Kandarp Solanki

Third Year Undergraduate
Engineering Physics
Indian Institute of Technology Bombay

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Interests

Artificial Intelligence, **Machine Learning**, **Data Analytics** and **Finance**

Education

2021-Present	**B.Tech in Engineering Physics,** *Indian Institute of Technology Bombay,*	*[CPI - 9.1/10]*
2021-Present	**Minor in Machine Intelligence and Data Science,** *Centre for Machine Intelligence and Data Science, IIT Bombay,*	*[CPI - 10/10]*
2021	**Higher Secondary Education,** *Bright Day School, Vadodara,*	*[96.4%]*
2019	**Senior Secondary Education,** *Bright Day School, Vadodara,*	*[98%]*

Projects and Internship

May 2023 - July 2023

Research Intern | Centre for Nanoscience and Engineering, IISc Bangalore
Guide: Sreetosh Goswami
- ○ Worked with a team of 5 scholars working on world-class nanofabrication technologies
- ○ Deployed ML models with >**90%** accuracy to automate MHz frequency prediction in SI5351 module
- ○ Examined fast-data transfer upto **400kbps** by configuring SI5351 using Serial Data & Serial Clock lines
- ○ Studied the memristor-based implementation of **Autoencoders** used for **intrusion and anomaly detection**

Spring 2022

Convolutional Network Segmentation using U-Net (Report)
Guide: Prof. Biplab Banerjee, Centre for Machine Intelligence and Data Science, IIT Bombay
- ○ Extended the idea of **U-Net** model using symmetric contraction & expanding paths to capture contexts
- ○ Designed & trained a deep learning image segmentation model on CARVANA dataset with >**98%** accuracy
- ○ Improved the results by ∼**10%** using advanced techniques like **data augmentation** & **batch normalization**

Summer 2022

Factors Affecting the Stock Market, Finsearch (Report)
Finance Club, IIT Bombay
- ○ Studied various types of **mergers, acquisitions, insolvencies, bankruptcies**: compared & contrasted
- ○ Carried out multiple case studies like **Reliance Communication** bankruptcy, acquisitions of **MTS India** and **Digi Cable**, **Vodafone** and **Mannesmann**, **Mindtree's** acquisition by **L&T**, defence strategies, etc.
- ○ Analyzed the impact on stock market due to these along with long term and short term effects of takeovers

Autumn 2022

Cryptocurrency: Analysis, Visualization and Prediction (Report)
Guide: Prof. Amit Sethi, Department of Electrical Engineering, IIT Bombay
- ○ Cleaned, analysed a cryptocurrency dataset with **10+** cryptos spanning over **7** years using **Pandas** library
- ○ Examined **correlation** between various cryptocurrencies & studied influence of financial markets on them
- ○ Built machine learning models based on **Recurrent Neural Networks (RNN)** using **Keras LSTM** model, trained them with the dataset and accurately predicted prices of 3 major cryptocurrencies, **Bitcoin, Ethereum** & **Litecoin**

Autumn 2022

Dependence of parameters on charge asymmetry in p-p collisions at 13 TeV (Repository)
Guide: Prof. Sadhana Dash, Department of Physics, 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**
- ○ Checked the dependence of parameters like charge particle multiplicity distribution and kinematic variables
- ○ 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

Feb 2023 - Present	**Advisor	INPhO, OCSC, PDC**

Advisor | INPhO, OCSC, PDC
Homi Bhabha Centre for Science Education, Tata Institute of Fundamental Research, Mumbai
- Involved in selection of a team of 5 representing India at IPhO 2023, who bagged 3 gold and 2 silver medals
- Reviewed answer scripts of **100+** applicants nationwide for **Indian National Physics Olympiad (INPhO)**
- Contributed to student shortlisting for **OCSC** camp and question paper preparation, selecting **35** students
- Developed highly challenging problems with **model solutions** for the **Indian team** participating in the **International Physics Olympiad (IPhO) 2023, Tokyo, Japan**, during the Pre-Departure Camp **(PDC)**

Winter 2022

Market Research Intern & Web Developer
AgroEdge Pvt. Ltd.
- Developed a website from the ground up for a catering service that would serve **10K+** customers/year
- Formulated **research documents** catering to need of commercial production of edible mushrooms
- Extensively studied the process of cultivating gourmet mushrooms and viability of their cultivation in India

