Pursuing **Honors** in Computer Science and Engineering

Academic Achievements

- Secured All India Rank 304 in IIT JEE Mains 2018 out of more than 1 million candidates 2018
- Secured All India Rank 665 in IIT JEE Advanced 2018 among over 200 thousand candidates 2018
- Awarded the esteemed **Kishore Vaigyanik Protsahan Yojana** (KVPY) fellowship **twice** 2016 & 2017
- Recipient of the prestigious **National Talent Search Examination** (NTSE) scholarship 2016
- Cleared the **National Standard Examination in Chemistry** (NSEC) by being in the **top 1%** 2018
- Felicitated by the **Rotary Club of Bombay** for academic excellence in 10th grade 2015

Internship

Analysis of Vector Addition Systems Summer 2020
Prof. Alain Finkel, ENS Paris-Saclay Research Internship

- Studied Vector Addition Systems by building an understanding of **Karp-Miller Graphs**
- Read literature about the **Minimal Coverability Set** of Petri Nets, notably MinCov and QCover
- Worked on the non-trivial problem of devising an **algorithm** to construct the **semi-linear bases** for projections of reachability sets of Vector Addition Systems
- Elucidated properties of a Karp-Miller Graph by writing **definitions** and **formal proofs**

Key Projects

Medical Image Segmentation using Recurrent Residual U-Net Spring 2020
Prof. Suyash Awate | Medical Image Computing Course Project

- Performed segmentation of skin cancer and retinal blood vessel images using **deep neural networks**
- Developed **R2U-Net** from scratch by augmenting a U-Net with **recurrent** and **residual** connections
- Trained it on ISIC and STARE+DRIVE datasets achieving good values for **Dice Coefficient** metric

Proofreading Rewriter Autumn 2019
Prof. Amitabha Sanyal | Software Systems Lab Course Project

- Developed a Python-based **NLP** tool that detects and corrects spelling and grammar mistakes
- Implemented a **rewriting** feature that suggests alternative words and phrases using statistics
- Integrated **Damerau–Levenshtein** distance and used **online APIs** like datamuse and phrasefinder

Battleships Spring 2019
Prof. Amitabha Sanyal | Programming Paradigms Lab Course Project

- Developed a **GUI-based** implementation of the board game Battleships in the language **Racket**
- Incorporated ideas from **functional** and **object oriented** paradigms to design **probabilistic** algorithms
- Parametrized algorithms by **difficulty** and made them **learn** from the opponent's previous moves

Spanning Tree Protocol Spring 2020
Prof. Varsha Apte | Computer Networks Lab Course Project

- Built a **loop-free** logical topology of LANs and bridges by implementing the protocol in **C++**
- Simulated the functioning of **learning bridges** on a sequence of data transfers using callbacks

Traffic Sign Classification using Deep Learning Self Project, Summer 2020

- Implemented a CNN based on **Inception** modules and **Spatial Transformation** layers from scratch
- Trained on the **GTSRB** dataset achieving almost **98**% accuracy with little to **no data augmentation**

Strategy and Game Theory Spring 2020
Summer of Science | *Maths and Physics Club* Reading Project
- Explored **Game Theory** formally by reading and reporting about Pareto Optimality, Nash Equilibria, Sequential & Bayesian Games, Subgame Perfection, and Nicky Case's **Game of Trust**

Bayesian Denoising and Image Reconstruction Spring 2020
Prof. Suyash Awate | *Medical Image Computing* Course Project
- Denoised brain MRI scans with **MRF** prior and **Huber** penalty using SGD with dynamic step sizing
- Performed CT image reconstruction in MATLAB using Radon transform and **filtered backprojection**

Other Projects

Cryptographic Analysis | *Programming Paradigms Lab* Course Project, Spring 2019
- Implemented a **decryption algorithm** using a strategy called **ETAI** in the language Racket, running heuristics like dictionary closure and secret word enumeration to decipher ciphertext

Shape Analysis | *Medical Image Computing* Course Project, Spring 2020
- Aligned MRI scans using **similarity transforms** to visualize shape means and **modes of variation**

Model Interpreter | *Programming Paradigms Lab* Course Project, Spring 2019
- Developed an interpreter for a subset of Racket using the **environmental model** of execution

Decision Trees | *Programming Paradigms Lab* Course Project, Spring 2019
- Constructed a decision tree in the language Racket which works using **entropy differences**

Interests

Theoretical Computer Science	Computer Vision	Computational Geometry
Mystery Novels	Swimming	Carnatic Classical Music

Technical Skills

Programming	C++, Python, Racket, JavaScript, Java, SWI-Prolog, HTML/CSS
Data Analysis	MATLAB, Tensorflow, Keras, NLTK, SciPy, NumPy
Other Tools	Git, VHDL, LaTeX, SQL, Wireshark, AutoCAD, Solidworks

Courses Undertaken

Computer Science	AI and ML*, Computer Architecture*, Operating Systems*, Medical Image Computing, Digital Logic Design, Design and Analysis of Algorithm, Logic for CS, Computer Networks, Data Analysis and Interpretation, Data Structures and Algorithms, Software Systems Lab, Discrete Structures, Programming Paradigms
Mathematics	Linear Algebra, Differential Equations, Calculus

* to be completed by December 2020

Positions of Responsibility

- **Teaching Assistant** | *ELIT* Summer 2019 & Spring 2020
  Helped many IITB students as part of English Language Improvement Training, using **interactive activities** and creating an environment for them to practice writing and speaking English
- **Teaching Assistant** | *Logic for CS (Minor)* Autumn 2020
  Conducting regular **tutorial sessions** and clearing concepts for a class of over **100** students
- **Lectures Coordinator** | *Techfest 2019-20* Winter 2019
  Helped execute the **Lecture Series** of Techfest which was graced by many eminent personalities

Extracurricular Activities

- Represented IIT Bombay at the 34th **Inter IIT Aquatics Meet**, held at IIT Guwahati 2018
- Contributed to articles as an **editor** for **BitStream**, the CSE department newsletter 2020
- Swam continuously for **12 hours** covering **17** kms at **Swimathon**, IITB's swim marathon 2019
- Hosted Mood Indigo's spell bee competition as the **quiz master** for two years 2018 & 2019
- Attended **Vijyoshi**, an annual national science camp, as a KVPY scholar 2017
- Bagged trophies in **mridangam** competitions at various fine arts societies in Mumbai 2016-2018
- Represented Mumbai Region at KVS **National Swim Meets** for 3 consecutive years 2013-2015