Agnipratim Nag

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EDUCATION

Indian Institute of Technology Bombay (IITB)   *[Nov 2021 - Present]*
Bachelors of Technology | Department of Physics   *GPA:* 9.37/10
Majoring in **Engineering Physics**, while pursuing a Minor in **Computer Science**.

National Centre For Excellence, Bangalore   *[May 2019 - April 2021]*
Intermediate/+2: Physics, Mathematics, Chemistry, Computer Science   *GPA:* 98.2%

The Frank Anthony Public School, Bangalore   *[June 2009 - April 2019]*
Matriculation: Science, Mathematics, Computer Science   *GPA:* 98.8%

PROJECTS

Automata and Computability   *[Dec 2022 - Present]*
Guide: Prof. Krishna S, IIT Bombay

Studying automata theory and the fundamentals of effective computation covering the following:

- **Kleene Algebra**: Applications in solving systems of linear equations and languages of arbitrary DFAs.
- **DFA State Minimization**: Finding the most efficient DFA for a language using minimization algorithms.
- **Turing Machines**: Formal definition, recursive sets, decidability of properties and diagonalization.
- **λ-Calculus & μ-recursive functions**: Syntax and computational equivalence to Turing Machines.

Geometry, Topology and Physics   *[Dec 2022 - Present]*
In-semester UG Research Programme | Prof. Vikram Rentala, IIT Bombay

- Reviewing the fundamental concepts of **algebraic topology, group theory** and **differential geometry**.
- Understanding the topological and geometric aspects of General Relativity and Quantum Field Theory.

ViBe Basket | Co-founder   *[Jun 2022 - Present]*
Incubated by the Desai Sethi School of Entrepreneurship | Awarded a grant of INR 50,000

- Conceptualised a **community-based application** in a team of five that simplifies planning outings.
- Designed **curated itineraries** based on personal experiences which are suggested to the user.
- Surveyed **300+** college students across the country and analysed various customer personas.
- Validated the critical hypotheses by **reviewing survey responses** and formalised a revenue model.
- Designed a **wire frame** mock-up and UI of the application, currently working on fine-tuning the idea.
- Developing an **MVP**, a problem-solution fit, and eventually a product-market fit. (Pitch Deck)

Dependence of kinematic variables and charge particle multiplicity
distribution on charge asymmetry in p-p collisions at 13 TeV   *[Oct 2022 - Nov 2022]*
Course Project | Prof. Sadhana Dash, IIT Bombay

- **Statistically analyzed datasets** generated by the Pythia 8 Monte Carlo simulator using the ROOT software containing fluctuations of **2 million+** charged particle multiplicities in proton-proton collisions.
- Studied the distribution of **charge asymmetry in different multiplicity classes** to observe trends in standard deviation and analysed the multiplicity distribution in charge symmetric and asymmetric regions.
- Plotted distributions of transverse momentum, pseudorapidity and azimuthal angle. (Repository)

The Lorentz Fitzgerald Contraction Hypothesis   *[Aug 2022 - Sep 2022]*
Course Project | Prof. Hridis Pal, IIT Bombay

- Studied the experiments that led to establishment of the postulates of the Special Theory of Relativity.
- Prepared a detailed presentation to highlight how the Lorentz Fitzgerald Hypothesis of **spacetime contraction** disagreed with experimental results of the Michelson-Morley Experiment.

HyperEntropicPingPong   *[Dec 2021 - Jan 2022]*
GameDev Hackathon | Developers' Community, IIT Bombay

- Designed a **multi-level 2D ping-pong game** with non-classical dynamics & quantum tunnelling.
- Executed the idea using vanilla **HTML, CSS and JavaScript** with version control through Git.
- Awarded a **special mention** and an interview for recruitment to the Developers' Community. (Repository)

Positions Of Responsibility

Undergraduate Teaching Assistant [Nov 2022 - Dec 2022]
Department of Mathematics, IIT Bombay

- Entrusted with the responsibility of being a teaching assistant for the freshman course MA 109: Calculus I.
- This included conducting weekly **live tutorial sessions** for **40+** students, helping them with conceptual doubts and preparing **recap slides** using LATEX. Some of these materials are on the course webpage.

Institute Design Convener [Jun 2022 - Present]
The Design Club | Institute Cultural Council, IIT Bombay

- Ideating and organizing **Vision: The Design Festival of IIT Bombay**, leading a design team of undergraduate students in planning and executing multiple month long design projects.
- Conducting a series of seminars by eminent professional designers attended by **400+ students**.
- Fulfilling publicity requirements of **80+ events and workshops** of cultural clubs across many genres.
- Training **600+ students** in interface & visual communication designing through **20+ workshops**.

Scholastic Achievements

- Currently ranked **5th** among 64 students in the B.Tech Engineering Physics batch of 2025 *[Present]*
- The **Joint Entrance Examination (JEE)**:
  - Secured **99.26 Percentile** in the JEE-Advanced Examination, among 0.15 million candidates *[2021]*
  - Secured **99.73 Percentile** in the JEE-Main Examination, out of over 930 thousand candidates *[2021]*
- Awarded the prestigious **KVPY Fellowship** by the Dept. of Science & Technology, Govt. of India *[2021]*
- Recipient of the Karnataka State Government Scholarship for exemplary performance in **NTSE** *[2018]*

Technical Skills

Software	ROOT, ROS, LTSpice
Tools and Web Dev	Git, GitHub, LATEX, HTML, JavaScript, CSS
Languages	Python, C++, Java
Libraries	NumPy, Pandas, Matplotlib, Seaborn, OpenCV, Plotly

Key Courses Undertaken

Physics	Quantum Physics and Application, Basics of Electricity and Magnetism, Classical Mechanics, Data Analysis and Interpretation, Introduction to Special Theory of Relativity, Thermal Physics, Introduction to Electronics, Electronics Lab I and II
Mathematics	Linear Algebra, Complex Analysis, Calculus I & II, Differential Equations I & II
Computer Science	Logic in Computer Science, Computer Programming & Utilization
Miscellaneous	Physical, Organic and Inorganic Chemistry, Economics, Engineering Drawing

Extra-Curricular Activities

- E-Sports
  - 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]*
  - Created several recreational gaming videos and accumulated **170,000+** views and generated advertisement revenue of **6000 INR** on Google AdSense through YouTube *[2017]*
- Sports
  - Represented The Frank Anthony Public School Football Team for 4 years *[2015-2019]*
  - Won the Inter-House Football Championship at the National Centre for Excellence *[2019]*
  - Semi-finalist at the Bangalore Football Club Inter-School Football Championship *[2018]*
  - Secured 1st place in Inter-House Football at The Frank Anthony Public School *[2016]*

Volunteer Experiences

Educational Outreach [Dec 2021 - Jun 2022]
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.
- Conducted weekly online classes for school students in Jharkhand to help improve their spoken English.
- Took regular instructive sessions to tutor students in quantitative and qualitative aptitude.