

**Name: Shalmali Patkar**  
**Dept: Chemical Engineering**  
**4<sup>th</sup> Year (Dual Degree)**

**Roll No: 09D11008**  
**CPI: 9.35**

Pursuing a **minor degree in Computer Science and Engineering.**

## **SCHOLASTIC ACHIEVEMENTS**

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- Currently ranked 1st among the 42 dual degree students and 2nd among the 110 students of chemical engineering department.
- Secured a grade of AP (awarded for the outstanding performance in Institute Core Courses) in one course (Solid Mechanics) over the last four semesters.
- Secured All India Rank 2210 (State Rank 171) among more than 9.6 Lac students who appeared for AIEEE 2009 and awarded scholarship for the same.
- Secured Merit in Maharashtra Pravinya Pradnya Examination.
- Ranked 99th among 2035 students in All India Open Mathematics Scholarship Examination, 2006.

## **PROFESSIONAL EXPERIENCE**

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- **University Of Michigan, US** *May-July 2012*  
Guide: Prof. Scott Fogler
  - Successfully conducted experiments on different compositions of Asphaltenes in heptanes and toluene mixture and observed their viscosity behavior.
  - Self taught the principles of NMR and obtained training on usage of the NMR instrument.
  - Developed examples and content for the 3rd edition of the book Strategies for Creative Problem Solving (SCPS) by Fogler and LeBlanc.
- **Mexus Education** *May-July 2011*  
Guide: Mrs. Teena Paul
  - Involved in conceptualizing and creating innovative educational content.
  - Successfully generated the content for a product named 'IKEN ZING'.
  - Generated the question bank for an online Math Exam, to be held throughout the country.
  - Devised the online test pattern, score evaluation method and report pattern for the exam.

## **KEY ACADEMIC PROJECTS**

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- **Soft sensing using deterministic sampling based Bayesian state Estimators** *Ongoing 2012*  
(Course Project)  
Guide: Prof. Sachin C Patwardhan
  - Soft sensing or on-line estimation of unmeasured states by fusing dynamic model based predictions with available measurements.
  - Use of deterministic sampling based Bayesian state estimators for soft sensing.
- **Molecular and Statistical Thermodynamics** *Spring 2011 (Course Project)*  
Guide: Prof. Jhumpa Adhikari
  - Did modeling and simulation in Scilab and Matlab for a one dimensional Ising model.
  - The problem was solved using Demon algorithm. Code was written to determine the average energy and magnetization of the system.
- **Introduction to Numerical Analysis** *Spring 2011 (Course Project)*  
Guide: Prof. Mani Bhushan
  - Solved an Ordinary Differential Equation – Boundary Value Problem (ODE-BVP) using Scilab.
  - Made use of numerical analysis techniques such as Finite Difference Method and Orthogonal Collocation Method for the same. Using numerical methods minimized the error between true solution and approximate solution.

- **DC Motor Encoder:** *Summer Project (2010)*
  - Successfully built a robot (car) using dc motors which could exactly follow a set of pre defined instructions.
  - Position and speed control were achieved using a pair of encoder wheels and IR sensors.

## **Position of Responsibility**

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- **MANAGER, VIRTUAL LABS** *(present)*  
*Collaborative initiative of IIT Bombay with MHRD to develop minimal cost virtual experiments*
  - Designing online experiments of Chemical Engineering using Open Source software, to be made available to students across country free of cost
  - Working with a team of 14 students to coordinate with Faculty, MHRD officials and other colleges
  - Mentoring student enthusiasts from various colleges to develop a complete Learning Management System including additional web-resources, video-lectures, animated demonstrations & self-evaluation
  - Generating ideas for Remote Triggered Experiments, a unique approach to provide online-access to Labs
- **TECHNICAL NOMINEE OF HOSTEL** *(2011-2012)*
  - Conceptualizing and initiating new events catering to more than 400 students.
  - Trying to inculcate the enthusiasm for technical activities and ensuring the increment in the technical knowledge of the hostel people through the same.
  - Working towards improving the hostel position in the institute in Technical activities.
- **CORE GROUP MEMBER OF ELECTRONICS CLUB, IIT-BOMBAY** *(2010-2011)*
  - Part of an eight member team, headed by three overall coordinators.
  - Successfully organised and conducted a microcontroller session attended by around 70 people

## **COURSES COVERED (BY DECEMBER 2012)**

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- Solid Mechanics, Chemical Engineering Thermodynamics, Process Fluid Mechanics, Chemical Reaction Engineering, Fundamentals of Heat and Mass Transfer, Transport Phenomena.
- Data Analysis and Interpretation, Introduction to Numerical Analysis, Economics.
- Computer Programming and Utilization, Discrete Structures, Data Structures and Algorithms, Operating Systems.
- Calculus, Differential Equations, Linear Algebra, Complex Analysis.
- Process Control, State Estimation, Computational Fluid Dynamics

## **EXTRA CURRICULAR**

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- Awarded a Certificate of Appreciation for efforts put in activities of National Service Scheme (NSS) (2009 - 2010)
- Secured 3rd prize in FreshE (competition under Electronics Club of IIT Bombay) (January 2010)
- Awarded hostel Tech Special Mention in 2010.
- Participated in Avlanche: *December(2011)*
  - Design and implemented a robot to collect balls and separate them in different pits based on image processing as a part of techfest, IIT Bombay's technical event.
- Participated in Nexus: *August(2010)*
  - Made an autonomous robot for following a grid, detecting a specific block and bringing to the top of a ramp. Used TSOP sensors for block detection.

## TECHNICAL SKILLS

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- Programming Languages: C, C++
- Operating Systems: Windows , Linux(basic)
- Packages: Scilab, Matlab, WinAVR, LTSpice, Arduino
- Microcontrollers: ATMEGA 8,16