Vatsal Ramanuj

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Education

Indian Institute of Technology, Madras(IITM)

B.Tech(honors), Electrical Engineering, with a minor in Physics 2022 - 2026

- **9.29** CGPA
- **Relevant Courses**: Digital Communication, Optics and Photonics, Electromagnetic Theory, Digital Signal Processing, Quantum Physics, Solid State Devices.

Achievements

- **Smayan Shah Price** for achieving the highest marks in Physics, Chemistry, and Math in Class 12.
- Multiple certificate & medal holder in the **Science Olympiad Foundation**.
- **First Overall Academic Topper** in Class 10.
- Multiple **International Youth Math Competition** & **International Astronomy and Astrophysics Competetion** certificate holder.
- **Kishore Vaigyanik Protsahan Yojana (KVPY) Scholarship** by the Indian Institute of Science. Scholarship of Merit, awarded to the top 250 students from over 40,000 applicants from all over the country.
- **Aruna Lal Scholarship** by Physical Research Laboratory, Department of Space, Government of India. Awarded to only 5 students from the state each year for extraordinary merit.
- All India Rank **228** in KVPY, **623** in Joint Entrance Exam (JEE) Mains [**top 0.06 percentile** of 1 million+ applicants]. All India Rank **1685** in JEE Advanced [**top 0.7 percentile** of 150k+ applicants].

Work Experience

OLA Krutrim

Bangalore, India

Software Development Intern June '25 - Aug '25

- SDE 1 working on **Advanced Driver Assistance Systems** (ADAS) for scooter and bikes.
- Wrote **5000+** lines of code testing Forward Collision Warning, Blind-spot Detection, and Lane Departure Warning systems for the safety of the driver.
- Implemented **automatic deployment** with Docker, **auto-formatting** by clang-format, along with extensive **unit tests, hardware integration and software-in-loop tests** for thorough testing of most lines and decision points of the code-base using **gcovr**.

Centre of Light for Life, The University of Adelaide

Supervisor: **Prof. Kishan Dholakia**

Research Intern May'24 - Jul'24

- Built and aligned an optical setup to characterize and fabricate **Bessel** and **Airy Beams** for diffraction-free **Light Sheet Fluorescence Microscopy** for deep tissue imaging.
- Completed Laser-Safety training and gained practical experience in handling and operating **class-3B Lasers**.
- Implemented deconvolution of the point spread function for a **twin-Airy beam** on real images of **biological tissues** taken by light sheet fluorescence microscopy methods to create a detailed 3-D image of the tissues.

SilverTouch Technologies Limited

Ahmedabad, India

ML Engineer Dec'23 - Jan'24

- Performed **Time Series Forecasting** using ML and Deep Learning for predicting and forecasting total weekly Dengue Cases in 2 cities in South America.
- Implemented various Deep learning models like **LSTM, LightGBM, GRU**, etc, achieving 87% prediction accuracy.

Volunteering

- **Avanti Fellows Mentor**: Mentored underprivileged students from government-run Javahar Vidyalas (government schools) to help them crack the IIT JEE Examination.
- **Saathi Mentor**: Guide to 3 first-year students at IITM, providing guidance for their journey at the institute.

Research Experience

Multistatic radar object localisation
Supervisor: **Prof. K Giridhar**

- Analyzed a non-parametric method for object localization in a multistatic scenario for multiple target objects. Applications are possible in drone detections and incorporation in 6G architecture.

21-cm line radio signal analysis
Supervisor: **Prof. CV Krishnamurty**

- Radio Antenna data collection and processing to study the **21 cm line** radiation from the galactic plane. Achieved **Impedance matching** between antenna and receiver with a coaxial cable. Characterized and processed data with power spectral density processing techniques.

Leadership Experience

Horizon
Coordinator(May'23 - Apr'24) and **Head**(Apr'24 - Apr'25)

- Active member of the **Physics and Astronomy Club** of IITM.
- **Organized and delivered talks**, astronomy observation sessions, and seminars for a diverse student audience.
- **Recruitment** and work **delegation** among 12 coordinators, 6 core team members, and over 50 total team members.
- Developed strong **leadership**, **problem-solving**, **communication**, and organizational skills through team and event management.

Teaching Assistant
EE2021-Material Science for Engineers(Jul'25-Nov'25)

- Teaching assistant for **Prof. Sayak Dutta Gupta**.
- Responsible for **test paper grading**, **attendance** marking, and **tutorial creation** for the course.

Team Abhyuday
Project Member(Oct'23 - Apr'24)

- Member of the **Research Payload** vertical at the student rocketry team of IITM.
- Built, calibrated, and tested **Hyperspectral camera** hardware for terrain mapping and imaging under foggy conditions.
- Specialized in image processing, Raspberry Pi, and Computer Vision.

Electronics Club
Project Member(Jun'23 - Mar'24)

- Worked on the project **Self Assembling Cubes**, inspired by MIT's M-blocks.
- Achieved **totally internalized locomotion** without any external moving parts.
- Specialized in ROS programming, reaction wheels, and ESP32 microcontrollers.
- Applied computer vision and OpenCV for image processing and object detection for path planning and controlled motion.

Projects

- **Timetable Maker**: A **GUI-based Flask app** hosted on Render to automatically create a Google Calendar **.ics file** for IITM student courses.
- **Obstacle Dodger Game**: 2 versions - Simple and lightweight **command line version** and a version with **face detection** with OpenCV to move the player with face movements.
- **Digit Recognizer**: An ML model created only using numpy trained on the MNIST dataset, along with a drawable GUI.

Skills

- **Programming**: Python, C++, Arduino, NumPy, OpenCV, Scipy, TensorFlow, Pandas, Tkinter, Pytorch, Matplotlib, Seaborn, Plotly, Scikit-learn, Flask, Docker, Clang, Jupyter, ESP32 Microcontrollers.
- **Technical**: Statistical Signal Processing, Data Analysis, Machine learning, Radio frequency systems and circuits, Communication Systems, Lasers, Quantum Mechanics, Linear Algebra, Probability.
- **Software**: Git, LaTeX, Linux, LTSpice, MATLAB, Wolfram Mathematica, Advanced Design Software, Altium, Ansys Electronics, Robot Operating System(ROS).