Abhijeet Prasad Bodas | **190100004**
Mechanical Engineering | **B.Tech.**
Indian Institute of Technology Bombay | **Gender: Male**
DOB: 5/28/2001

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2023	8.6
Intermediate	HSC	Ratanbai Walbai Junior College	2019	95.05%
Matriculation	ICSE	Smt. Sulochanadevi Singhania School	2017	97.00%

Pursuing a **minor** degree in the department of **Computer Science and Engineering** at IIT Bombay

Academic Achievements

- Secured an All India Rank of **628** in the JEE Advanced exam among **2.45 lakh** student candidates [2019]
- Among top **1%** of students to receive the **KVPY** Fellowship out of **1 lakh** participants, with AIR **717** [2018]
- Secured **99.84%** percentile in the JEE Mains examination among **9 lakh+** candidates all over India [2019]
- Secured a **scholarship** for higher education in science on being among **top 2 students in Mumbai** region in the Maharashtra Higher Secondary Education (**HSC**) class 12th board exams in the **science** stream [2019]
- Among **top 1%** in India in the National Standard Examination in Astronomy and selected for **INAO** [2018]

Work Experience

Summer Analyst | Goldman Sachs, Bengaluru [May - July 2022]
Production Runtime Experience, Core Engineering Division

- Enhanced the **runtime predictions** for processes and jobs part of a complex **dependency graph**, in order to better estimate their **time of completion** (ETA) using historical as well as **real time** data
- Achieved upto **12%** reduction in mean absolute **errors** after training multiple ML models like **XGBoost**, **Support Vector Machine** and **Neural Network**, and performing **hyper-parameter** tuning on them
- Developed **Gremlin** queries to traverse the **Janus graph** database and fetch data about common resources accessed by processes, in order to forecast delays for a process based on delays in it's **upstream** processes
- Implemented a **Graph Neural Network** based on **message passing** using the **PyTorch Geometric** library to have the model learn the graph structure, and trained the model by **masking** the child nodes

Student Developer | Google Summer of Code [May - August 2021]
The Zulip project: powerful, open-source group chat application with first-class threading

- Fixed many bugs and developed new features in the **notifications subsystem** of the **Django** codebase
- Developed the **mute users** feature, which was one of the **release highlight** in the Zulip 4.0 announcement
- Fixed several bugs due to **race conditions** by using **locks** and **transactions** in the **PostgreSQL** database
- Developed a new **lossless** email notifications event **queue processor** by using persistent database storage
- Consolidated all notifiability logic in a new Python **dataclass**, while ensuring **backwards compatibility** of the **API** as well as the Tornado **event queue** system in order to avoid issues during **server upgrade**
- Contributed **200+** commits from **50+** pull requests along with unit and integration **tests** to the codebase

Key Projects

Electric Vehicle Charging Network Optimisation [Jan - April 2022]
Course project: Industrial engineering and operations research | Prof. Avinash Bhardwaj

- Formulated a constrained **optimization** problem to minimize the overall customer **travelling time** by choosing locations for constructing charging stations for electric vehicles among a set of available locations
- Implemented the formulation in **AMPL**, using the **CPLEX** solver to find the optimal station locations
- Used **Selenium** for web-scraping the Google Maps webapp to obtain a **distance matrix** of distances between **29** demand locations and **20** possible charging locations in the **Mumbai** region as a case study

Parallelized Matrix Factorization [April - May 2021]
Course project: High performance scientific computing | Prof. Shivasubramanian Gopalakrishnan

- Implemented the **Modified Gram Schmidt** algorithm for QR factorization of square matrices in **C++**
- Achieved upto **60% speedup** by paralellizing the algorithm implementation and performing a **time study** to analyze the effect of matrix size and the number of parallel **threads** on the program's execution time
- Used the **OpenMP** multiprocessing library and **Nvidia's CUDA** platform for **GPU** based parallelization

Image Compression [March - May 2021]
Course project: Introduction to Machine Learning | Prof. Biplab Banerjee

- Performed **Principal Component Analysis** of the RGB component matrices of a given image using **Singular Value Decomposition** to reduce the image size, by utilzing the **Scikit-learn** Python library
- Obtained a **PSNR** value of **24** by using **150** components, with up to **62.5%** theoretical reduction in size

Git Contribution CLI [September 2020]
Personal hobby project

- Developed a **command-line interface** to generate commit history based **heatmap** graphs similar to those on GitHub profiles, but calculated from local **git** repositories, using the **Go programming language**
- Scanned for **.git** folders to detect repositories in all **sub-folders** of a given directory using **recursion**
- Utilized the **go-git package** to find commits authored by a given **email** to generate the heatmap graph

Positions of Responsibility

Web Convener | Undergraduate Academic Council | IIT Bombay [April 2020 - May 2021]
Part of a 4 member team in UGAC catering to 4500+ students in the institute

- Responsible for **upgrading and maintaining** the academic council's webpages and **building** new ones
- Developed a responsive webapp, **Credit**, using **Django** and **Bootstrap**, for writing course reviews, and implemented various features such as **up-vote/down-vote** review, course liking, and admin **moderation**
- Revamped the **Learnerspace** and **iSURP** portals which saw **280+** student enrollments in **90+** projects

Teaching Assistant | Department of Chemistry | IIT Bombay [Nov - Dec 2021]
Prof. R.B. Sunoj and Prof. Maheswaran Shanmugam

- Assisted the course instructors in conducting the **online** mid-semester examination for **1350+** students

Technical Skills

- **Programming Languages**: C++, Python, Javascript (and TypeScript), Bash, Java, PHP, AMPL, Go
- **Tools & Frameworks**: Django, Tornado, PyTorch, SkLearn, CUDA, LaTeX, Git, PostgreSQL, Bootstrap
- **Software Experience**: Linux shell, Visual Studio Code, Vim, GitHub, Microsoft Office, Jupyter Notebook

Courses Completed

- **Computer Science**: Computer Networks, Operating Systems, Implementation Techniques for Relational Database Systems, Introduction to Machine Learning, Logic for CS, Computer Programming and Utilization
- **Mathematics and other courses**: Introduction to Numerical analysis, Linear Algebra, Calculus, Industrial Engineering and Operations Research, High Performance Scientific Computing, Economics

Extracurricular Activities

- Addressed **100+** students in a session on contributing to **Open Source** Software arranged by the **WnCC**
- **Mentored 6** third year students for their internship preparation for software roles as a D-CAMP **mentor**
- Secured **2nd position** in Shell Energy Day brainstorming competition among **10+** participating teams
- Achieved a **perfect score** in the **SciComp General Championship** conducted by Maths and Physics club
- Completed **year-long** course to learn to play the **tabla** instrument as a part of NSO in the freshman year