YASH SANGHVI

CURRICULUM VITAE

Mobile Number: +91 9167345410
Email ID: sanghviyash7@gmail.com
Date of Birth: 12th July 1995
Nationality: Indian

Saibaba Nagar, Borivali (W),
Mumbai - 400092, India.

https://yash-sanghvi.github.io/

RESEARCH INTERESTS

Robotics, Human Computer Interaction, Haptics, Teleoperation, Mechatronics, Automation, Internet of Things

EDUCATION

B.Tech + M.Tech, Mechanical Engineering | Indian Institute of Technology Bombay | GPA: **9.39/10** '13 - '18

- **Ranked 2nd** in the department Dual Degree (i.e. B. Tech + M. Tech) Batch, out of 48 students
- Awarded the highest **AP** grade in the course *Introduction to Numerical Analysis*
- **Minor** degree in Electrical Engineering
- M. Tech Specialization: **Computer Aided Design and Automation**

Intermediate Examination | K.C. College, University of Mumbai | Performance: **90.33%** '13

Matriculation | Our Lady of Remedy High School | Performance: **92%** '11

KEY AWARDS AND HONORS

Graduation Awards | For performance throughout the stay at IIT Bombay

- **Dr. Shankar Dayal Sharma Gold Medal** | Awarded to 1 out of 2,500+ graduating students of IIT Bombay '18
  For being the most outstanding student in terms of general proficiency, excellence in academic performance, extra-curricular activities and social services; awarded by the Hon. Prime Minister of India, Shri Narendra Modi
- **Institute Organizational Roll of Honor** | Awarded to 1 out of 2,500+ graduating students of IIT Bombay '18
  For the demonstration of exceptional leadership skills and contributions to IITB and India through National Service Scheme (NSS) and the Student Satellite Team
- **Institute Technical Citation** | Awarded to 9 out of 2,500+ graduating students of IIT Bombay '18
  For the role played in taking IITB into the space age and mentoring several universities in their satellite endeavors

Yearly Awards | For performance in a particular academic year

- **Institute Technical Color** | Awarded to 12 out of 10,000+ on-roll students of IIT Bombay '17
  For writing the flight code (>10,000 lines) for Pratham, IITB's 1st student satellite, launched in September 2016
- **Institute Academic Prize** | Awarded to the top 2 rank-holders in every department '16, '15
  For ranking 1st (2015-16) and 2nd (2014-15) in the Mechanical Engineering Department (Dual Degree Batch)

PUBLICATIONS AND INVITED PRESENTATIONS

- Y. Sanghvi and S. Maiti, "Modeling and Detection of L and Inverted T Cracks in Laminated Composite Beams using Natural Frequencies" to be presented at *5th International Conference on Mechanics of Composites* (Instituto Superior Técnico, Portugal), July 1-4, 2019
- "Manufacturing Analytics: IoT based Overall Equipment Effectiveness (OEE) Measurement and Improvement", poster presentation at *Applied Materials India Engineering and Technology Conference* (IIT Bombay, India), September 27, 2018
- "Making of a Satellite: The Journey of Pratham from an Idea to Orbit", oral presentation at *Tech & RnD Expo* (IIT Bombay, India), October 7-8, 2017

KEY RESEARCH / TECHNICAL PROJECTS

Electrical Subsystem Lead, Pratham | 1st Student Satellite, IIT Bombay Sep '13 - Apr '17

Launched on-board PSLV-C35 in Sep '16, Pratham was designed and built exclusively by the students of IIT Bombay

- Spearheaded **Power system**; ensured detection of Pratham's separation from the PSLV and subsequent power-up, apt storage, distribution of solar power, battery charge management and health monitoring of critical components
- Devised and executed the functionality test plan for monitoring key parameters during environmental tests at ISRO
- Enacted SPI, I^2C, UART protocols between **ATmega128** μC (On-board Computer) and sensors, actuators, peripherals
- Implemented the **AX.25** error detection protocol to packet the telemetry data sent and received by Pratham
- Reviewed 10,000+ pages of documentation; presented before ISRO Scientists in the **Critical Design Review** and Pre-Shipment Review to obtain a launch slot for Pratham
- Felicitated by the **Hon. Governor of Maharashtra**, Ch. Vidyasagar Rao for the contribution in Pratham

Detection of L and Inverted T cracks in Composite Beams | Master's Thesis Apr '17 - Jun '18

