Gowtham Kuntumalla

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Interests

I am passionate about Generation and Control of 'High Speed' Applications, Automation, Economics and How to connect them. I wish to help create new Energy Storage and Effective Utilization technologies to alleviate a future world crisis. Also I am fond of reading articles on Space Exploration, Control of Human Mind.

Education

2014-Present　**B.Tech in Mechanical Engineering**, *Indian Institute of Technology - Bombay*, Mumbai, Minor in Computer science, Among top 5% in class, *CPI -* **9.30 / 10** .

2012-2014　**Intermediate/+2**, *Narayana Junior College*, Hyderabad, Percentage- *97.40%*.

2012　**Matriculation**, *Narayana Concept School*, Kadapa, CGPA- *9.7*.

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

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 **Condenser Heat Recovery based Desalination System**,
2015 *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 - **Unmanned Army Rover | Team Project**,
Nov 2017 *Guide: Prof. Shantanu Tripathi, ME 423- Machine Design*, IIT Bombay.

- Designed the rover in a team of 5. Involved in team planning and budget optimization.
- Added night-vision camera feature and remote transmission of live camera feed.
- Theoretically designed automatic triggering of gun using servo mechanism. Coordinated with vendors for manufacturing of individual components

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

- Used MATLAB for simulating these electrical analogies & verified results of a research paper.
- Analytically studied the effect of phase between Pressure, Volume flow rate and how the acoustic power is affected by these parameters.

January - **Product Service System Model & Six Sigma Management**,
March 2017 *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 six sigma principles (6σ)

October - **Chatter Characterization of Micro-machined Ti6Al4V Surface**,
Nov 2016 *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 **Detection of Adulterants in Oils**,
2016 *ME 226 - Mechanical Measurements*, IIT Bombay.

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

October **Traffic light Simulator for Pedestrians**,
2015 *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 quiet roads

November **Sudoku Autosolver**,
2015 *CS 101- Computer Programming and Utilization, IIT Bombay*.
- ○ Coded and debugged an automatic Sudoku solver 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 - **Teaching Assistant**,
April 2017 *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 - **Technical Councillor**,
March 2017 *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 1st **position** / 16 teams in the overall technical general championship (GC) of IIT Bombay during 2016-17 academic year
- ○ 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
- ○ *Guided* 3 *technical secretaries* as a part of hostel council for smooth conduction of events in the hostel with around 550 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 which the satellite may experience during operation in orbit

○ 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, Wire Shark, 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	Non Linear Dynamics & Chaos*, Numerical Analysis, Calculus, Linear Algebra
Others	Computer and Network Security*, Microprocessors and Automatic Controls, Operating Systems, Data Structures and Algorithms, Digital Electronics, 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 1st 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 Vehicles (PSLV), Geostationary SLV rockets were launched from India

Sports

○ Completed one year training camp in Volleyball, offered by *N*ational Sports Organisation(NSO),IITB

○ 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