Gowtham Kuntumalla

Indian Institute of Technology, Bombay

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Pursuing Bachelors degree with Honors in *Mechanical Engineering* and Minor in *Computer Science & Engineering*

Education

Examination	University	Institute	Year	CPI/%
Graduation	*IIT Bombay*	*IIT Bombay*	2017	9.30
Intermediate/+2	Andhra Pradesh State Board	Narayana junior college, Hyderabad	2014	97.4
Matriculation	Andhra Pradesh State Board	Narayana concept school, Kadapa	2012	9.70

Internships & Research Projects

May - July 2017 **High temporal resolution probing of Sol-Gel transition in a Diffusion limited cluster-cluster aggregation (DLCA) system**,
Guide: Prof.Rajan Chakrabarty, Washington University in St.Louis, USA, *Summer Internship*.

- Undertook comprehensive literature review on fractals, aggregation processes and wrote a protocol on conducting computer simulations on high performance computing (HPC) cluster
- Performed stochastically modelled computer simulations on DLCA processes with emphasis on formulating kinetics of the sol to gel transition in these models along with effect of change in defining parameters
- This work is being continued by my student mentor in the university which will most probably lead to a peer reviewed journal publication.

November 2016- Present **Computational Analysis of Potential Rocket Propellants**,
Guide: Prof. Neeraj Kumbhakarna, Department of Mechanical Engineering, IIT Bombay.
B.Tech Project

- Modelled High Nitrogen content Bis-Homo Cubane (BHC) compounds using *ab initio* level quantum mechanics based methods in computational chemistry.
- Computed various parameters such as heat of formation, specific impulse, density determining the utility of potential propellants using *Gaussian 09* and *NASA Chemical Equilibrium with Applications(CEA)*
- Modelled combustion reactions predicting their kinetics and thermochemical properties.
- Presently exploring the combustion kinetics when Teflon reacts with Aluminium and effects of solvent on characteristics of this reaction.

April - June 2016 **2D Particle Image Velocimetry (PIV)**,
Guide: Prof. Amit Agrawal, Department of Mechanical Engineering, IIT Bombay.

- Studied the present techniques for PIV in two dimensions.
- Developed computer code which is *twice as fast as* presently available software on MATLAB. It performs the 2D digital evaluation of velocity using FFT routine of Cross Correlation. Precise upto *6 significant digits*

December 2015 **Condenser Heat Recovery based Desalination System**,
Guide: Dr. Milind V.Rane , Department of Mechanical Engineering, IIT Bombay.

Implementing *Humidification Dehumidification (HDH)* desalination of water by modification of an existing Split Air-Conditioning system in a team of two

- Studied different types of heat recovery desalination systems
- Identified faulty electrical connection in *Pressure Monitor* and switch unit and suggested the change required to make the system function properly
- *Performed water irrigation experiment* on checkered glass surface and decided the number of sources required on top to ensure uniform spread of water

Course Projects

July - Nov 2017 **Unmanned Army Rover | Team Project**,
Guide: Prof. Shantanu Tripathi, ME 423- Machine Design, IIT Bombay.

- Designed few machine elements. Added night-vision camera and remote transmission of live camera feed.
- Theoretically designed automatic triggering of gun using servo mechanism. Spoke to vendors for manufacturing of individual components

January - March 2017 **Electrical Circuit Analogy of Stirling Type Pulse Tube Cryocooler | Seminar** ,
Guide: Dr. Milind Atrey, ME 420- Cryogenic Engineering 1, IIT Bombay.

- Used MATLAB for simulating these electrical analogies and obtained realistic plots.
- Analytically studied the effect of phase between Pressure, Volume flow rate and how acoustic power is affected.

January - March 2017 **Product Service System Model & Six Sigma Management**,
ME 308- Industrial Engineering and Operations Research, IIT Bombay.

- Formulated an elaborate plan for establishing a company on waste management and treatment
- Ideated a detailed plan for establishing and running a company on manufacturing solar panels based on 6 sigma

October - Nov 2016 **Chatter Characterization of Micro-machined Ti6Al4V Surface**,
ME 338- Manufacturing Processes 2, IIT Bombay.

- Studied about Micro-milling process and designed an experiment to estimate chatter on Ti6Al4V plane job surface after Micro-milling.
- Performed experiments on high speed micro-milling center and obtained actual depths of cut data using sophisticated *Focus Variation Microscope (FVM)*.
- Analyzed the data and predicted the safe operational spindle speeds, tool feed, ideal depth of cut range for Ti6Al4V material which is a widely used Titanium alloy.

March 2016 **Detection of Adulterants in Oils**,
ME 226 - Mechanical Measurements, IIT Bombay.

- Analysed presence of different known adulterants in edible vegetable oils
- Proposed methods for detection of these adulterants using physical measurements of viscosity and density. Specified methods involving *Andrade Equation*, falling ball viscometer

October 2015 **Traffic light Simulator for Pedestrians**,
EE 221- Digital Electronics, IIT Bombay.

- Designed a traffic lights physical circuit model including *time constraints* for pedestrian passage across a two way road using Integrated Circuits, LEDs, resistors, capacitors
- Obtained different time intervals by varying time constants in specific regions of circuit
- This model can be extended to use it as a *low cost* alternative to traffic lights in less busy roads

November 2015 **Sudoku Autosolver**,
CS 101- Computer Programming and Utilization, IIT Bombay.