Guide: Prof. Surjya K. Maiti, Chair Professor, Mechanical Engineering Department, IIT Bombay

Project: Formulation of a vibration based model for the detection of L and inverted T cracks in composite Euler Bernoulli beams for predicting the life of composite aerospace and mechanical structures

Forward Problem	• Analytically predicted (>**85% accuracy**), the natural frequencies of a damaged orthotropic symmetric cantilever composite beam given the location and size of the L or inverted T shaped crack • Validated the frequencies using **ANSYS Composite PrepPost** (ACP), achieved a match of 80%
Inverse Problem	• Graphically predicted the **location** and **size** of cracks in a cantilever beam with more than 75% accuracy, given any four natural frequencies of the cracked and intact beams • Used **Genetic Algorithm** to solve the inverse problem with just the natural frequencies of the cracked beam as input and achieved similar accuracy as the graphical approach

PROFESSIONAL RESEARCH EXPERIENCE

Research Associate | National Centre for Aerospace Innovation and Research (NCAIR) Sep '18 - Present

NCAIR is an industry-academia consortium founded in IIT Bombay in collaboration with Boeing and Hindustan Aeronautics Limited (HAL), with a vision to create a world-class aerospace manufacturing ecosystem in India

Guide: Prof. Asim Tewari, Chair Professor, Mechanical Engineering Department, IIT Bombay

Project: Industrial Internet of Things (IIoT) based monitoring of shop floor machines

- Determined the state of the shop floor machines (ON/ OFF/ Cutting) using current and vibration sensors
- Fabricated the **IoT device**; developed and tested the device software for optimal collection of sensor data, its subsequent conditioning and interface with the server side PHP script for the transfer of data
- Devised the test cases for training the **Machine Learning** back-end algorithm to identify the machine state
- Interfaced with the Machining Group, Analytics Group and Front-end team to understand their constraints and requirements pertaining to sensor locations, volume and type of data, and the transfer speed

Mechanical R&D Intern | Hindustan Unilever Limited, Mumbai May - Jul '16

Developed an Environmentally Sustainable Refrigeration System for PureIt Floor Standing RO Water Purifier

- Awarded **Pre-Placement Interview** based on output and leadership skills displayed during the internship
- Reduced **carbon footprint** by >40 kg CO_2 e/unit by modifying the system to replace HFC R-134a refrigerant with eco-friendly HC R-600a, satisfying Unilever Sustainable Living Plan (USLP)
- Dimensionally optimized the existing system design and reduced cooling time by **30%** (23 to 16 minutes)
- Consulted Western Refrigeration, Emerson etc. to obtain practical viewpoint in design decisions

LEADERSHIP AND SOCIAL SERVICE

Project Manager, Advitiy | 2nd Student Satellite, IIT Bombay May '17 - Apr '18

Advitiy is the next step after Pratham towards making IIT Bombay a Center of Excellence in Satellite Technology

- Took over leadership to improve reliability while ensuring a reduction in the project time-line by >50%
- Finalized the mission statement and **payload** for Advitiy, after evaluating 30 proposed payload ideas for feasibility, impact (both technical and social), alignment with long term goals of the project and resource availability
- Introduced kaizens like instituting **Quality Assurance (QA)** practices, setting up a detailed inventory, etc.
- Conceptualized, structured and launched a **Satellite 101 Wiki**, for institutes aiming to venture into satellite technology, acknowledged by **AMSAT-UK**, the world's largest organization for amateur satellites.
- Facilitated the *pro bono* establishment of a **Ham Radio club** in IITB; participation of 40+ students

Overall Co-ordinator, National Service Scheme (NSS), IIT Bombay Apr '16 - Mar '17

NSS is the largest student volunteer body of IIT Bombay, serving >100K people via public welfare activities

- Led a **3 tier team** of 400+ volunteers solving problems in sectors like education, sustainability, health-care etc.
- Facilitated the launch of **Voice For Purpose** for making quality audio content available to blind people
- Initiated **Adult Literacy Program** for providing basic English training to 50+ mess workers
- Organized a Cashless Transactions Awareness Drive post **demonetization** of Rs. 500 and 1000 notes; impacted over 80 fish vendors/ small shops around the campus
- Increased the online presence of NSS IITB by >**200%** through activities like
  - The Artistic Impact - A nationwide *Socio-Art* competition; participation from 15 cities of India
  - Letters of Love - Global Outreach program for Syrian kids; participation of 300+ campus residents

