

Yashraj Gurumukhi

GRADUATE STUDENT · MECHANICAL ENGINEERING

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Education

University of Illinois, Urbana Champaign

M.S IN MECHANICAL ENGINEERING

Illinois, USA

August 2018 - Present

- Awarded with **Department Fellowship** for 2018-19 session

Indian Institute of Technology Bombay

B.TECH. WITH HONOURS IN MECHANICAL ENGINEERING AND MINOR IN ELECTRICAL ENGINEERING

Mumbai, India

July 2014 - May 2018

- Ranked **3rd** in a class of 150 students with a CGPA of **9.55/10**
- Conferred **Institute Academic Excellence Award** for extraordinary academic performance during 2016-17 session
- Recipient of the OP Jindal Engineering and Management Scholarship (**OPJEMS**) 2017-2018 awarded for academic and leadership excellence
- Awarded **Department Technical Citation** for contributions to department technical culture

Product Development Experience

IIT Bombay Racing

Prof. Amber Shrivastava, IIT Bombay

A CROSS FUNCTIONAL, 75+ STRONG TEAM DESIGNING AND FABRICATING ELECTRIC RACE CARS FOR FORMULA STUDENT DESIGN

August 2015 - July 2018

COMPETITION HELD ANNUALLY AT SILVERSTONE, UNITED KINGDOM WITH 125+ TEAMS FROM 30+ COUNTRIES

Chief Mechanical Officer

July 2017 - July 2018

- Led the overall mechanical subsystem, with focus on vehicle dynamics testing-tuning along with the role of Deputy Team Leader
- Monitoring the allocation and expenditure of total subsystem budget of **INR 2.5 million**
- Led research on All-Wheel-Drive with torque vectoring and in-hub motors for the team's future vehicles
- Secured new sponsors for funding worth **INR 1.2 million**
- Team achieved **12th** position in Engineering Design Event at FSUK 2018 and conferred with IMechE **Formula Student Award** for 4 seasons

Design Engineer

July 2016 - April 2017

- Overhauled steering design to include **2-metal steering rack** and **steering shaft**
- Automated** the process of generating steering geometry to increase accuracy and reduce time spent during design phase
- Designed suspension geometries by kinematic optimization for rim size reduction to 10 inch, achieving decrease in moment of inertia by 12%
- Modelled the steering assembly in SolidWorks, analyzed in ANSYS Static Structural to optimize for reduced weight while ensuring strength

Research Experience

Analysis of a flapping wing for ornithopter

Undergraduate Thesis

PROF. ARINDRAJIT CHOWDHURY, DEPT. OF MECHANICAL ENGINEERING, IIT BOMBAY

July 2017 - April 2018

- Conducted an extensive literature review to understand unsteady lift and drag generation, and unsteady flow over flapping wings
- Developed a mathematical model in MATLAB based on existing theory to capture lift, drag and thrust generation for different wing profiles and finding an optimal wing design based on these results
- Designed a test rig for full scale wing testing as similitude experiments are unable to capture results accurately for a flapping wing.

Microfluidic Models of Angiogenesis

Research Internship

PROF. JONATHAN SONG AND PROF. SHAURYA PRAKASH, OHIO STATE UNIVERSITY

May 2017 - July 2017

- Fluid forces affect permeability and growth rate of blood vessels, with possible implications for cancer research
- Worked in a Biological Safety Level-2 (BSL-2) lab to culture Human Umbilical Vein Endothelial cells (HUVECs)
- Manufactured micro-devices by soft lithography, conducted permeability measurements under different fluid forces
- Surveyed literature for effect of various electric fields on cells and conducted the initial experiments to measure effect of Direct Current (DC) electric fields on permeability of HUVECs

Control of Homogeneous Charge Compression Ignition Engine

PROF. ARINDRAJIT CHOWDHURY, DEPT. OF MECHANICAL ENGINEERING, IIT BOMBAY

June 2016 - April 2017

- Achieved stable HCCI combustion for gasoline as a fuel with reduced emissions and increased efficiency over a diesel engine
- Developed Arduino based PID controller to achieve constant engine speed for different loads by regulating fuel air intake of engine in homogeneous charge mode

Lift Controller

Course Project

DIGITAL ELECTRONICS, PROF. ANIL KOTTANTHARAYIL, ELECTRICAL ENGINEERING, IIT BOMBAY

Autumn 2015

- Designed logic for the circuit that would act as controller for a single channel lift for a 4 storeyed building
- Implemented the circuit using logic gates, registers, counters, multiplexers

ChessOverIP: An autonomous chess playing bot

INSTITUTE TECHNICAL SUMMER PROJECT, IIT BOMBAY

May 2015 - June 2015

- Designed and built a one-player chess playing physical bot, in a team of 4, capable of competing against an AI or a remote opponent
- Implemented a dynamic thresholding based image processing algorithm using OpenCV module to track the movement of pieces
- Awarded **Best Implementation** at TechRnD Expo 2015, selected out of **121 projects**

Development of a Navier Stokes Solver

Course Project

COMPUTATIONAL FLUID DYNAMICS, PROF. ATUL SHARMA, MECHANICAL ENGINEERING, IIT BOMBAY

Autumn 2016

- Developed a Finite Volume approach based two dimensional Navier-Stokes solver in SciLab to analyse lid-driven cavity flow using semi-implicit method for pressure linked equations

Positions of Responsibility

Undergraduate Teaching Assistant

BASICS OF ELECTRICITY AND MAGNETISM, PROF. KUMAR RAO, DEPT. OF PHYSICS, IIT BOMBAY

Spring 2016

- Organizing tutorial sessions for 40 freshmen on different topics pertaining to the course
- Assisted the instructors in comprehensive and timely evaluation of students

Technical Secretary

HOSTEL 5, IIT BOMBAY

August 2015 - April 2016

- Maintained the hostel tech room and organised various technical activities in the hostel
- Led the hostel in various inter-hostel technical competitions
- Awarded Hostel Technical Special Mention for 2 consecutive years for contribution to hostel tech culture

Computer Skills

Computer Aided Design (CAD) SolidWorks, AutoCAD

Computer Aided Engineering (CAE) ANSYS Static Structural, ANSYS Fluent, MSC Adams

Mathematical Analysis MATLAB

Programming Languages and Packages C/C++, Python, SDL, OpenCV

Extracurricular Activity

Music

- Trained in **Violin** for two years (2006-2008) and **Guitar** for one year (2014-2015)
- Trained in **Indian classical singing** for 3 years; Secured 1st Class in first level certificate course

Competitions

- Third among 120 teams in intra college Logic General Championship held in IIT Bombay 2016
- Third in DataQuest, optimization based analytics competition, held in IIT Bombay by **Capital One** 2016
- Third among 600 teams in Mumbai round of TCS IT Wiz - interschool IT quiz 2012

Technology

- Built several hobby projects including an automatic book lamp, remote controlled plane, line follower bot, personal radio transmitter
- Avid follower of computer hardware, gaming and technology news and reviews