Pranjal Jain | **170070030**
Electrical Engineering | **B.Tech.**
Indian Institute of Technology, Bombay | **Gender: Male**
DOB: 01-06-1999

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	
Intermediate	CBSE	Amity International School	2017	92.40%
Matriculation	ICSE	The Shri Ram School Aravali	2015	95.20%

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

Publications

- **Pranjal Jain**, Atul Sharma, Kanak Mahadik, Somali Chaterji, "Prometheus: Transformer Architectures for Configuring Error Correction Tools for Short- and Long-Read Sequencing Technologies" manuscript submitted and under review at **Computational and Structural Biotechnology Journal**
- Michael Roth, Jinkyu Koo, **Pranjal Jain**, Somali Chaterji, "THEIA: Simultaneous learning of individual microRNA-gene interactions and regulatory comodules" manuscript submitted and under review at **Nature Scientific Reports**

Scholastic Achievements

- Awarded the **KVPY Fellowship** by the Department of Science and Technology, Government of India *(2016)*
- Secured **All India Rank 239** in **JEE Advanced** out of over 1.6 lakh candidates *(2017)*
- Secured **All India Rank 253** in **JEE Main** out of over 15 lakh candidates *(2017)*
- Received an **AP** grade in **EE236: Electronic Devices Lab** (given to **top 1**% students) *(2018)*
- Ranked **first** on a Kaggle competition organised through **CS419: Introduction to Machine Learning** *(2020)*

Projects and Internships

Secure activity recognition through Federated Learning *(July'20-Present)*
Bachelor's Thesis *Guide: Prof. Biplab Banerjee, Prof. Saurabh Bagchi, Prof. Subhasis Chaudhuri*

The project is a joint effort with professors from the **Department of Electrical and Computer Engineering, Purdue University**

- Supported by a **$5 million** grant from the **US Federal Government** for research on **secure federated learning**
- Applied **knowledge distillation** on compressed models to mimic larger **3D Channel-Separated Networks**
- Designed the training process to ensure **data privacy** of edge devices
- Ensured **fidelity** of the global model in the event of **collusion** between multiple devices

Automatic parameter configuration of Genome error correction tools *(Jan'20-Aug'20)*
Purdue University *Guide: Prof. Somali Chaterji*

- Outperformed previous **state-of-the-art** *Athena*
- Leveraged **Just-in-Time compilers** to reduce inference times by **18x**
- Improved performance by **35%** using **word-level models**
- Adapted the algorithmic suite to optimize long read **PacBio** and **Nanopore** error correction tools

Simultaneous learning of individual microRNA-gene interactions and regulatory comodules *(Jan'20-Aug'20)*
Purdue University *Guide: Prof. Somali Chaterji*

- Grouped functionally related miRNAs and genes via **non-negative matrix factorization (NMF)**
- Surpassed **SNMNMF, PIMiM and Tiresias** by achieving **Adjusted Rand Index (ARI)** scores of up to **0.8**
- Evaluated our pipeline on the the cancer genome atlas breast invasive carcinoma **(TCGA-BRCA) dataset**
- Compared our results with **miRCancer** and found that **219/319 miRNAs** and **88/112 genes** are cancer related

Matsya, Autonomous Underwater Vehicle (AUV) *(2017-18)*
RoboSub, AUVSI & US Office of Naval Research *Guide: Prof. Leena Vachhani, Prof. Hemendra Arya*

AUV-IITB is an interdisciplinary team working on the design and development of state-of-the-art Autonomous Underwater Vehicles which compete at the RoboSub competition in San Diego, California, and at NIOT-SAVe, Chennai

- Contributed to the preparation of the electrical stack of **Matsya-5.0**
- Implemented a **PID-based control algorithm** for a **robotic arm**
- Abstracted a sketch for a **Battery Management System** using **CAN (Controller Area Network)**

Automatic speech recognition system *(2019)*
Course Project, CS753: Automatic Speech Recognition *Guide: Prof. Preethi Jyothi*