Founder & Manager, Open Learning Initiative (OLI) | An initiative under NSS Jan '15 - Jul '17

A YouTube channel breaking language barriers, OLI hosts 250+ educational videos in 8 regional languages of India

- Benefited **1000+ students** in Giridih (an insurgency affected district) in absence of permanent teachers
- Amassed >75,000 subscribers, >6 million views (highest in IIT Bombay) in 3.5 years, **4000% growth** in 2016-17
- Videos hosted on the educational portal of **Madhya Pradesh** state government
- Success story published by Business Insider and Indian Express
- Invited by the **Ministry of Human Resources Development, Government of India** to contribute to DIKSHA - National Teacher Platform, to enable, accelerate and amplify solutions in the realm of education

TEACHING AND MENTORING EXPERIENCE

- Served as a **Teaching Assistant** (TA) for the following courses:
  - MA 214: Introduction to Numerical Analysis | 50 students Summer '15 and '17
  - ME 201: Strength of Materials, IIT Goa | 30 students Autumn '17
  - ME 616: Fracture Mechanics | 20 students Spring '18
  - SSWC101x: Soft Skills and Workplace Communication | MOOC on IIT BombayX Spring '18
- Organized **Ground-station Workshop** for 50+ students from 15+ colleges of India; taught *Systems Engineering Principles* and *Useful Team Building Practices* Jun '17
- Mentored and guided **5 colleges** across India in starting their own student satellite projects

RELEVANT SKILLS

Programming Languages	C, C++, Python, embedded C, Arduino, HTML, CSS, PHP
Softwares	MATLAB, ANSYS, SOLIDWORKS, Eagle, LaTeX, Audacity, MSC Adams, Atmel Studio, LT-Spice, Adobe Photoshop, MS Office, COMSOL Multiphysics, Advanced Excel

EXTRA-CURRICULAR ACTIVITIES

Public Speaking

- Delivered a speech representing the U.G. batch at the **Institute Valedictory Function**, 2018 — Apr '18
- Delivered an **Institute Lecture** on Pratham on Tinkerer's Lab Inauguration Day — Mar '17
- Presented Pratham before 3500 students and parents in **VEDH** (Vocational Education, Direction and Harmony) organized by the Institute for Psychological Health — Dec '16

Miscellaneous

- Developed the prototype of an '**Autonomous Sweeper bot**' under Institute Technical Summer Projects, at one third of the price of commercial robotic vacuum cleaners — Summer '14
- Taught 'General Knowledge' in **NGO Asha** to students of class 7-9 — Autumn '17
- Successfully cleared the Elementary and Intermediate **Drawing Grade Examinations** conducted by the Art Examination Committee, Government of Maharashtra — '07, '08
- Proficient in **4 languages**: English, Hindi, Gujarati and Marathi
- Hobby blogger, reader and pianist

REFERENCES

Prof. Surjya Kumar Maiti,
Chair Professor,
Dual Degree Project Guide,
Department of Mechanical Engineering,
Indian Institute of Technology Bombay.
Email: skmaiti@me.iitb.ac.in

Prof. Asim Tewari,
Chair Professor,
Professor In-charge, NCAIR,
Department of Mechanical Engineering,
Indian Institute of Technology Bombay.
Email: asim.tewari@iitb.ac.in

Prof. Anand Rao,
Faculty Advisor, National Service Scheme,
Centre for Technology Alternatives for Rural Areas,
Indian Institute of Technology Bombay.
Email: a.b.rao@iitb.ac.in

Prof. Prabhu Ramachandran,
Faculty Advisor, Student Satellite Project,
Department of Aerospace Engineering,
Indian Institute of Technology Bombay.
Email: prabhu@aero.iitb.ac.in

Prof. Varun Bhalerao,
Faculty Advisor, Student Satellite Project,
Department of Physics,
Indian Institute of Technology Bombay.
Email: varunb@iitb.ac.in

RELEVANT LINKS

- **Open Learning Initiative (OLI), NSS IITB:** https://www.youtube.com/c/OLINSSIITB
- **Satellite 101 Wiki:** https://www.aero.iitb.ac.in/satelliteWiki/index.php/Satellite_101
- **Personal Website:** https://yash-sanghvi.github.io/
- **Personal blog:** https://theiinaniitian.wordpress.com/