Training and Workshops

Winter 2022

National Initiative on Undergraduate Sciences (NIUS)
HBCSE-TIFR, Mankhurd, Mumbai
- Attended week-long series of lectures by eminent Indian professors on frontline physics research topics, like **low energy n-n scattering, quantum entanglement, morphological anaylsis of thin films, etc.**
- Worked on multiple meticulous experimental lab problems at **HBCSE, Mankhurd** based on optics, electromagnetism, and electronics, **rigorously analysed** the results and **received a felicitation certificate**

Academic Achievements

2023 **Ranked 8th** out of 62 junior undergraduates in IIT Bombay's Engineering Physics batch of 2025

2023 One of 2 nominated for **AUA-THU Global Summer School** held at Tsinghua University, China

2023 Conferred with the highest grade **AP** for academic excellence in the course **DS303 - Introduction to Machine Learning**, given to only **1** out of **173** students

2021 Secured **99.78 %ile** in Joint Entrance Examination **(JEE) Mains** out of ~**1 million candidates**

2021 Secured **AIR 989** out of **0.14 million** candidates in Joint Entrance Examination **(JEE) Advanced**

2021 Selected to participate in **National Initiative in Undergraduate Science** (NIUS) program by **Tata Institute of Fundamental Research** (TIFR), Mumbai (only **65 selections nationwide**)

2021 Secured **State Rank 75** of **1** lakh+ candidates in **Gujarat Common Entrance Test (GUJCET)**

2019 Awarded **Certificate of Merit** in 2 subjects given to **top 0.1%** meritorious students in **Class X** by **CBSE**

Positions of Responsibility

March 2023 - June 2023

Teaching Assistant | Department of Physics, Department of Mathematics, IIT Bombay
PH111 (Classical Mechanics), PH112 (Quantum Mechanics), MA108 (Differential Equations)
- Conducted interactive weekly problem-solving tutorial sessions for **40+** first year undergraduate students
- Hosted a **Tutorial Service Centre (TSC)** session for the course PH111 witnessing **100+** undergraduates
- Curated a comprehensive list of exam-preparation resources for quick revision used by **60+** students monthly

May 2023 - Present

Joint Secretary
Students' Association of Physics Department, IIT Bombay
- Elected representative of **250+** UG students, managing a budget of **INR 1 lac+** for department events
- Planned an annual calendar executing **10+** events in sports, culturals, etc catering to **500+** people
- Collaborated on external client liaison, facilitating departmental trips and industrial visits with stakeholders

May 2022 - May 2023

Institute Sports Convener
Institute Sports Council, IIT Bombay
- Appointed as convener out of **250+** applicants through an extensive assignments and interviews
- Ideated & executed the General Championship opening ceremony which saw an attendance of **500+** people
- Currently working on the **Sports App** using **Angular** for front-end and **NodeJS** for back-end which will cater to all the updates related to Inter-IIT, Aavhan, General Championships, and all other sports activities

May 2022 -   **Aavhan Coordinator**
May 2023   *Institute Sports Council, IIT Bombay*
○ **Coordinated** and **ideated** multiple events organised under **Aavhan 2022** - IITB's Sport Festival
○ Collaborated with **Decathlon** to promote sports activities and fitness culture within the institute
○ Ideated and executed the **Aavhan-Half Marathon** catering to **5K+ people**

Key Courses Taken

Physics	Special Theory of Relativity, Photonics, Thermal Physics, Quantum Mechanics I & II
Mathematics	Linear Algebra, Complex Analysis, Ordinary and Partial Differential Equations, Numerical Analysis
Minor	Data Analysis & Interpretation, Programming for Data Science, Introduction to Machine Learning
Online	Machine Learning by Andrew Ng, Finance for Non-Finance Professionals by RICE University

Technical Skills

Languages	C++, Python, HTML, CSS, JS, SQL, Bootstrap, ROOT
Data Science	NumPy, Pandas, Matplotlib, Seaborn, MATLAB, GNU Octave
Softwares	LTSpice, MSOffice, Canva

Extracurriculars

○ Self published book on **Gumroad** with sales >**10K INR** on how to learn CSS smartly   **'21**
○ Attended a 2-day workshop & implemented some hands on projects on tinkercad.com   **'22**
○ Competed in **Google Kickstart** & coded efficient algorithms to complex problems   **'21**
○ Completed a yearlong training program in National Sports Organization **(NSO)** Cricket   **'22**
○ Participated and **won** the Aavhan's Revive Sports League **(RSL)** in Cricket out of **6** teams **'22**
○ Learnt the basics of playing a guitar organized by Symphony, IITB's Music Club   **'22**
○ Part of the team of 45 selected by trials for **Inter-IIT Camp** for **Cricket**   **'22**