Bharat Monga | **100010061**
Mechanical Engineering | **UG Fourth Year(Dual Degree)**
Indian Institute of Technology, Bombay | **Male**
Specialization: Computer Aided Design (CAD) & Automation | **DOB: 11-11-1991**

Examination	University	Institute	Year	CPI / %
Graduation	**IIT Bombay**	**IIT Bombay**	**2013**	**9.04**
Intermediate/+2	**CBSE**	**Swami Sant Dass Public School**	**2010**	**91.00**
Matriculation	**CBSE**	**Swami Sant Dass Public School**	**2008**	**89.83**

AWARDS AND ACHIEVEMENTS

- Awarded **DAAD-WISE** research grant by **German Academic Exchange Service** (given to 167 students across India)
- Awarded **Branch Change** from Aerospace Engineering to Mechanical Engineering offered to only 38 students out of batch of 880
- Awarded **Advanced Performance Grade** in **Linear Algebra** (given to only 8 students in a course enrolment of 880)
- Secured an **All India Rank of 1351** in **Joint Entrance Examination'2010**
- Secured an **All India Rank of 624** in **All India Engineering Entrance Examination 2010**
- Secured an **All India Rank of 187** in 11th **National Science Olympiad 2008**
- Secured **All India Rank of 14** in **International Olympiad of Science 2009** organised by Society of Science Education

INTERNSHIPS

Finite Element Modelling of CFRP Structures *May-July 2013*
Guide: Prof. Dr.-Ing. Frank Henning *Karlsruhe Institute of Technology, Germany*

- Modelled Delamination in Double Cantilever Beam (DCB) using shell elements and surface based cohesive behaviour in FE software ABAQUS
- Used quadratic nominal stress criterion for damage initiation and fracture energy based criterion for damage evolution
- Wrote a python script to obtain crack length as a function of time by extracting simulation data from a set of nodes along delamination length
- Further analysed simulation data to find fracture toughness and bending stiffness of the DCB specimen
- Studied the effect of various parameters on simulation results in comparison to experiment data

CNC Milling Programming, CNC Technik Private Limited *May 2012*

- Developed CNC Milling Programs for regular work pieces using CAM software MasterCam for generating variety tool paths for contour, basic drill, spot drilling, pre drilling, facing and pocketing
- Formulated **optimum velocity** and **feed rate** for a given workpiece maximizing the production rate.
- Optimized tool paths to reduce cycle time and increase surface finish; successful implementation resulted in **2% profit** in company's production cycle.

Design of Portable Trolley, Creative Concepts *July 2012*
Guide: Rajesh Gangar

- Analysed the problem of heavy lifting done by rural women to fetch water and firewood from far off places.
- Came up with a design for a trolley having **2 degrees of freedom** using software Solidworks to carry loads up to 50 kgs by applying a force of 7 kg.
- Design was kept simple enough to reduce manufacturing costs so that rural people could afford it.
- Several prototypes were tested to optimise the design allowing perfect pairing of stability and ease in rotation.
- The work was appreciated in National Newspapers: **The Times of India** and **Hindustan Times**

Plancess EduSolutions Private Limited *Dec 2011*

- Developed study material for engineering college aspirants covering all topics of JEE and AIEEE
- Successfully executed new deals through effective negotiation and organised seminars for school students regarding JEE and AIEEE preparation.

KEY ACADEMIC PROJECTS

Energy Survey of Hamlets in Sanjay Gandhi National Park, Mumbai *Jan - April 2012*

Guide: Prof. Anand B Rao (CTARA, IIT Bombay)

- Surveyed 2 hamlets in Sanjay Gandhi National Park to find the current energy consumption pattern and to suggest an alternative energy resource to be used in place of kerosene/firewood to reduce pollution.
- Estimated the amount of fuel consumed per person and their mode of procuring the same; made a **Sankey Diagram** showing energy inflows and outflows.
- Presented suggestions on the use of Solar Photovoltaic based lanterns instead of kerosene for lighting.

