

# Ankush — CV

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## Education

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**Indian Institute of Technology Bombay**, Mumbai, India [2017 – 2021]

- Bachelor of Technology in Engineering Physics
- **Minor** (earned by crediting 5 additional courses) in Electrical Engineering

## Honors and Awards

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- **Texas Instruments Global Recognition** (x2) for excellent work [2022 & 2023]
- Recipient of the **Madhuri Gupta Scholarship** from the Bombay Sappers Association (BSA) for all four years of my undergraduate studies, an honor awarded to only two students nationwide annually [2017 – 2022]
- Awarded **Merit-based scholarship** in high school based on academic performance [2015]
- Achieved **All India Rank 912** in JEE Advanced among **220,000** students [2017]
- Acquired **All India Rank 1957** in JEE mains out of **1.2 Million** students [2017]
- Amongst State-wise **Top 1%** in National Standard Examination in Chemistry (NSEC), organized by IAPT and was among **300** who qualified for Indian National Chemistry Olympiad [2016]

## Technical Publications

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- **Ankush Ankush**, Aayush Garg, Venkateswaran P, Guha L, Avishek Pal, "*Enhanced customer engagement with quick and precise PSpice models using AI*", TI Technical Leadership Conference, Texas, 2023
- **Ankush Ankush**, Aayush Garg, Venkateswaran P, Guha L, Avishek Pal, "*ML driven PSpice model*", Texas Instruments India Technical Conference, India, 2023

## Industrial Experience

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**Texas Instruments | Bengaluru, India** June '21 – Present

*Mixed Signal Design Verification Lead, Analog Power Products Department*

- Led the pre-silicon analog design verification effort of **4 power path protection** projects deployed in industrial, automotive and enterprise segments to successful tape-out
- Spearheaded the development of **ML-generated PSpice Model** for analog/mixed-signal devices, enhancing **early customer engagement** and minimizing design-phase gaps. Successfully implemented and widely adopted across multiple teams at TI in Dallas and India.
- Pioneered the upload of **ML-based PSpice device model** for the TI product **TPS25961** on [ti.com](https://ti.com)
- Developed and meticulously managed comprehensive parametric, system, and manufacturing test plans & verification environments for **Analog Power Products**, ensuring rigorous testing and quality assurance
- Created a **UVM integrated functional DV framework** enabling comprehensive regression, checker review, and RTL/GLS violation analysis within a 2-day timeframe, significantly expediting digital design iterations
- Enhanced **SoC test and verification plans** by collaboratively optimizing coverage at both block and system levels through close coordination with Design, Systems, and Test teams
- Guided the industry's first **AI-driven device-level finite state machine generation**, using unsupervised learning to autonomously detect discrete states in analog devices' continuous space, enabling self-learning
- Deployed **machine learning for automated waveform review in Design Verification** in multiple analog centric chips thereby eliminating manual review process and reduced cycle time by couple of week
- Mentored new hires and interns for **design verification execution**, focusing on pre-silicon stages
- Initiated AI/ML connectivity on the development of machine learning initiatives across various teams at TI
- Conducted a "**Getting Started on ML**" session for TI DFT, Test, and FuSa engineers

Texas Instruments | Bengaluru, India

May '20 – July '20

Intern

- TI internship program to design a crucial digital **averaging filter block** for the PMBUS digital telemetry circuit of TPS25990 (eFuse)
- Developed and validated multiple digital averaging filter algorithms, ultimately achieving an exceptional **modified innovation algorithm** with superior outcomes in area, error, frequency, and stability

CataConn | Startup

Oct '20 – Jun '21

Founder, Guided by Prof Aparna Rao, IITB

- Administered over 100 teaching hours, recruited and supervised a team of more than 10 tutors for personalized **1-on-1 IIT-JEE** coaching, and provided guidance to a cohort of 500+ students
- Developed a machine learning-driven tutor search platform, optimized SEO techniques, and garnered over **300K site impressions** in just 5 months

## Research and Technical Projects

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ML Driven PSpice Modeling

Sep '22 – Present

(Filed 2 patents at the US-PTO)

- Designed an automation suite to efficiently generate precise **top behavioral PSpice models** for analog devices using a strategically optimized set of test cases, effectively representing device behavior
- Developed a **comprehensive workflow** involving automated data extraction from waveform databases, data preprocessing, and neural network architecture creation for training on dedicated servers
- Implemented a **hierarchical ML approach** incorporating insights from internal blocks and transient delays
- Successfully produced PSpice device models for **TPS25961** (eFuse) and **TPS1213-Q1** (High-side driver)

Semiconductor Research Corporation

Dec '21 – Present

SRC is a non-profit research consortium that sponsors semiconductor research and workforce development in academia on behalf of the semiconductor industry

- [SRC 3160.005] **Leading technical liaison** and TI coordinator for SRC project with **Prof. Abhijit Chatterjee** from Georgia Institute of Technology on **"ML-Assisted Scalable DfT and BIST of AMS Systems"**
- [SRC 2982.001] Technical Liaison for the academia-industry project on **"Machine Learning Assisted Verification Methodology for Analog & Mixed Signal Circuits"** with Anna University Team

Mars Rover Project, IIT-B

Sep '18 – Aug '21

Electronics Subdivision Head, leading a team of 15 members & build an all-terrain rover prototype, which secured 4th place amongst 28 international teams at the Indian Rover Design Challenge(IRDC) 2020

