Snehadeep Gayen | CS21B078

B. Tech (Hons.) Computer Science and Engineering

Minor in Mathematics

EDUCATION

B. Tech CSE | CGPA 9.94/10 — Jul '21 - Present
Indian Institute of Technology Madras — Chennai, TN

HSC Class 12th | 98.17% — Apr '19 - Apr '21
Pace Junior Science College — Mumbai, MH

ICSE Class 10th | 98.80% — Apr '18 - Apr '19
Lilavatibai Podar High School — Mumbai, MH

EXPERIENCE

Software Internship at Optiver Amsterdam — May'24 - Jul'24

- Worked in the **Quant Research Data Team** of Optiver Delta1
- Added functionality to **create TCP/IP filters** from session configuration files for packet parsers and **optimised** them for performance.
- Added functionality to **convert timestamps** across timezones, accounting for Daylight Saving Time changes
- **Replaced a saturated time-series Postgres database** with a OneTick database, and **optimised its schema** based on past SQL queries to **minimise query time**.

Avishkar Hyperloop, Student Team, CFI — Oct '22 - Jul'23

- Part of Embedded Software Team of the **Main Control Unit** and **Navigation Unit** of our Hyperloop Pod.
- Used **RTOS** to collect and store data from **over 20 sensors** using various communication protocols at **low latency**.
- Demonstrated our Hyperloop Pod in the prestigious **European Hyperloop Week - Scotland 2023** among over 25 teams globally, and were **awarded runner-up in the Best Sense and Control System** category.

Teaching Assistant, CSE Dept, IIT Madras — Aug '24 - Present

- Worked as a Teaching Assistant and designed Verilog labs for Computer System Design course under Dr. Sutanu Chakraborty

Tutor & Contributor, NPTEL — March '23 - Jun '23

- Created **YouTube tutorials** for previous years' GATE CS questions
- These tutorials aim to support applicants who may have limited access to resources

CODING ACHIEVEMENTS

- **Rated 1806** Expert on Codeforces
- **ICPC 2022 - AIR 151** and **Institute Rank 7** in Kanpur Qualifiers
- **AIR 3** in Shaastra CP Potpourri (Mixed-bag coding contest)
  [Shaastra is Asia's largest student-run Techfest]
- **Global Rank 9** in CodeChef Starters 96 | **Global Rank 231** in Codeforces Round 881 | **Global Rank 373** in Google Farewell Round | **Rank 2** in Republic Day Contest '24 and **Rank 3** in Endgame Contest organised by Programming Club, IITM

KEY COURSES & LABS

- Computer System Design
- Data Structures
- Computer Architecture
- Theory of Computation
- Compiler Design
- Operating Systems
- Functional & Logical Programming
- Computer Networks
- Patterns & Machine Learning
- Router Architecture & Algorithms †∗
- Principles of Economics
- Microeconomics, Macroeconomics ∗
- Introduction to Game Theory
- Probability Theory †
- Combinatorics †
- Linear Programs & Optimisation †
- Linear Algebra †

† - Graduate Course
∗ - Ongoing

SOFTWARE SKILLS

- **Languages**: C++, C, HDL (Verilog), OCaml, Python, Java, Prolog, Flex, Yacc, SQL, x86, MIPS and 8085 ASM, LaTeX, HTML & CSS, R
- **Tools**: CMake, Make, git, gdb/lldb, TI CCS, AutoCAD, GTKWave
- **Libraries**: TI RTOS, Boost, Xerces, ESP32 libraries, Python libraries

SCHOLASTIC ACHIEVEMENTS

- Awarded Sri V Ramachandran Prize for **Highest CGPA** in Semesters 3 & 4 of B.Tech and Dual Degree in Computer Science
- Secured **AIR 5** in JEE Mains '21 out of 1 million students
- Secured **AIR 161** in JEE Advanced '21
- Secured **AIR 10** in Indian Statistical Institute Exam
- Secured **AIR 21** in INChO and attended Orientation Camp for International Chemistry Olympiad
- Awarded KVPY Fellowship '20 with **AIR 338**
- Winner of Mimamsa '22 at IISER Pune | 4th place in Chemenigma '22 at IISC Bangalore | Won Silver Medal in Homi Bhabha Science Competition (conducted in Maharashtra) **AIR** ← All India Rank

RESEARCH

WiFi Sensing for IoT using Machine Learning — *C, Python*

Undergraduate Research under Prof. Ayon Chakraborty

- Created an end-to-end IoT pipeline for real-time Human Activity Recognition using WiFi CSI (Channel State Information) Sensing and Machine Learning on the Server
- Analysed the effect of compression on CSI data and its tradeoffs on the Network Bandwidth, Energy Consumption & Sensing Accuracy.
- This work has been accepted in **AIoT workshop at MobiHoc '24 organised in Athens, Greece.**

Custom Protocol Headers for Network Support — *P4, Python*

Undergraduate Research under Prof. Krishna Moorthy Sivalingam **Ongoing*

- Ideating on a custom protocol header to improve network telemetry or security using P4 switch data plane programming language.
- Deployment & Testing on Intel Tofino switches

PROJECTS

Java Compiler Design — *Java, C*

CS3300 Course Project - Prof. Krishna Nandivada — Jul-Nov '23

- Developed a **5 stage** compiler, from a **subset of Java to MIPS** Assembly.
- Used JavaCC and Java Tree Builder to implement lexical analysis, type-checking, semantic analysis, IR translation and register allocation.

OS Scheduler and Memory Management Unit Design — *Java*

CS3500 Course Project - Prof. Prashant LA — Jul-Nov '23

- Developed a Multi-Level Feedback Queue process scheduler and a Memory Management Unit with an LRU page replacement policy.

LAN Chatroom, Music Streaming & HTTP Server — *C*

CS3205 Course Project - Prof. Ayon Chakraborty — Jan-May '24

- Developed a LAN Chatroom Server scratch using only Unix Sockets
- Built a Music Streaming server and client using Unix sockets and ALSA.
- Developed a simple multithreaded HTTP Server capable of serving files and handling GET and POST requests

CPU Design — *Verilog*

CS2610 Course Project - Prof. C. Chandra Sekhar — Jan-May '23
CS2310 Course Project - Prof. Ayon Chakraborty — Jul-Nov '22

- Implemented a CPU with **Register file** and **ALU** supporting Arithmetic and Logical instructions on both 8-bit integers and 12-bit floats
- Built a combinational 8-bit CPU with structural gate-level Verilog

Closeness Centrality Algorithm — *C++*

Project under Prof. Manikandan Narayanan — May-Jun '23

- Implemented the CENDY algorithm, an on-line algorithm for updating Average Path Length and Closeness Centrality in a Dynamic Graph, based on this paper.

EXTRACURRICULAR ACTIVITIES

- **Sports:** Awarded 13 medals in Track & Field and Best Athlete U14 in High School, Taekwondo Red Dan II Belt, NSO Athlete at IITM
- Mentored incoming freshmen under **Saathi, IIT Madras**