Shivam Mittal | **10D100043**
Mechanical Engineering | **UG Third Year(Dual Degree)**
Indian Institute of Technology, Bombay | **Male**
Specialization: Computer Aided Design (CAD) & Automation | **DOB: 18-11-1992**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2013	7.90
Intermediate/+2	I.S.C.	Brightlands School	2010	92.75
Matriculation	I.C.S.E.	Brightlands School	2008	93.20

Research Interest

- Finite Element Analysis- Vibration and impact simulations
- Dynamics and control of systems
- Failure characteristics and mechanical properties of Composites
- Product design and integration

Awards and Achievements

- Ranked 26th in Matriculation state board (ICSE) among 6,00,000 students
- Secured All India Rank 482 in IIT-Joint Entrance Exam , All India Rank 532 and State Rank 4 in All India Engineering Entrance Exam
- Ranked 151 in ISAT conducted by Indian Space Research Organization(I.S.R.O.)
- Recipient of Heritage Fund Scholarship 2010-14 by IIT Bombay

Projects Undertaken/ Research Experience

Formula Student Electric Competition 2013 Class 1A, Silverstone UK [Aug'12 – Present]
Guide: *Prof C. Amarnath and Prof R.K. Singh*
Involved in IIT B Racing Team as the Chassis Designer and senior Vehicle Integration Manager

- Revamped the chassis design with ergonomics, space utilization and proper load paths for vehicle components using CAE tools
- Achieved *67%* weight reduction by optimization with torsional, modal and aerodynamic analysis
- Used composites in the design of the body works to increase the aesthetic appeal of the vehicle
- Guided other members in developing components for ease in manufacture and assembly
- Designed a modular setup and experimentally validated the hub to hub torsional stiffness
- Motivating and mentoring 6 junior engineers in the chassis subsystem for Formula Student '13

Tata Motors [May'12-Jul'12]
Wheel Alignment Stability and Eliminating Vehicle Pulling

- Theoretical analysis and experimentation for short listing key contributors to Vehicle Pulling
- Used tools like kaizen, ishikawa charts, benchmarking and 5s drill to systematically study and evaluate the cause and effect of the problem thus finally develop methods to tackle them
- Delivered solutions and rectification procedure for TATA INDIGO and MANZA, thus reducing the alignment instability and pulling by *35%.*

Formula Student Electric Competition 2012 Class 1A, Silverstone UK [Mar'12 – Jul'12]
Involved in the first ever effort by an Indian team at formula student event towards design and manufacture of an electric formula type race car

- Modelled and analysed the impact attenuator and conducted impact tests on bodyworks materials
- Designed a modular seat for driver comfort and accessibility
- Conducted flow simulations and modified the battery pack to reduce the peak temperature by *12%*

SAE Baja India 2012 [Aug'11 – Feb'12]

Revolutionized chassis by revisiting the fundamentals and improving analysis techniques; drafted and executed an extensive design validation plan to measure the deviation from design

- Using a finite element model performed crash analysis of a disfeatured Baja car assembly hitting a rigid wall to analyse driver safety during frontal impact
- Performed modal analysis by vibration modelling of chassis to estimate the natural frequency
- Conceptualised and fabricated a screw jack twist fixture to determine chassis torsional stiffness
- Successfully validated the FEA for scaled space frame structures with less than *6%* error

Laser Surface Texturing Of Ti_6Al_4V via Fibre Laser [Sep'12 – Present]

Guide: *Prof R.K. Singh*

- Studied the effect of parameters like surface tension on laser surface texturing of Ti6Al4V through simulation using COMSOL MULTIPHYSICS 4.0.
- Investigated if the process behaves according to our intuition, experimental studies and physics
- Investigation of the surface effects of laser treatment on the bio-compatibility of the substrate
- Analysed fluid flow of melt pool and heat transfer into work piece

Applications of Rapid Manufacturing in Orthopaedics [Sep'12 – Present]

Guide: *Prof K.P. Karunakaran*

- Studied material specificity wrt rapid manufacturing processes of implants for bone replacement
- Literature survey of process capability of SLA, FDM, SLS, LOM, 3DP for prosthetic limbs
- Support structure requirements and limitations in these processes
- Study aimed at the development of a methodology for rapid manufacture of orthopaedic implants

Modification of a Jaggery processing furnace for Energy Optimization [May'11-July'11]

Guide: *Prof K. Iyer*

- Optimized the furnace chamber, chimney and heat regenerator to increase efficiency by *18%*
- Simulated natural convection and heat flow of a chimney using ANSYS(Fluent)

Virtual Keyboard (Course Project)

Guide: *Prof R.K. Joshi*

- Developed a C++ program for an on-screen keyboard used for entering data by mouse
- Generated a graphical user interface for on-screen keyboard using FLTK graphics

Competitions

- Participated in Trackmania, made a wireless remote controlled car using differential mechanism
- Led a team of four students in making of a line following autonomous vehicle
- Participated in Arduino Coding Competition organised by electronics club IIT Bombay
- Participated in Autodesk Inventor workshop organised under Radiance by Autodesk

Relevant Learning and Skills

Academic	• Pursuing Major in Mechanical Engineering • Honours in Computer Aided Design and Automation
Software	• **CAD:** Solidworks, Pro-Engineer, Design Modeller • **FEA:** Explicit Dynamics, Auto Dyne, Fluent, LS Dyna, HyperWorks • **Others:** C/C++, JAVA, MATLAB, MATHEMATICA,

Extra-Curricular Activities

Cultural	• **Languages :** German • **Sports:** Played in Football Premier league • **Drama:** performed in Performance Arts Festival 2010
Social	• NCC(National Cadet Corps) B Certificate holder • Volunteer for service projects carried out by 'Art of Living Foundation'