015, for the event Mauler
- Silver Medal in IEEE Happy Ageing Hackathon, August 2015

RESEARCH INTERESTS

Control Systems, Computer Vision, Mechanisms Analysis & Design, Embedded Systems, Automotive Design, Innovative Powertrains

CO – CURRICULAR ACTIVITIES

MUSIC: Like to play Synthesizer and Guitar at Hobby Level

SPORTS: Plays Badminton, Chess & Football at Hobby Level

QUIZ, ELOCUTION & DEBATES: Have done Quizzes, Elocution & Debates at Intra and inter-school level.

Kharagpur, September 19, 2016