

# SUBHRAJIT DAS

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## EDUCATION

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<b>PhD in Computer Science and Engineering</b> Indian Institute of Technology Gandhinagar, Gandhinagar, India <i>Director's PhD Fellow</i> <i>Advisors: Prof. Abhishek Bichhawat, Prof. Yuvraj Patel</i> CPI: 10	<i>2025 - Present</i>
<b>M.Tech. in Computer Science and Engineering</b> Indian Institute of Technology Gandhinagar, Gandhinagar, India CPI: 9.84 <i>Specialization: Computer Systems</i>	<i>2023 - 2025</i>
<b>M.Sc. in Computer Science</b> University of Kalyani, Kalyani, India CGPA: 9.76 <i>First Class with Distinction</i> <i>First Rank in University</i>	<i>2021 - 2023</i>
<b>B.Sc. (Honours) in Computer Science</b> Panighati Mahavidyalaya, Sodepur, India ( <i>Affiliated to WBSU</i> ) CGPA: 9.89	<i>2018 - 2021</i>
<b>Higher Secondary (Class XII)</b> Kalyangarh Vidyamandir, Ashoknagar, India, ( <i>Affiliated to WBCHSE</i> ) <i>Science Stream: Physics, Chemistry, Mathematics, Computer Science</i> Percentage: 86.20	<i>2016 - 2018</i>
<b>Secondary (Class X)</b> Prafulla Nagar Vidyamandir, Habra, India, ( <i>Affiliated to WBBSE</i> ) Percentage: 79.28	<i>2010 - 2016</i>

## RESEARCH INTERESTS

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CPU Parallelism, Distributed Systems, and Usable Security

## RESEARCH EXPERIENCE

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<b>Accelerating Large Integer Arithmetic with Parallel Addition, Subtraction, and Vedic-Based Multiplication Using AVX512</b>	<i>Jan 2024 - Apr 2025</i>
<i>Supervisors: Prof. Abhishek Bichhawat, Prof. Yuvraj Patel</i>	M.Tech Thesis, IIT Gandhinagar
· Designed high-performance faster data-parallel algorithms for large integer addition and subtraction using AVX512 for most cases.	
· Achieved average execution-time speedup of 2.06x for addition and 2.32x for subtraction (up to 131k bits) compared to the GNU Multiple-Precision Arithmetic Library (GMP).	
· Designed a faster Vedic-based multiplication algorithm for large integers using AVX512-IFMA for 256-bit operands, with execution-time speedup of 1.83x compared to the GMP library.	
· Additionally, designed approximate variants of the proposed algorithms for large integer addition and multiplication, achieving average execution-time speedup of 2.52x and 2.80x, respectively, compared to GMP.	

## **Studies on Various Maximal Covering Location Problems using Genetic and Artificial Bee Colony Algorithms**

Sep 2022 - Jun 2023

*Supervisors: Prof. Priya Ranjan Sinha Mahapatra and Dr. Soumen Atta* M.Sc Thesis, University of Kalyani

- Implemented an algorithm to solve the NP-Hard Maximal Covering Location Problem using Genetic Algorithm with Local Refinement, showing promising results in various SJC data sets in terms of both achieving near-optimal benchmark results and computational time. However, in some instances, the benchmark results were missed by a small margin, while it beats some of the existing models in terms of computational time by a multi-fold time.
- Designed and implemented an algorithm to solve the NP-Hard Probabilistic Maximal Covering Location Allocation Problem using Artificial Bee Colony Algorithm with Regional Facility Enhancement, achieving optimal benchmark results of commercial solver CPLEX in 50% of cases, with an average computational time of 85.83 seconds, with an average gap of 0.01%, but matched accuracy with other meta-heuristics models while beating most of the preceding models in computational time.

## **Reversible Multiplier Accumulate Unit**

Jan 2021 - Aug 2021

*Supervisors: Mr. Biswanath Sen*

B.Sc Project, Panihati Mahavidyalaya

- Proposed a reversible design of the Multiplier Accumulate Unit (MAC) using reversible gates for low power consumption and heat dissipation, helping us in energy saving.
- Additionally, proposed a reversible design of Adder/Subtractor and Information Shifter, which is helpful for addition/subtraction and shifting information at a very low power energy.

## **TEACHING EXPERIENCE**

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### **Teaching Assistant**

Jul 2023 - Present

*Dept. of CSE*

IIT Gandhinagar

- Assisted with courses such as Distributed Systems and Cloud Computing, Computer & Network Security, Compilers, and Data Structures and Algorithms - I.

### **Guest Lecture on SIMD and Code Profiling**

Oct, 2025

*Computer Systems, CS 612*

IIT Gandhinagar

- Given a couple of guest lectures on exploiting x86-64 data parallelism using compiler auto-vectorization, intrinsics and also profiling code with Linux perf and relevant syscalls for the course CS 612 - Computer Systems.

### **Guest Lecture on RAID**

April, 2025

*Operating Systems, CS 330*

IIT Gandhinagar

- Given a guest lecture on RAID for the course CS 330 - Operating Systems.

### **Principal Instructor**

Nov 2024

*Dept. of CSE*

IIT Gandhinagar

- Conducted a Student-Run Course (SRC) titled “Code Profiling and Optimization” in collaboration with a colleague, under the mentorship of *Prof. Abhishek Bichhawat*. The course, part of the Student Academic Council initiative, focused on code profiling, performance benchmarking, and leveraging various tools and libraries for code optimization.

