

Shyam Iyer **Engineering Physics Indian Institute of Technology Bombay** 190040116 **B.Tech.** Gender: Male DOB: 10/18/2001

Graduation III Bombay III Bombay	2023	8.74
Intermediate HSC PACE Junior Science College Dadar	2019	92.00%
MatriculationICSEG. D. Somani Memorial School	2017	97.60%

Pursuing a 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)
- 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

PROFESSIONAL EXPERIENCE

Barclays Corporate and Investment Bank | Intern Analyst

May '22 - Jul '22

Jul '21 - Apr '22

(2019)

- Part of the Electronic Trading Desk in Mumbai analysing trade data for US Equities Markets
- Experimentally demonstrated significant price improvement as a result of a novel liquidity discovery algorithm - Employed statistical functions of the SciPy package as well as Numpy and Pandas on Python
- Augmented internal reports with **30**+ trend visualisations for improved client profiling on the LX Darkpool - Utilised **PySpark** and **SQL** on Hadoop clusters to aggregate billions of rows of trade data into useful trends

QuHu | Backend Software Intern

- Worked in a 30-member team of individuals launching India's first unique social audio platform
- Developed the backend **REST API** infrastructure using **Spring Java** for an Android application frontend
- Incorporated an end-to-end user and post management service for blocking and reporting content
- Managed the MongoDB and SQL Databases on AWS and completed a migration project to Amazon RDS

PROJECTS

Course Project, Sep '21 - Nov '21 Reservoir Training in Liquid State Machines | Neuromorphic Engg.

- Conducted a detailed review of a Liquid State Machine reservoir in MATLAB by varying parameters such as order of synapses, quantity of neurons and synaptic strength between neurons to analyse the differences
- Implemented an original idea of "Manifesting Multiple Personalities in Liquid State Machines" via separate neuronal configurations on one LSM and obtained a 75% accuracy on the model testing outcome separation

Automatic Bicycle Gear Shifter | Microprocessor Lab

- Developed the algorithm for shifting gears factoring slope and speed of the cycle on Arduino using Embedded C
- Created a tabletop prototype comprising sensor modules and successfully presented the project via a demonstration

PT Symmetric Photonic Heterostructures | Waves and Optics

- 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

Arithmetic Logic Unit | Digital Systems

- 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

- 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

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

- Developed an Autonomous Drone Delivery infrastructure for parcel delivery within campus using ROS on Ubuntu
- 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

Course Project, Oct '21 - Nov '21

Course Project, Feb '21 - Apr '21

Course Project, Nov '20 - Dec '20

Course Project, Sep '20 - Dec '20

Mar '20 - Jun '20

Game Theory | Summer of Science

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 their applications in decision making processes
- Studied lecture video content of the online course ECON 159 Game Theory offered by Yale University
- Documented my learnings in a **10,000** word report and analysed a **case study** on Discussion in Game Theory

KEY COURSES

- Computer Science: Computer Programming and Utilization, Introduction to Machine Learning, Computer Networks, Neuromorphic Engineering, Operating Systems, Logic for Computer Science*
- Physics: Quantum Information and Computing, Special Theory of Relativity, Non-Linear Dynamics, Quantum Mechanics I & II, Photonics, Statistical Mechanics, Introduction to Atomic and Molecular Physics*
- Mathematics: Calculus, Linear Algebra, Complex Analysis, Differential Equations II, Numerical Analysis
- Miscellaneous: Biology, Economics, Digital Systems, Data Analysis & Interpretation, Operations Analysis*
- * to be completed by November 2022

TECHNICAL STRENGTHS

Programming Languages	C++, Python, ROOT, Java, JavaScript, MATLAB
Development Tools	Bash, PySpark, AWS, SQL, MongoDB, HTML, CSS3
Software/Platforms	I₄T _E X, Git, Docker, ROS, Solidworks, AutoCAD, Premiere Pro

LEADERSHIP AND ORGANISATIONAL EXPERIENCE

Teaching Assistant | Department of Biosciences and Bioengineering

- 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 - May '22

Led a 7-member council as an elected representative of 10,000 students, organising 30+ events annually • Spearheaded the conduction of 9 events under IIT Bombay's Literarium with a budget of 0.7 Lakh

consisting of a General Quiz, writing competitions, workshops and talks by acclaimed writers

- 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**
- Strengthened quizzing culture with Summer League and Winter League campaigns; achieving 250% increase in page visits and 900% increase in participation through consistent activity and a point-based leaderboard system

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 during lockdown increasing the club's social media presence 12 fold
- Coordinated 15 events under the flagship Battle of the Batches clocking 12+ hours with 200+ participants

EXTRACURRICULAR ACTIVITIES

Quizzing and Literary Arts	 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 Stood 3rd place at the National Finals of Aqua Regia 2015, certified by Guinness World Records in 2007 as India's Largest Science Quiz Qualified to the quarterfinals in the Institute Scrabble League out of 80+ participants Participated in the Jamnabai Narsee School Cascade National Debate in 2016
Social Work	 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	 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	 Completed a year-long training in Athletics through the National Sports Organization Certified Green Belt holder by the Shotokan Karate-Do International Federation
Miscellaneous	 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

Apr '21 - Jun '21