



Shyam Iyer
Engineering Physics
Indian Institute of Technology, Bombay

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B.Tech.
Gender: Male
DOB: 18-10-2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	null
Intermediate	HSC	PACE Junior Science College Dadar	2019	92.00%
Matriculation	ICSE	G. D. Somani Memorial School	2017	97.60%

Pursuing **Honours in Physics**
Pursuing **Minor in Computer Science & Engineering**

ACADEMIC ACHIEVEMENTS

- Awarded a **Change of Branch** to the department of **Engineering Physics** among 8 out of 1000+ students (2020) owing to exemplary academic performance in the first year of study
- Conferred with an **AP Grade** in the course BB 101 Biology for Engineers given to the **top 2%** (8 out of 565) in the entire freshman batch for exceptional performance in the course (2019)
- Secured **98.46 percentile** in JEE Advanced Examination 2019 among 0.16 million candidates (2019)
- Achieved **99.43 percentile** in JEE Main Examination 2019 among 1.1 million candidates (2019)

PROFESSIONAL EXPERIENCE

Backend & ML Intern | QuHu July '21 - Present
Working in a 16-member team of individuals launching India's first unique social audio platform

- Developing the backend infrastructure using **SpringBoot in Java** for an Android application frontend
- Integrating **Category segregation** and Hashtag functionality to augment user experience and post search
- Exploring techniques to implement a personalised user feed recommendation system via **ML algorithms**

PROJECTS

PT Symmetric Photonic Heterostructures | Waves and Optics *Course Project, Feb '21 - Apr '21*

- Studied **PT symmetric Hamiltonians** in optics and the resulting S matrices, Transfer Matrices, and the Generalized Unitarity relations specifying the relation between transmittance and left/right reflectances.
- Reproduced plots of trivial and non-trivial PT symmetric **Anisotropic Transmission Resonances**, PT symmetry breaking transitions, boundaries and their application in CPA laser points for unidirectional invisibility in Python

Analysis of Underlying Event Data in ROOT | Data Analysis *Course Project, Oct '20 - Dec '20*

- Analyzed the data generated by the PYTHIA 8 Monte Carlo event generator for the interactions of protons in **2 million** proton-proton collisions at 13TeV using **ROOT**, a data analytics software developed at CERN.
- Reproduced the plots for frequencies of the **relative angle** between the particles and lead particle and the density of the scalar sum over the momenta of particles in three regions for various **multiplicity classes**

Arithmetic Logic Unit | Digital Systems *Course Project, Nov '20 - Dec '20*

- Designed a 16-bit Arithmetic Logic Unit using **structural VHDL** and verified the design using a testbench
- Implemented the code for a fast, parallel prefix form carry look-ahead **Kogge-Stone** adder and subtractor

Strange Attractors | Non-Linear Dynamics *Course Project, Sep '20 - Dec '20*

- Conducted a **literature review** on the origin of strange attractors, their fractal geometry and characterisations
- Applied the **Euler method** in Python to simulate trajectories of the Lorenz, Rossler, Henon and Ueda systems

InstiDelivery | Institute Technical Summer Project Mar '20 - Jun '20

Part of a 4-member team which designed and simulated a Drone Delivery system over the course of four months

- Completed a **four month** long project on developing an Autonomous **Drone Delivery** infrastructure for delivery of packages within IIT Bombay campus using **Robot Operating System (ROS)** in Ubuntu Linux
- Simulated three quadcopters in **Gazebo Simulator** to deliver packages over a maximum distance of **2.0 km**
- Constructed a complete **virtual model** of IIT Bombay campus as a testing ground for the drone simulation using satellite data from Open Street Maps in 3D rendering software **Blender**
- Designed a website using **Django** backend along with a real-time tracking system via **Bing Maps** in **JavaScript**
- Selected in the **Top 3** projects out of **64** teams after rigorous evaluation by the Institute Technical Council

Game Theory | Summer of Science Apr '20 - Jun '20

Self learning project mentored by an experienced senior under the Maths and Physics Club of IIT Bombay

- Learned key concepts of Game Theory such as **Nash Equilibrium**, **Backward Induction**, Evolutionary and Behavioural Game Theory and applications in decision making via the course ECON 159 by Yale University
- Documented my learnings in a **10,000** word report and analysed a **case study** on Discussion in Game Theory

Junior Dynamics Engineer | Team Hyperloop IITB

Jan '20 - Aug '20

Part of a 30 member team involved in designing and building a functioning prototype Hyperloop pod

