Agnipratim Nag | **210260005**
Engineering Physics | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 06/05/2003

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2025	
Intermediate	CBSE	National Centre for Excellence	2021	98.20%
Matriculation	ICSE	The Frank Anthony Public School	2019	98.80%

Pursuing a **Minor** in **Computer Science and Engineering**

Scholastic Achievements

- Currently holding **Department Rank 4** among 64 students in the Engineering Physics batch of 2025 *(2023)*
- Secured a **99.79** All India Percentile in the **JEE Main** exam from among **0.93 million** candidates *(2021)*
- Achieved **99.26** All India Percentile in the **JEE Advanced** exam from among **150,000** candidates *(2021)*
- Awarded the prestigious **Kishore Vaigyanik Protsahan Yojana Fellowship** by IISc Bangalore *(2021)*

Research Experience

Minimizing Systems via Alternating Simulation *(Jan '23 - Present)*
Guides: Prof. Krishna S, IIT Bombay and Dr. Khushraj Madnani, Max Planck Institute for Software Systems

- Studied the formalism of hybrid systems, timed automata and modelling evolution of finite state machines
- Developing an algorithm to extend the concept of **minimizing transition systems** via **alternating simulation** equivalence to timed automata to model real-time systems in a computationally efficient manner

Decidable Extensions of Metric Temporal Logic *(May '23 - Present)*
Guides: Prof. Krishna S, IIT Bombay and Dr. Khushraj Madnani, Max Planck Institute for Software Systems

- Surveyed semantics of Temporal Logic, Timed Words and their analysis via **Ehrenfeucht–Fraïssé games**
- Working on analysing how **different fragments of MTL** perform with respect to decidability and satsifiability checking over timed words, when modalities such as punctuality and strictness are constrained

Entrepreneurial Experience

ViBe Basket | **Software Developer** | **Entrepreneurship Project** *(Jun' 22 - Present)*
Incubated by the IDEAS Program, Desai Sethi School of Entreprenurship *IIT Bombay*

- Building a **AI driven application** that streamlines planning, execution and logistics for group outings
- Developed an automated **chatbot** that queries college outing requirements into a database and uses **Natural Language Processing** via `word2vec` models that suggest best-fit restaurants based on **cosine similarity**
- Designed an algorithm that finds the optimal match for the group using a method based on weighted scores
- Selected as the **top five** teams to qualify to Level 2 of the IDEAS Program and awarded a grant of **INR 2L**

Key Technical Projects

VanGoghAI - A Generative Painting Agent *(May '23 - Jul '23)*
Institute Technical Summer Project, Institute Technical Council

- Implemented **Neural Style Transfer** as part of a 4-member team, seamlessly blending artwork styles with image content to create captivating art compositions (Ranked **1st among 40+ teams** at Review Meet 1)
- Utilized **transfer learning** with pre-trained VGG19 to extract meaningful features from images, enabling the generation of logos and artistically rich images by merging content features of silhouettes and art styles

Statistical Analysis of Random Pattern Detection *(Mar' 23 - Apr' 23)*
Guide: Prof. Pradeep Sarin | Course Project: Digital Systems

- Designed an experiment to verify the **Central Limit Theorem** from statistics through digital electronics
- Developed a circuit that generates pseudo-random bit-strings and performs pattern matching using a **finite state machine** designed using **Karnaugh-maps**, and recorded successful matches using a **counter circuit**
- Plotted results with Matplotlib and Pandas to illustrate the **normally distributed nature of the data**

Learning with Quantum Computers *(Dec' 22 - Jan' 23)*
Winter in Data Science | Analytics Club

- Surveyed the fundamentals of quantum computing from *Quantum Computation and Quantum Information*
- Studied the working and implementation of quantum algorithms to solve the **Deutsch-Josza Problem** and programmed the solution using **Qiskit** to demonstrate its exponential speedup over classical algorithms
- Executed a quantum algorithm using **Pennylane** to train a model based on a **variational circuit** to **cluster a sample dataset** using quantum implementations of machine learning and neural networks

HyperEntropicPingPong *(Dec' 21 - Jan' 22)*
GameDev Hackathon | Developers' Community

- Designed a basic **multi-level 2D ping-pong game** with non-classical dynamics and quantum tunnelling
- Executed the idea using vanilla **HTML, CSS and JavaScript** implementing version control through Git
- Awarded a **special mention** from 30+ teams and an interview for recruitment to the Developers' Community

Technical Skills

Languages and Tools	C++, Python, Java, LaTeX, Git, Markdown
Data Science	Matplotlib, NumPy, Scikit-Learn, Pandas, Plotly

Positions of Responsibility

Department Academic Mentor *(Jun' 23 - Present)*
Department of Physics

- Mentoring **9 sophomore students** and assisting them in navigating the department's academic curriculum
- Involved in designing event posters and maintaining an alumni database as part of the Outreach subteam

Undergraduate Teaching Assistant *(Dec' 22 - Present)*
Departments of Physics, Mathematics and Computer Science & Engineering

- Assisted in the courses Calculus I and II, Classical Physics and Logic in Computer Science by conducting weekly interactive problem solving sessions and clearing conceptual doubts for a batch of **45 junior students**

Institute Design Convener *(Jun' 22 - Apr' 23)*
The Design Club, Institute Cultural Council

- Part of a **5 member team** responsible for promoting design culture across the institute by organising seminars and workshops by professional designers and training **600+ students** in visual & interface design

Key Courses Undertaken

Physics	Quantum Mechanics I and II*, Photonics*, Microprocessors* Quantum Information and Computing, Classical Mechanics, Data Analysis & Interpretation, Special Relativity, Waves, Thermal Physics, Digital and Analog Electronics
Computer Science	Logic in Computer Science, Computer Programming and Utilisation, Data Structures and Algorithms
Mathematics	Linear Algebra, Complex Analysis, Calculus I & II, Differential Equations I & II, Introduction to Numerical Analysis

**To be completed by December 2023*

Extracurriculars

- Secured **1st place** at the Hostel 2 Football Championship, from among 8 teams *(2023)*
- Created several recreational gaming videos and accumulated **170,000+** views and generated advertisement revenue of **6000 INR** on Google AdSense through YouTube *(2022)*
- Won the Inter-House Football Championship at the National Centre for Excellence *(2019)*
- Secured **2nd place** and won a cash prize of **35,000 INR** at the Rocket League Minor conducted by the League of Extraordinary Gamers, Bangalore during ILG Cup Season 2 *(2018)*

Volunteer Experience

Educational Outreach *(Dec' 21 - Jun' 22)*
Open Learning Initiative, National Service Scheme *IIT Bombay*

- Worked with National Service Scheme, IIT Bombay to provide free education available to **110,000+** underprivileged students through educational science videos in the Bangla language on YouTube