- Designed and implemented the electronics subsystems end-to-end, right from logic units consisting of **RPi, NUC** and hardware components like **Motor Drivers, DC-DC convertors & Bio-Sensors**
- Optimized the circuit design of the same to neatly fit in the area as specified by the mechanical design team; used **GX-160, USB connectors** to simplify the circuit interfaces of the **actuators & motors**
- Utilized **potentiometer feedback from actuators**, point cloud data from the on-board depth camera (**Realsense D435**) and Virtual **URDF arm model** to enable intuitive control of the robotic arm
- Worked on **robotic arm automation** by leveraging IK algorithms & depth cam (stereo vision)

MicroProcessor, IITB-Proc

May '19

Course Project, Supervisor Prof. Virendra Singh, Department of Electrical Engineering, IITB

- In a Team of 4, Designed a 16-bit, Multi-cycle Microprocessor, IIT-Proc in **VHDL** which executes instructions like AND, NAND, Store, Load, BEQ and JUMP
- Designed the **datapath diagram and FSM** for the control unit of the microprocessor
- Designed all its components like ALU and Register file (consists of 8-registers)

## HEXAPOD

Jun '18 – Jul '18

*Institute Technical Summer Project*

- Built an **arduino** based six-legged moving robot (Hexapod) with **18 degrees of freedom**
- Established a **wireless communication** and syncing with **PS2 controller**
- Manufactured the bot by use of **Laser cutting and 3D-printing**

## Positions of Responsibility

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### Department Alumni Secretary

April '18 – Mar '19

*Engineering Physics Department, Student alumni relations cell(SARC)*

- Organized and strengthened the **Department Alumni** database since **1965**
- Organized two **CORE TALKS** to enhance the core culture by Alumni of Physics department.
- Collected **35+** projects by contacting alumni from different **core industries** to float among the **120+** students as a part of **Industrial Learning Program**
- Assisted **SARC** in conducting **mock interviews** and successfully brought **60+ alumni** to prepare **350+** final year students for their placements
- Hosted Annual **Alumini day** with **700+** attendees and raised funds approx. **INR 368 Million**

### Coordinator Media and Publicity (Techfest-IITB)

Jul '18 – Dec '18

*Asia's largest college Technical festival, footfall of 1.75 lakhs+, 500+ universities*

- Conceptualized, Executed and Managed various events like Science and Technical Competitions
- Coordinated with **100+ College Ambassadors** across India to conduct various competitions and workshops in their respective colleges
- Led a team of **10+ organizers** to increase outreach of events conducted by Techfest

## Technical Skills & Interests

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<b>Design and Simulation</b>	Cadence Virtuoso, Cadence Simvision/ Viva, PSpice, LTSpice, MADE flow (TI DV env), Synchronicity DesignSync
<b>Other Tools</b>	Jupyter, Arduino IDE, MATLAB, Eagle, Autocad, 3D view, $\text{\LaTeX}$
<b>Programming Languages</b>	Python, R, TensorFlor, Verilog/ System Verilog, Verilog AMS, VHDL, C/ C++, Robot Operating System (ROS), Bash
<b>Interests</b>	Machine Learning, Statistics, Reinforcement Learning, Robotics

## Key Courses Taken

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<b>Cadence</b>	SystemVerilog for Design and Verification v21.10 (Online), SimVision for Debugging Mixed-Signal Simulations vXcelium22.03 (Online)
<b>Electrical</b>	Introduction to Electronics, Analog Circuits, Digital Systems, Electronic Devices and Circuits, Signals And Systems, Power Electronics, Electronics Lab, Microprocessors, Terahertz : Technology & Applications, Solid State Microwave Devices and their Applications, Microwave Integrated Circuits
<b>Physics</b>	Group theory, Photonics, Quantum Mechanics I and II, General Theory of relativity and Special relativity, Waves & Oscillations & Thermodynamics, Statistical Physics, Electromagnetic Theory, Quantum Optics, Physics of Quantum Devices
<b>Miscellaneous</b>	Introduction to Computer programming and utilization, Calculas, Linear Algebra, Differential Equations I and II, Basics of Electricity and magnetism, Thermal Physics, Data Analysis and Interpretation, Classical Mechanics I, Complex Analysis, Introduction to Numerical Analysis, Physics lab, Economics, Biology, Chemistry

## Volunteer and Community Work

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### Back to School Campaign

Jun '22 – Present

*Campaign Volunteer, Corporate Social Responsibility (CSR) program, organized by Youth for Seva*

- Provided valuable **assistance to underprivileged students**, fostering their educational pursuits
- Contributed to the **distribution of essential school materials** to children residing in various rural locations across Karnataka, India, thereby improving their initial school experience
- Actively participated in a campaign (as a **volunteer**) that collectively aided over **20,000** children through various forms of support

### Sapling Plantation Drive

*Volunteer, Corporate Social Responsibility (CSR) program*

- Participated in the **sapling plantation drive** organized by TI India at Bangalore University
- Collaborated with the team to plant **1000** saplings of **native species** as part of a forest thickening project

## Extra-Curricular Activities

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- Active member for **ML in Design Verification Initiative @ TI**
- **XLR8, Aug '17, Electronics and Robotics Club**: Designed, built, and programmed a robot using a differential steering mechanism, AT Tiny 2313 IC, Bluetooth module HC-05, and L293D motor drive
- **RC Plane, Nov '17, Aeromodelling Club**: Explored aircraft mechanisms and flight basics while investigating design parameters for improved performance, resulting in optimized fuselage, stabilizers, and wing designs
- Successfully completed one year training in Yoga (2017-2018) under **National Sport Organization**
- Organizer of **Mood Indigo (2017), Horizon and workshops** (Cultural fest of IIT Bombay )
- Mentored a group of four students in XLR8'18 and then mentored couple of groups during ITSP'19
- Awarded Certificate of Merit by the CBSE for obtaining A1 grade in all subjects in class X