- Developed an ASR system for Swahili using **Kaldi**
- Implemented **hidden markov models** and **smoothed Ngram models**

Multi-cycle processor *(2019)*
Course Project, EE309: Microprocessors *Guide: Prof. Prof. Virendra Singh*

- Designed and implemented a **16 bit architecture microprocessor** using **VHDL**
- Enabled the microprocessor to interpret **14 instructions** of three different types

Knowledge Incubation Seminar *(2019)*
Course Project, EE225: Network Theory *Guide: Prof. Vikram Gadre*

The initiative is organized annually by **TEQUIP, Government of India** as a **World Bank** assisted project to improve the quality of technical education in India

- Presented an overview of **various sensors** used in **Autonomous Underwater Vehicles and Airplanes**
- Judged by approximately hundred post graduate students and professors and **commended** for our work

Certifications

Equity Portfolio Management | *NSE Academy* *(May'20-July'20)*

- Awarded **Grade A** for exceptional performance in the course
- Studied and deployed strategies like **Momentum, Pairs Trading and Value Investing** on a virtual platform

Mentorship, Leadership and Teaching Roles

Head | *Department Academic Mentorship program, Electrical Engineering* *(April'20-Present)*

Spearheading a 35-member team aiming to play a facilitative, supportive and developmental role for students in the department

- Handpicked a team of **35** mentors from **90** applicants after an extensive interview and peer review process
- Restructured the team with a **3 member cabinet** to ensure smooth execution of initiatives
- Addressed issues regarding the unprecedented event of mentoring in an **online setting**

Department Academic Mentor | *Academic Mentorship program, Electrical Engineering* *(2019-20)*

- Mentored **12 sophomores** on a one-to-one basis on various aspects of their life including their academic and extra-curricular pursuits in the institute
- Assisted the **DAMP coordinators** in smoothly implementing the team's initiatives

Institute Student Mentor | *Student Mentorship Program* *(July'19-Present)*

- **One of 13** third-year students selected based on a rigorous procedure comprising of an interview and peer review
- Mentored **12 freshmen** during the previous tenure

Teaching Assistant | *Physical Chemistry* *(2018)*

Part of a 4-member undergraduate team for the course CH107: Physical Chemistry

- Responsible for conducting weekly doubt clearing sessions for approximately **300 freshmen**

Technical Skills

Programming	C/C++, Python, VHDL, Bash
Software	Git, Quartus, MATLAB, gnuplot, LaTeX, Ngspice, AutoCAD, SOLIDWORKS

Key Courses Undertaken

Computer Science	Data Structures and Algorithms, Computer Networks*, Introduction to Number Theory and Cryptography, Logic for CS, Automatic Speech Recognition, Introducing to Machine Learning, Machine Learning for Remote Sensing*
Mathematics	Data analysis and interpretation, Probability and Random processes, Linear Algebra, Complex Analysis, Differential Equations, Calculus
Electrical	Microprocessors, Digital Systems, Analog Systems, Signals and Systems, Communication Systems, Network Theory

** to be completed by Nov 2020*

Extracurriculars

Sports

- **Gold** in the **Basketball** General Championships, IIT Bombay *(2019)*
- **Bronze** in the **Hockey** General Championships, IIT Bombay *(2019)*
- Selected to be a part of the **Inter-IIT training camp** for **Athletics (Long distance running)** *(2017-18)*
- Selected to be a part of the **Inter-IIT training camp** for **Basketball** *(2017-18,2018-19)*
- Completed **10 kilometers of swimming** in **8.06 hours** at the annual Swimathon *(2019)*
- Participated in **Aavhan**, the sports festival of IIT, as a part of the **institute basketball team** *(2018)*
- Completed one year in the **National Sports Organization(NSO)** as a part of the **Basketball team** *(2017)*

Miscellaneous

- Exhibited **AUVs** Matsya 4.0 and Matsya 5.0 at the **Technical R&D expo,** IIT Bombay *(2017)*
- Organized an **online** information session on the importance of **mental health** *(2020)*