Mrigankashekhar Shandilya

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B.Tech in *Computer Science and Engineering*, with Honours +91 89579 09077

Education

Degree	Institute	CPI/%	Year
Bachelor of Technology (B.Tech)	IIT Gandhinagar	**9.08/10**	2022 - Present
Indian School Certificate (ISC)	City Montessori School, Lucknow	98%	2022
Indian Certificate of Secondary Education (ICSE)	St. Francis' College, Lucknow	97%	2020

Experience

Tower Research Capital | *Finance & Treasury Tech, Post Trade* | *Software Engineering Intern* *(Aug'25 - Dec'25)*

- Designed, implemented, and productionized an end-to-end **concurrent** Journal Posting Workflow to maintain consistent ledger book records using **Java (Spring)**, **Postgresql**, and **Typescript (React)** taking measures to handle race conditions.
- Implemented a common **Java** library for securely accessing the Journaling APIs through the codebases of **multiple** teams.

Google | *Git Solutions, Core Engineering* | *Software Engineering Intern* *(May'25 - Aug'25)*

- Developed and deployed an AI-assisted feature for Google's CI/CD platform with contextual awareness through a Retrieval Augmented Generation **(RAG)** system, using **Java (Spring)**, TypeScript (Lit), and Vertex AI impacting over **17000** users.
- Drove end-to-end feature delivery, including **microservice creation**, **CI/CD pipeline setup**, **collaboration** with AI, Security, and UX teams, and gathering developer feedback for feature validation and accuracy to ensure **successful launch**.

IIT Kanpur | *Advisor: Prof. Surender Baswana* | *Student Research Associate* *(May'24 - Jul'24)*

- Attempted to solve the problem of **maintaining decremental s-t max-flow** over edge deletions in an unweighted and directed network in **amortized time** $\mathcal{O}(n)$ per edge update by exploiting properties of the **structure of s-t mincuts**.
- Transitioned to finding the **vital edges** of a weighted undirected graph in less than $\mathcal{O}(n)$ maxflow-computations.
- Received the **"Tapas Mishra Memorial Chair Fellowship"** at IIT Kanpur to fund the expenses of the internship.

Research Projects

Efficient Batch Updates in Interval Scheduling (in $\mathcal{O}(f \log n)$ time) | *Advisor: Prof. Manoj Gupta* 🔗 *(May'23 - Nov'23)*

- Extended the batch-updates algorithm to a **fully dynamic setting** with an **amortized update time of** $\mathcal{O}(\sqrt{n} \log n)$.
- Developed an **incremental algorithm** with **worst-case update time** $\mathcal{O}(\log n)$ using existing research and previous work.

Improved Partitioned Learned Bloom Filters | *Advisor: Prof. Anirban Dasgupta* 🔗 *(Jan'24 - May'24)*

- Optimized the computation of optimal partition thresholds from $\mathcal{O}(Nk \log N)$ **[current state-of-the-art]** to $\mathcal{O}(Nk)$.
- Designed and implemented **TurboPLBF** to test efficacy on datasets like Malicious URLs and EMBER against PLBFs.

Other Projects

Compiler for self-designed language | *Advisor: Prof. Balagopal Komarath* 🔗 *(Jan'25 - Apr'25)*

- Designed a custom **low-level** language with **strict-typing** and implemented a compiler in **C++** for it up to **type-checking**.
- Co-developed a compiler in **Python** for an untyped version of the language, along with a **stack-based VM in C**.

RISC-V Emulator | *Advisor: Prof. Sameer Kulkarni* 🔗 *(Sep'24 - Nov'24)*

- Co-developed a modular RISC-V emulator in **C** supporting multiple **RISC-V ISAs** validated by **official RISC-V tests**.
- Implemented and debugged **UART** and **virtual I/O**, while also assisting in the design of the **virtual memory system**.

Algorithm Design for Large-scale Course Allocation for IIT Gandhinagar 🔗 *(Jan'24)*

- Designed and implemented an algorithm in **Python using Numpy and Pandas**, inspired by **the Hospital Resident Matching Algorithm**, for **fair allocation of courses** to **over 1000 students** based on their **preferences and needs**.

Achievements

- Secured **AIR 4** and **global rank 105** at **Asia Pacific Informatics Olympiad 2022** (among **35 participating nations**).
- Qualified for **IOITC 2021** by securing a rank among the **top 42** students in the **INOI 2021**, and **ranked 18** at the camp.
- Received the **Silver Medal** in **Indian National Olympiad in Informatics (INOI) 2022** by securing **rank 21** in India.
- Secured a position among the **top 1% teams** in **ICPC 2023 Regionals** by securing **rank 44** in the **Kanpur Regionals round** and **rank 54** in the **Chennai Regionals round** (from among **3368 participating teams** in the preliminary round).
- Received **Honorable Mention** in **ICPC 2022 Regionals, Amritapuri** by securing the **87th rank** among **1212 teams**.
- Secured **global rank 8** in CodeChef Starters 157 (Div. 1); **Indian Junior rank 3 & Scholarship** in Sep '21 CodeChef Lunchtime (Div. 2); **Ratings: Codeforces (2017, Candidate Master), CodeChef (2099, 5⋆)**

Positions of Responsibility

Club Secretary | *Competitive Programming and Algorithms Club* *(Aug'23 - Jul'24)*

- Mentored and guided students (**3000+**), through various **events** and **workshops** while managing a team of problem-setters.
- Spearheaded **IIT Gandhinagar's inclusion** in the **first ICPC camp**, collaborating with **13 top Indian colleges**.

Skills and Courses

**excellent performance – A+ grade [11/10]*

- **Programming Languages/Tools:** C++, Python, Java, C, JavaScript, Typescript, Spring, Lit, NumPy, Pandas, Bash, Git
- **Relevant Courses:** Computer Networks, Compilers, Deep Learning, Operating Systems*, Theoretical Foundations of ML, Computer Organization & Architecture, Advanced Algorithms, Intro to Data Science, Complexity Theory, Data Structures and Algorithms, Theory of Computation, Discrete Math, Probability Statistics & Data Visualization, Intro to Computing*