Parth Pujari

Computer Science and Engineering
Indian Institute of Technology, Bombay

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B.Tech.
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Examination	University	Institute	Year	CPI
Graduation	IIT Bombay	IIT Bombay	2025	11

Pursuing an **Honors** in Computer Science and Engineering

SCHOLASTIC ACHIEVEMENTS

- Awarded **Branch Change** to Computer Science and Engg (**18** in **1400**) for academic excellence. *(2022)*
- Secured **All India Rank 537** in the **IIT JEE Advanced** examination out of 150,000 candidates. *(2021)*
- Attained a percentile of **99.749** in the **JEE Main** examination out of 0.9 million candidates. *(2021)*
- Scored a total of **375** marks in **BITSAT** (99+ percentile) out of 0.3 million students *(2021)*

INTERNSHIP AND RESEARCH EXPERIENCE

Optiver | *Software Development Internship (FPGA Software)* | *Amsterdam, Netherlands* *(Summer '24)*

- Created a **production like environment** for testing and analysing **rule based** options hardware trading systems
- Implemented automated systems for managing HW/SW processes, networks, mock stock exchanges and test setups
- Utilized the environment to test and pass **new releases** of production software and hardware performance metrics

Securing Memory Hierarchy in GPUs | *RnD Project - Prof. Biswabandan Panda* *(Autumn '24)*

- Creating **covert** attack channels on GPU memory hierarchies using **software prefetching** based on memory latency
- Researching on and reverse engineering prefetching instructions and their semantics in NVIDIA's **PTX virtual ISA**
- Utilizing **microbenchmarking techniques** and algorithms like the chasing pointer to test GPU memory latency

Compressed Sensing in Group Testing | *Bachelor Thesis Project - Prof. Ajit Rajwade* *(Autumn '24)*

- Improving on the current viral load estimators used in **compressed sensing pool testing** methods for RT-PCR
- Utilizing **Bayesian inference** to estimate distributions of infected samples and errors in their testing parameters
- Using combinatorial group testing and compressed sensing to improve upon algorithms for deconvoluting pooled tests

KEY PROJECTS

Denoising Diffusion GANs | *AI ML* | *Prof. Preethi Jyothi* | *(Autumn '23)*

- Implemented **denoising diffusion Generative Adversarial Networks** using multimodal conditional GANs
- Enhanced image generation, improving **image quality** and **diversity** competitive with original diffusion models

Stable Diffusion | *Seasons of Code, IIT Bombay* | *(Summer '23)*

- Implemented **Denoising Diffusion Probabilistic Models** (DDPM) paper using Hugging Face'sthe DIffuser's U-Net and used it for conditional generation of images based on the FashionMNIST datset
- Implemented latent diffusion using the **diffuser's VAE** and the diffusion U-Net for high resolution image generation

Image Processing *Advanced Image Processing* | *Prof. Ajit Rajwade* *(Spring '24)*

- Implemented image denoising and deblurring for very low SNR images using the **Poisson Inverse model method**
- Used the Plug and Play approach based on Anscombe transform using Gaussian denoisers like BM3D to deblur images
- Implemented image inpainting, denoising and debluring using **Regularized Partial Differential Equations**

Computer Architecture | *Computer Architecture* | *Prof. Biswabandan Panda* | *(Spring '23)*

- Implemented and tested the **Tagged Geometric Length Predictor** (TAGE) and the **L-TAGE** branch predictor
- Implemented simulations of a **best offset prefetcher** in C++ at the L2 cache on the ChampSim simulator

C Compiler Design | *Implementation of Programming Languages* | *Prof. Uday Khedker* *(Spring '24)*

- Created a C compiler in C++ using **Lex** and **Yacc** for lexical analysis and syntax parsing respectively
- Created a context free grammar, abstract syntax trees and intermediate representations for the simplified C language

MENTORING AND POSITIONS OF RESPONSIBILITY

Teaching Assistant - *Computer Architecture* | **Mentor**: Game Engine Dev | **Convener** - Web and Coding Club

TECHNICAL PROFICIENCY AND COURSEWORK

Technical: C, C++, VHDL, Scheme, Java, Python, Bash, MATLAB, SQL, PyTorch, Scikit-learn, Scipy, Matplotlib
Coursework: Networks, Advanced Architecture, Operating Systems, Advanced Image Processing, AI-ML, Compilers, Applied Algorithms, Commutative Algebra, Extremal Combinatorics, Optimization Models

EXTRACURRICULARS

- Received **International Rank 1** in the Akhil Bharatiya Gandharva MV's **Visharad** exam for singing proficiency.
- Invited as a professional singer to the **All India Radio** for performances in Indian Classical Vocals *(2016-2020)*