- Worked on the **COMSOL Multiphysics** platform to develop simulations of **magnetic brake models**
- Pursued research on the high-velocity lateral control efficiency of **Electrodynamic Wheels** (EDW)
- Designed friction cum magnetic array brakes for the design packet submission which got shortlisted for the **final round** at the **Arizona DesertLoop** competition and symposium

KEY COURSES

- **Physics:** Basics of Electricity & Magnetism, Classical Mechanics, Special Theory of Relativity, Thermal Physics, Non-Linear Dynamics, Quantum Mechanics I & II*, Waves Oscillations & Optics, Photonics*
- **Mathematics:** Calculus, Linear Algebra, Complex Analysis, Differential Equations II, Numerical Analysis
- **Computer Science:** Introduction to Machine Learning, Computer Networks*, Neuromorphic Engineering*
- **Miscellaneous:** Biology, Economics, Digital Systems, Data Analysis & Interpretation

* to be completed by November 2021

TECHNICAL STRENGTHS

Programming Languages	C++, Python, ROOT, Java, JavaScript, MATLAB
Web Development	HTML, CSS3, Bootstrap
Software/Platforms	L ^A T _E X, Git, ROS, Solidworks, AutoCAD, COMSOL, Premiere Pro

LEADERSHIP AND ORGANISATIONAL EXPERIENCE

Teaching Assistant | Department of Biosciences and Bioengineering

Apr '21 - Jun '21

Course: BB101 — Instructors: Prof. Ambarish Kunwar, Prof. Neeta Kanekar

- Academically mentored a group of **80** undergraduate students in a team of three Teaching Assistants
- Conducted weekly **tutorial sessions** throughout and cleared conceptual doubts through personal interaction

Institute Literary Arts Secretary | Institute Cultural Council, IIT Bombay

Apr '21 - Present

Leading a 7-member council as an elected representative of 10,000 students, organising 30+ events annually

- Strengthened quizzing culture with the DQ Summer League campaign; achieving **250% increase** in page visits and **900% increase** in participation through consistent activity and point-based leaderboard system
- Expanded the Inter Institute Scrabble League to **8 IITs**, acted as **Overall Coordinator** heading a team of 16 for the second annual inter-collegiate edition which saw a participation of **120 students** across **168 matches**
- Initiated 'Campus Chronicles', a journalism platform to showcase experiences of students in Culturals
- Coordinating a team of 6 under 'ICC Podcasts', an initiative to organise and host podcasts on cultural genres

Literary Arts Convener | Institute Cultural Council, IIT Bombay

May '20 - Apr '21

Part of a 6-member council responsible for organising Literary Arts events for a 10,000 strong student community

- Created content for **70+** online campaigns increasing the club's social media presence over **12 fold**
- Coordinated **15 events** under the flagship Battle of the Batches clocking **12+ hours** with **200+ participants**
- Presented the club to **2500+** PG & UG Freshmen at the Cultural Orientation by conceptualising a video
- Spearheaded the conduction of **8 events** under IIT Bombay's **Literarium** with a budget of **1.4 Lakh** consisting of an **Open General Quiz**, writing competitions and workshops and talks by **acclaimed writers**

EXTRACURRICULAR ACTIVITIES

Quizzing and Literary Arts	<ul style="list-style-type: none">• Awarded Par Excellence in Quizzing in 2016 and 2017 at G.D. Somani Memorial School for exceptional performance in representing the school at various quizzes• Finished 2nd place at the 2nd Inter IIT Scrabble League as part of the IITB Contingent
Social Work	<ul style="list-style-type: none">• Raised funds for the Terry Fox Foundation towards cancer research at the Tata Memorial Hospital and participated in the Terry Fox Run for Cancer in 2014, 2015 and 2016• Visited the Leprosy Mission Trust Vocational Training centre in Nashik, Maharashtra in 2016 to gain awareness about leprosy rehabilitation and donated grains to the centre
Culturals	<ul style="list-style-type: none">• Performed in a group hip-hop exhibit at Institute Salsa Night 2019 for 500+ attendees• Played the Acoustic and Bass Guitar in 5 school bands over three years
Sports	<ul style="list-style-type: none">• Completed a year-long training in Athletics through the National Sports Organization• Certified Green Belt holder by the Shotokan Karate-Do International Federation
Miscellaneous	<ul style="list-style-type: none">• Moderated a three-day long Astrophysics workshop with 200+ attendees (2020) organised by the Astronomy Club of IIT Bombay and Techfest• Attended a week long Quantum Computing workshop focused on implementing (2020) IBM Qiskit organised by the Maths and Physics Club of IIT Bombay