## PROJECTS

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**WimpyGPU: Leveraging Commodity Hardware for Compute-intensive GPU Tasks** Oct 2025 - Present

*Team Contributor*

IIT Gandhinagar & University of Edinburgh

- Investigating how clusters of commodity hardware can tackle compute-intensive tasks typically reserved for accelerators.

**Developer Experience of Consent Management Platform Integration** Oct 2025 - Present

*Team Contributor*

IIT Gandhinagar

- Investigating the usability challenges developers face when integrating Consent Management Platforms (CMPs) into web applications.

**Online Authentication Habits of Indian Users [1]** Oct 2023 - May 2024

*Team Contributor*

IIT Gandhinagar

- Conducted a structured survey with 90 Indian participants, analyzing awareness, usage, and perceptions regarding password habits, password managers, and Two-factor Authentication (2FA).
- Highlighted many interesting insights, including a tendency to use default settings, and emphasized the need for tailored strategies to enhance password security.

**Instant Payment Gateway** Feb 2024 - April 2024

*Team Contributor*

IIT Gandhinagar

- Developed an instant payment system using microservices architecture (Go, gRPC, Docker) with a single-server deployment, processing up to 400 requests/second and 1000+ concurrent connections, ensuring secure, fault-tolerant transactions via Nginx load balancing and sharded MySQL/SQLite.
- Designed key components (Authenticator, Payment Handler, Resolver, Banks) for transaction coordination, failure recovery, and notifications, leveraging ELK Stack and wrk for performance benchmarking.

**TennisServe: A Parallel Game Matching Server** Jan 2024 - April 2024

*Individual Contributor*

IIT Gandhinagar

- Developed a simulation of a tennis game matching server where multiple players send requests for games: singles, doubles, male, female, or mixed. Utilized OpenMP threads to handle client requests and MPI calls for player communication. Managed the availability of limited tennis courts (4 courts) to continuously match players' requests.

## PUBLICATIONS

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- [1] Pratyush Choudhary\*, Subhrajit Das\*, Mukul Paras Potta\*, Prasuj Das, and Abhishek Bichhawat, “Online Authentication Habits of Indian Users,” in *Proceedings of BuildSEC’24, Building a Secure & Empowered Cyberspace*, IEEE Society on Social Implications of Technology (SSIT), New Delhi, India, Dec. 2024.

## RELEVANT CERTIFICATION

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**Certification in Scientific Writing**, IIT Gandhinagar, Semester I, 2025-26

**Certification in Teaching**, Indian IIT Gandhinagar, Semester II, 2023-24

## POSITIONS OF RESPONSIBILITY

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**Volunteer** Dec 16-18, 2024  
*FSTTCS 2024* IIT Gandhinagar

- Volunteered at the 44th conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2024), organized by IARCS in association with ACM India.

**Class Representative** Oct 2021 - June 2023  
*Dept. of CSE, MCS* University of Kalyani

- Facilitated communication between faculty, administration, and batch-mates in matters ranging from class-related concerns to advocating for a fee reduction for the batch.

## ACHIEVEMENTS

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Selected for Director's Fellowship for admission into PhD at IIT Gandhinagar	Jan 2025
Best Paper Award for "Online Authentication Habits of Indian Users" at BuildSEC'24	Dec 2024
MoE Scholarship for Teaching Assistantship, IIT Gandhinagar	Jul 2023
All India Rank of 530 in the GATE 2023 Computer Science examination	Mar 2023
Qualified for West Bengal SET in Computer Science for Lecturership	Mar 2023
Awarded with UGC NET JRF in Computer Science	Dec 2022
Qualified for UGC NET in Computer Science for Lecturership	Dec 2022
Swami Vivekananda Merit-cum-Means Scholarship, Govt. of West Bengal	Oct 2021

## SKILLS/HOBBIES

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<b>Programming Languages</b>	C, C++, Java, MATLAB, Assembly, Go, Python, R, Shell, SQL, Prolog, Kotlin, HTML, CSS, JavaScript, JSP
<b>Tools/Libraries/Simulators</b>	Git, Docker, gRPC, OpenMP, MPI, SIMD Intrinsics, Valgrind, Linux Perf, GDB, Wireshark, NS2, Mininet
<b>Operating Systems</b>	Linux/Unix, Windows
<b>Hobbies</b>	Enjoying Music and Travelling
<b>Languages</b>	Bengali (native), English (fluent), and Hindi (intermediate)
<b>Other Interests</b>	Geopolitics, Financial Instruments

## OTHER ACTIVITIES

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Presented a poster on our work on "Accelerating Large Integer Arithmetic with Parallel Addition, Subtraction, and Vedic-Based Multiplication Using AVX512" at the invite-only Computer Systems Workshop at IISc Bangalore, Oct 2025

Assisted in organizing web security CTFs for ICAN Faculty Development Program on Cybersecurity at IIT Madras, July 2025

Selected for the 37th Inter IIT Aquatic Meet 2023 Training Camp at IIT Gandhinagar

Completed Fifth-Year Examination in Fine Art (2017) from Sarbabharatiya Sangeet-o-Sanskriti Parishad with First Class in Theory and First Division with Distinction in Practical

Received multiple awards and medals as an Off-Spin bowler in Cricket during high school years, competing in district and state-level tournaments