



**Ramanath Pai**  
**Mechanical Engineering**  
**Indian Institute of Technology, Bombay**

**07010022**  
**B.Tech.**  
**Male**  
**DOB: 23rd Sep, 1989**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2010	8.52
Intermediate/+2	CBSE	KV Ambarnath	2007	95.40
Matriculation	Maharashtra State Board	Smt. K. C. Gandhi English School	2005	91.33

## Major Technical Projects

**PRATHAM – IIT Bombay’s First Student Satellite** *Co-curricular project*  
*Member, Structures Sub-system* *Autumn 2008 – Summer 2010*

- Surveyed extensive literature on modelling of satellite structure and components in ANSYS
- **Analysed the structural response** for static and dynamic loading to prevent disintegration of the satellite structure under **harmonic loads and random vibrations**
- Qualified for the final round of Mahindra Satyam **Aerospace Young Engineer Awards 2010**

**Automatic Control System for novel Steam Expander** *B.Tech. Honours Project*  
*Guide: Prof. M. V. Rane* *Autumn 2010 – Ongoing*

- Aimed at developing an efficient automatic control system for a 10 kW capacity steam expander based on the reciprocating piston mechanism
- Currently working on **identifying and realising** the ideal combination of **sensors, actuators and control law** to sustain the expander without allowing steam to condense in the supply
- Project expected to **utilise energy from waste or co-produced steam with 60% efficiency**

## Research Experience

**Efficiency analysis of Ballard Nexa Fuel Cell System** *Summer Internship 2010*  
*Control, Instrumentation and Electrical Systems Lab, University of Western Ontario, Canada*

- Experimented with **DC/DC converter parameters** to study their effect on fuel cell efficiency and **optimised** the same for maximum efficiency
- Proposed a **new model for the internal resistance** of the fuel cell based on experiments and evaluated **efficiency-load characteristics** for the fuel cell system under resistive load
- Results being used for research involving fuel cells in **distributed generation** applications

## Key Academic Projects

**Probing Station for MEMS Logic Gates** *Guide: Prof. P. S. Gandhi* *Summer 2009*

- Built a standalone probing station for Micro-Electro-Mechanical devices costing about INR 7,000
- Developed an efficient mechatronic system to control a needle mounted on CD-ROM drive head
- Currently being used for research to validate the results of MEMS chip deflection simulations

**Micromouse** *Personal Project* *Winter 2007 – Winter 2008*

- Designed and built a fully-autonomous robot which can navigate and solve an unknown maze
- Implemented a **Proportional - Derivative control** law for position control of the robot to enable it to move along a straight path while navigating the maze
- Finalist at Techfest, the technical festival of IIT Bombay in 2009

**Product Life-cycle Management of Knee Implant** *Course Project* *Spring 2010*

- Worked in a **diverse** five-member team to **design a knee implant** to restore full functionality in **fracture and bone cancer** cases and to satisfy the needs and requirements of **Indian patients**
- Design was validated to test compliance with **Design for Assembly, Manufacture, Safety, Service** and principles of **cost estimation and minimisation**

**CNC Milling Machine** *Course Project* *Autumn 2009*

- Led a team of 12 members to build a CNC milling machine costing less than INR 10,000
- Input in the form of ASCII file communicated to the microcontroller using **UART protocol**
- Modelled lead-screw based **stepper motor controlled actuation** mechanism in SolidWorks

## Awards and Achievements

---

- **Robotics and Technical activities** – *inter-collegiate* and *inter-hostel events*
  - **2<sup>nd</sup>** in Mumbai Leg of Nexus 2009, a **nationwide Techfest competition** involving building a grid following robot which receives checkpoint information via RF communication module
  - **2<sup>nd</sup>** among 7 teams in Roboholix - an **inter-hostel competition** involving the manually operated robot outwitting the autonomous robot of the other team to fill a bowl of water
  - **3<sup>rd</sup>** among 15 teams in Techathlon - an **inter-hostel competition** with series of events related to paper plane, structural and electronic circuit design
- Awarded **Hostel Technical Color** (2008-09) for playing an instrumental role in helping the hostel secure the **3<sup>rd</sup>** place in the Technical General Championship
- Qualified for **Indian National Chemistry Olympiad 2007** by virtue of being in the top 1% among 33,300 students in the National Standard Examination in Chemistry (NSEC)
- Ranked **14<sup>th</sup>** among students of 850 Central Schools across India in Class **12<sup>th</sup>** board examination

## Positions of Responsibility

---

**Overall Coordinator, TechniC** – The Technical Club of IIT Bombay *2009-2010*

- Spearheaded a two-tier team of **12 core group members** and **12 hostel technical secretaries** to increase participation in technical activities by executing institute-wide events
- **Energy General Championship:** Collaborated with Techfest 2010 for an initiative to make the campus *energy efficient* with an **8% reduction in energy consumption** translating into **savings of INR 7.79 lakhs**
- Pioneered a large scale inter-hostel **combat robotics competition**, *Robo Wars*, which witnessed **overwhelming participation** from all hostels
- Organised an **industrial tour** for 35 students to the **Suzlon Wind Farm** in Ahmadnagar
- Coordinated an IITB contingent which went on to win a major robotics event at Shastra - the technical festival of IIT Madras

**Institute Student Mentor** *2010-11*

- Selected to be a **student-mentor** on the basis of **balanced academic performance and extra-curricular activities**
- **Penned articles** for the freshman booklet and **assisted in setting up the freshman forum**, an initiative to solve doubts faced by first year students before joining IIT
- **Mentored 11 new entrants** and helped them make a smooth transition to campus life
- **Monitored and mentored** two senior students suffering from severe academic under-performance as a part of the **Department Academic Mentorship Program**

## Technical Skills

---

*CAD packages* : Pro/Engineer, SolidWorks, Eagle (PCB Layout)

*Modeling & Analysis* : MATLAB/Simulink, ANSYS, COSMOS

*Microcontrollers* : Atmel AVR – ATmega 8/16/32, Philips 89C52, Freescale XEP100

*Programming* : C/C++

*Miscellaneous* : Microsoft Office, HTML, L<sup>A</sup>T<sub>E</sub>X

## Extra-Curricular Activities

---

### Cultural

- Awarded **Hostel Special Mention** for **dramatics** in the Performing Arts Festival 2008
- Part of school team in the **18<sup>th</sup> National Youth Parliament** competition held by the Ministry of Parliamentary Affairs at Jaipur and was awarded the **2<sup>nd</sup>** prize for **meritorious performance**
- **Quizzing enthusiast**, regularly participate in various quizzes held in the institute
- Participate in **Potpourri** events such as *dumb-charades*, *picto* and *rebuses*

### Miscellaneous

- **Volunteer to teach electronics** to freshmen in Electronics Club sessions
- Enthusiastic about **web-designing** – maintain a personal homepage on the department server