

SHYAM IYER

(+91)-91-679-32101 ◊ shyam.iyer@iitb.ac.in

EDUCATION

Indian Institute of Technology Bombay, Mumbai, India

2019 - 2023

- **Major:** Bachelor of Technology in Engineering Physics
Overall CPI: 8.74
- **Minor:** Computer Science and Engineering
CPI: 9.0

PROFESSIONAL EXPERIENCE

Barclays Corporate and Investment Bank | Intern Analyst

May '22 - Jul '22

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

Jul '21 - Apr '22

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

Reservoir Training in Liquid State Machines | Neuromorphic Engg.

Course Project, Sep '21 - Nov '21

- 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

Course Project, Oct '21 - Nov '21

- 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

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

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

- 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

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 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

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 (2019)

KEY COURSES

- **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
- **Computer Science:** Computer Programming and Utilization, Introduction to Machine Learning, Computer Networks, Neuromorphic Engineering, Operating Systems, Logic for Computer Science*
- **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	L ^A T _E X, Git, Docker, ROS, Solidworks, AutoCAD, Premiere Pro

TEACHING 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** and cleared conceptual doubts through personal interaction
- Arranged thorough revision sessions for **500+** students prior to examinations during 2 semesters

LEADERSHIP AND ORGANISATIONAL EXPERIENCE

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	<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• 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	<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
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