- Coded and debugged in C++.
- Developed graphical interface using *SimpleCpp* graphics package
- Designed the code as a part of the course using *Recursive Backtracking* algorithm

Scholastic Achievements

2017 Ranked top 5% in class comprising approximately 160 students

Spring 2017 Earned a perfect 10 GPA in this semester

2014-17 Ranked in the top 10 out of 160 in the Department of Mechanical Engineering

Autumn 2015 **Only** person in batch of 156 student to get grade point 10 in Engineering Metallurgy.

2014 **All India Rank 320**, IIT-JEE among *150,000* overall participants for entrance to the IITs.

2014 Secured 99.97 percentile in JEE-Mains among more than *1.3 million* candidates

2014 Secured 117th rank in AP-EAMCET, among *200,000* candidates

2011-12 Awarded **Amateur Mathematician** title and certificate of merit by **IAAMS (Integral Association of Amateur Mathematicians and Scientists)**

2014 Secured position among **top 1%** at National level in National Standard Exam in Astronomy

2009 Secured **1st rank** at District level in **SLSTSE** olympiad conducted by Unified Council

Scholarships

2014 Kishore Vigyan Protsahan Yojana(**KVPY**) awarded by Department of Science and Technology, India for promotion of basic sciences among high school students

Work Experience

February - April 2017 **Teaching Assistant**, *Differential Equations, MA 108*, IIT Bombay.

- Mentoring a batch of around 50 students in the course content
- Cleared doubts and guided them in solving numerical problems in tutorial hours and outside as well

April 2016 - March 2017 **Technical Councillor**, *Hostel 4*, IIT Bombay, *Techno-Managerial Role*.

Awarded Color and Special mention for significant contribution to the development of hostel culture.

- Led the hostel team winning the 1^{st} **position** in the overall technical general championship (GC) of IIT Bombay during 2016-17
- Conducted workshops, group discussions on working of common electronics such as calculator, keyboard, Gameboy. Undertook initiatives such as 'Tech-Quiz' to encourage critical thinking
- Instrumental in renovation of hostels 'Tech-Room' and supplying it with requisite equipment.
- Conducted intra hostel championships for Electronics club's Jhatka GC and Logic GC
- Ensured *fruitful participation* of hostel in Institute Technical General Championships(GC)
- *Guided* 3 *technical secretaries* as a part of hostel council for smooth conduction of events in the hostel with around 600 students

January - October 2016 **Team Member, *PRATHAM***, *Student Satellite Team*, IIT Bombay.

The satellite is completely designed and manufactured by a team of students, under the mentorship of *Indian Space Research Organization (ISRO)*

- Analyzed and verified (modal,static structural) integrity of satellite components under various dynamic loads
- Lectured groups of students about satellite in an interactive exhibition at Nehru science centre

January 2015 **Organiser**, *Techfest*, IIT Bombay.

- Helped in organising Lectures by Manjul Bhargava, Fields medal 2014 and Ada Yonath, Nobel prize in Chemistry and Subhash Khot during the lecture series department of the technical festival

Computer skills

Programming C++, Linux shell, Python, HTML, CSS, Computer Numeric Control (basic)

Softwares Gaussian 09, NASA CEA, ANSYS(mechanical), MATLAB, AutoCad, Solid Works, OpenCV library, LaTeX

Key Courses

Mechanical Machine Design*, Cryogenic Engineering, Applied Thermodynamics, Industrial Engineering & Operations Research, Kinematics and Dynamics of Machines, Heat Transfer, Advanced Thermodynamics and Combustion, Manufacturing Processes I & II, Solid Mechanics,Gas Dynamics*, Fluid Mechanics, Engineering Metallurgy, Mechanical Measurements, and *corresponding laboratory courses*

Mathematics Numerical Analysis, Calculus, Linear Algebra,Non Linear Dynamics*

Others Computer and Network Security*, Operating Systems, Data Structures and Algorithms, Digital Electronics, Microprocessors and Automatic Controls, Computer Networks, Data Analysis and Interpretation, Economics, Biology, Environmental Sciences

(* courses will be completed by the end of autumn 2017.)

Extra-curricular activities

Technical

- Secured 1^{st} position for design and construction of a Rube Goldberg machine with 15 successive contraptions in the Padarth, Annual MEMS department festival 2016 (IIT Bombay).
- Successfully designed and fabricated remote controlled plane in *Aeromodelling club*, IIT Bombay in 2014
- Visited *Satish Dhawan Space centre* of ISRO at Sriharikota , where various Polar Satellite Launch Vehicle (PSLV), Geostationary SLV rockets were launched from India

Sports

- Completed one year training camp in Volleyball, offered by *N*ational Sports Organisation(NSO), IIT Bombay
- Amateur Badminton player, participated in district level tournament

Miscellaneous

- Raised Funds for a *Charity for welfare* of Blind children of INTRODDD, Hyderabad
- Keen interest in Energy Conservation, Locomotives, Propulsion, Space Exploration, World-War 2 History
- Successfully completed *Lean Six Sigma* Green Belt Program conducted by KPMG, India.