Energy and Economic Analysis of Vertical Shaft Brick Kiln Technology in Khadki, Mumbai *Jan - April 2012*

Guide: Prof. Anand B Rao (CTARA, IIT Bombay)

- Performed a comprehensive survey on energy utilisation and emissions in Vertical Shaft Brick Kiln and compared it to conventional brick kiln
- Analysed economic viability of project using criteria like Payback period, Net Present value and Internal Rate of Return.
- Studied the impact of project on environment and life of local people

Electrical Discharge Machining of Silicon *Aug 2012 – Nov 2012*

Guide: Prof. Ramesh K. Singh

- Modelled electric discharge machining of silicon to determine the effect of pulse voltage, electric current and pulse duration on the temperature profile using software Ansys.
- Studied the formation of recast layer and its effects on the creep and fatigue properties of the material

Friction Stir Welding *Aug 2012 – Nov 2012*

Guide: Prof. K.P.Karunakaran

- Analysed the operation of friction stir welding and its process parameters like tool geometry, tool tilt, toll rotation and traverse speed
- Studied the effect of these parameters on flow of metal and heat and also on the microstructure of the joint.

Mechanical and Thermal Analysis of High Speed Steel (HSS) *Aug – Nov 2011*

Guide: Prof BP Kashyap

- Detailed the effects of components like Tungsten, Molybdenum, Cobalt, Chromium and Vanadium on the **Hardness** and **Wear Resistance** of HSS
- Analysed the benefits of heat treatment processes like **Preheating, Austenitizing**, **Quenching** and **Tempering** on HSS.

Heat and Stress Analysis of Cylindrical Fin *Aug 2012 – Nov 2012*

Guide: Prof SK Maiti

- Developed a Finite Element model of cylindrical fin used in heat exchangers in Matlab
- Calculated temperature distribution and thermal stresses using this model.
- Simulated a similar model in Ansys to validate the results of the matlab model.

Market Analysis: Dell India Private Limited *Jan - April 2012*

Guide: Prof. Dinesh Sharma (School of Management, IIT Bombay)

- Detailed **Situational Analysis** of the company's product line-up using **SWOT** analysis technique
- Described the Company's current **Segmentation, Target Markets** and **Marketing Mix**

Graphical Representation of Bohr's Model *Jan - April 2011*

Guide: Prof RK Joshi (CSE, IIT Bombay)

- Developed cross-platform Graphical User Interface using C++ and Fast Light ToolKIT (FLTK) to demonstrated exhaustive analysis of Bohr's atomic model for elements in the periodic table using atomic number as user input

TEACHING EXPERIENCE

Differential Equations	Conducted tutorial and doubt clearing sessions for a batch of 50 students
Electricty and Magnetism	Designed and graded answer scripts

RELEVANT COURSES

Automatic Control Engineering	Feedback control systems, Transient response and stability, Controllers, Root-locus method, Nquist's stability criterion, Bode and Nichols plots, State-space systems, Digital Controls and System compensation
Vibration Engineering	Vibrations of continuous systems-bars, beams and plates, Flexural and torsional vibrations, Vibration exciters and pickups, Advanced vibration analysis, Introduction to self-excited, non-industrial and random vibrations, Some case studies of industrial problems
Microprocessors	Sequential circuits, Registers, counters, tri-state logic, Timing and control circuitry, Functional architecture of microprocessors, Microcontroller Programming, dynamic system behaviour.
Vibro-acoustics	SDOF & MDOF systems, Longitudinal waves in bars, Flexural vibrations of beams, Plate & shell vibrations, Quantification of noise, Sound sources, Room acoustics, Statistical Energy Analysis
Finite Element and Boundary Element Methods	Finite element formulation-variational method, method of weighted residuals, Linear elastic stress analysis-2D, 3D and axisymmetric problems, Analysis of structural vibration, heat conduction, fluid flow, Boundary element formulation for heat conduction and 2D stress analysis.

TECHNICAL SKILLS

Software Packages	Abaqus, Ansys, MATLAB/SIMULINK, Adams, Solid Works, MasterCam, Freescale XEP100
Languages	C/C++, Python, HTML
Operating systems	Windows and Ubuntu

EXTRA CURRICULAR ACTIVITIES

ZYPHER *Feb 2010*

- Made rocket glider using water and compressed air as propellant
- Rocket was streamlined to reduce drag and fins were added to increase stability and flight time

TRACK MAINA *Oct 2010*

- Fabricated remote controlled car using L293D circuits

MEMBER OF NATIONAL SERVICE Scheme *2010-2011*

- Organised campaigns for clothes collection in the campus to help the poor and flood affected people