



Abhinav Vaishya

Education

Jul 2018 - Jun 2023 **Bachelor of Technology (Honours) and Master of Science by Research, Computer Science and Engineering**, International Institute of Information Technology, Hyderabad (IIIT-H).

Advisor: [Dr. Prasad Krishnan](#)

Thesis Title: Low Complexity Cache-Aided Communication Schemes for Distributed Data Storage and Distributed Computing

Specialization: Algorithms and Theory [[Certificate](#)]

Research Experience

Jul 2023 - Present **Research Associate**, Indian Institute of Science, Bangalore (IISc).

- Quantum Error-Correcting Codes (QECC)
 - Worked on constructing multimode Gottesman-Kitaev-Preskill (GKP) codes with better error-correcting properties through the lens of lattice theory.
 - I also audited a course on QECC taught by Prof. Navin Kashyap at IISc.
 - I have been part of the Quantum Codes reading group, where I have presented Qudit Stabilizer Codes.
- Advisor: [Dr. P Vijay Kumar](#)

Jun 2022 - Jun 2023 **Research Intern**, Technical University of Munich (Remote).

- Codes for Distributed Storage (Literature Review)
 - Presented papers on Convertible Codes.
- Coding Theory for Blockchains (Literature Review)
 - Did comprehensive literature survey on the topic and presented the same.
- Advisor: [Dr. Rawad Bitar](#)
- I was unable to continue working after graduating from IIIT-H and joining IISc.

May 2021 - Jun 2023 **Research Assistant**, IIIT-H.

- Coded Caching via Locally Recoverable Codes (Yet to be published)
 - Constructed a scheme that has parameters identical to Maddah-Ali-Niesen scheme.
- Coded Caching via Subspace Designs (Accepted at IEEE JSAIT, 2023)
 - Worked on the proof and numerical results for a coded caching (and distributed computing) scheme based on the q-analogs of combinatorial designs, i.e., subspace designs.
- Lower bound for the Coded Data Rebalancing (CDR) problem (Yet to be published)
 - Devised an algorithm to find a lower bound for CDR with cyclic storage using index coding proof techniques.
- Coded Data Rebalancing for Distributed Storage Systems with Cyclic Storage (Accepted at IEEE ITW, 2022)
 - Constructed rebalancing schemes for single-node removal and addition scenarios in replication-based distributed storage systems.
- Advisor: [Dr. Prasad Krishnan](#)

Aug 2020 - Apr 2021 **Undergraduate Researcher**, IIIT-H.

- Coded Data Rebalancing for Distributed Storage Systems
- Advisor: [Dr. Prasad Krishnan](#)

- May 2019 - Jun 2020 **Undergraduate Researcher**, IIIT-H.
o A software framework for annotation of manuscript document images (Showcased at a workshop, ICDAR, 2019)
o Advisor: Dr. Ravi Kiran Sarvadevabhatla

Work Experience

- Jan 2023 - May 2023 **Teaching Assistant**, IIIT-H.
o Information-Theoretic Methods in Computer Science, Spring '23
o Introduction to Coding Theory, Spring '22
o Linear Algebra, Spring '21
o The role involved conducting tutorials, setting and evaluating assignments and exams.
- Jun 2019 - Oct 2019 **Problem Setter**, Hackerrank.
o Prepared various original programming and algorithmic problems along with strong testcases.
- Aug 2018 - Dec 2018 **Web Developer**, VLEAD, IIIT-H.
o Worked on building a web application for interactive online learning modules.

Publications

1. Shailja Agrawal, K V Sushena Sree, Prasad Krishnan, **Abhinav Vaishya**, Srikanth Kale, "Cache-Aided Communication Schemes via Combinatorial Designs and their q -analogs", IEEE Journal on Selected Areas in Information Theory (JSAT), 2023. [[IEEE](#)][[Arxiv](#)]
 2. Athreya Chandramouli*, **Abhinav Vaishya***, Prasad Krishnan, "Coded Data Rebalancing for Distributed Data Storage Systems with Cyclic Storage", IEEE Information Theory Workshop, 2022. [[IEEE](#)][[Arxiv](#)][[Slides](#)]
- * indicates equal contribution

Course Projects (Selected)

- Spring 2021 **Encoding and Decoding of Reed Solomon Codes (Language: Python 3)**
o Implemented the encoding and decoding procedures of Reed Solomon Codes. Sympy was used in the implementations. This project was a part of the course Topics in Coding Theory.
- Spring 2020 **Distributed Algorithms**
o Implemented many graph based and sorting algorithms, a simple single server architecture (supports multiple clients), for distributed systems using OpenMP(C++), MPI(C++), Cuda(C++/Python), and RMI(Java). This project was a part of the course Distributed Systems.
- Spring 2020 **Applications of Linear Programming (Language: Python 3)**
o Used Linear Programming for solving various interesting problems such as - Jigsaw Puzzle, Sudoku, Convex Hull, and Largest Circle in a Polygon. This project was a part of the course Optimization Methods.

Relevant Courses

- Algorithms and Theory (at IIIT-H) Algorithms, Complexity and Advanced Algorithms, Computational Complexity Theory, Principles of Information Security, Introduction to Coding Theory*, Topics in Coding Theory, Information-Theoretic Methods in Computer Science*, Advanced Mathematical Structures.
- Theory (at IISc) Quantum Error-Correcting Codes**
* indicates that I attended the course as a Teaching Assistant
** indicates that I audited the course

Skills

Languages C, C++, Python, MATLAB, Java, Javascript, SQL, Erlang, TeX

Libraries numpy, scipy, sympy, MPI

Miscellaneous

- Ranked 88th in ACM-ICPC Online Round 2019-20. (Honorable Mention) [[Certificate](#)]
- Selected for the Onsite Round of ACM-ICPC Asia Regionals, Amritapuri 2019-20.
- Certificate for Problem Solving (Advanced) by Hackerrank. It covers topics like Data Structures such as Trees, Graph Traversal, using Dynamic Programming and Specialized Algorithms, among others. [[Certificate](#)]
- Merit List awardee.