Soham Chatterjee

✉ soham.chatterjee@tifr.res.in   🔗 profile   ○ sohamch08

🌐 sohamch08.github.io

Education

2024 – current	🔖 **I-Ph.D Computer Science, Tata Institute of Fundamental Research, Mumbai**
2021 – 2024	🔖 **B.Sc. Math and Computer Science, Chennai Mathematical Institute**

Research Intereset

Algorithms and Complexity Theory with Algebraic nature, Error Correcting Codes, Pseudorandomness, Polyhedral Combinatorics.

Research Publications

1   S. Chatterjee, P. Harsha, and M. Kumar, *Deterministic list decoding of reed-solomon codes*, 2025. arXiv: `2511.05176 [cs.CC]`. 🔗 URL: `https://arxiv.org/abs/2511.05176`.

Talks and Presentations

2026	🔖 BPL ⊆ SC**: Nisan's Pseudorandom Generator for** BPL Course-Work presentation (TIFR): Pseudorandomness. Paper by Noam Nisan, 1992 Slides: [PDF]
	🔖 **Subspace Polynomials and List Decoding of Reed Solomon Codes** Course-Work presentation (TIFR): Topics in Coding Theory. Paper by Eli Ben-Sasson, Swastik Kopparty & Jaikumar Radhakrishnan, 2006.
	🔖 **Universal Optimality of Dijkstra using Fibonacci Priority Queue with Working Set Property** Oral Qualfier Presentation. Paper by Haeupler, Hladík, Rozhoň, Tarjan, Tětek, 2024. FOCS Best Paper. Slides: [PDF]
	🔖 $n^{1.62}$ **Upper Bound of the Hurwitz Problem** TIFR Student Seminar. Paper by Pavel Hrubesh, 2024
2025	🔖 **Super Polynomial Lower Bound on Traveling Salesman Polytope** Coursework Presentation (TIFR): Combinatorial Optimization. Paper by Fiorini, Massar, Pokutta, Tiwary and Wolf, 2012 Slides: [PDF]
	🔖 **Bounds on Price of Anarchy using LInear and Quadratic Programming** Coursework Presentation (TIFR): Algorithmic Game Theory. Paper by Kulkarni and Mirrokni, 2015. Slides: [PDF]
	🔖 **Bipartite Matching is in Quasi-NC** TIFR Student Seminar. Paper by Stephen A. Fenner, Rohit Gurjar and Thomas Thierauf, 2016.
2024	🔖 **Hensel and Newton Methods in Valuation Rings** Coursework Presentation (CMI): Algebra and Computatiopn. Paper by J von zur Gathen, 1984

Talks and Presentations (continued)

2023   **Coursework Presentation (Algorithmic Coding Theory II)**
Algebraic Geometric Codes, jointly presented by Me and Shree Ganesh S J
Report: [PDF]

   Coursework Presentation (Parallel Algorithms anc Complexity)
"Iterated Mod Problem" by Karloff and Ruzzo
Slide: [PDF]

Attended Workshops

2025   FSTTCS, BITS Pilani

   HDX and Codes, ICTS

2024   FSTTCS, IIT Gandhinagar

Jan-Apr 2024   Quantum Computing Semester, CMI

Relevent Courses

- **TIFR Courses**

  - Mathematical Foundations of Computer Science
  - Algorithms
  - Probability
  - Computational Complexity
  - Algebra, Number Theory & Computation
  - Combinatorial Optimization
  - Algorithmic Game Theory
  - Pseudorandomness
  - Topics in Coding Theory
  - Algebraic Complexity Theory
  - Polynomial Methods in Combinatorics

- **CMI Courses**

  Math Courses:

  - Linear Algebra (Algebra 1)
  - Group Theory (Algebra 2)
  - Ring and Field Theory (Algebra 3)
  - Commutative Algebra
  - Real Analysis (Analysis 1)
  - Analysis in Euclidean Space (Analysis 2)
  - Analysis in Metric Space (Analysis 3)
  - Complex Analysis
  - Discrete Mathematics
  - Calculus
  - Probability Theory
  - Topology
  - Differential Equations

  Computer Science Courses:

  - Design and Analysis of Algorithms
  - Theory of Computation
  - Complexity Theory
  - Parallel Algorithms and Complexity
  - Expander Graphs and Application
  - Algorithmic Coding Theory (Two Parts)
  - Algebra & Computation
  - Quantum Algorithmic Thinking
  - Quantum Information Theory
  - Functional Programming with Haskell
  - Advanced Programming with Python
  - Programming Language Concepts (Java, Concurrent Programming, Lambda Calculus)

Research Internships

Summer 2024	Worked on *Derandomization of Isolation Lemma over Polytopes* Guide: Dr. Rohit Gurjar, IIT Bombay
Dec'23-Jul'24	Project on *Quantum Property Testing of Junta Functions and Partially Symmetric Functions* Guide: Dr. Arijit Ghosh, ISI Kolkata
Summer 2023	Reading project on *Factorization of Arithmetic Circuits* Guide: Dr. Nitin Saxena, IIT Kanpur
Dec 2022	Reading project on *Computational Number Theroy and Algebra for Algebraic Comlexity Theory* Guide: Dr. Nitin Saxena, IIT Kanpur

Achievements

2024	Ranked 5 in the Joint Entrance Screening Test I-PhD exam for Theoretical Computer Science.
2021	Got selected for NISER for Bachelors through the NEST exam.
2020	Ranked 28 in 12th Statistics Olympiad organised by C R Rao Advanced Institute of Mathematics, Statistics and Computer Science.

Miscellaneous

	Subreviewer for STACKS 2026
	TA Ship: Algorithms, TIFR, 2025 by T. Kavitha
2023	Coursework Project (Quantum Algorithmic Thinking) Qiskit Implementation of Quantum Circuit of Modular Exponentiation: Implemented the paper "Quantum Networks for Elementary Arithmetic Operations" by Vedral, Barenco and Artur Code: [Link]
	Coursework Project (Quantum Algorithmic Thinking) Qiskit Implementation of Kushlevitz and Mansour Algorithm: Implemented the paper "Learning Decision Trees Using The Fourier Spectrum" by Kushilevitz and Mansour Code: [Link]

Computer Skills

Languages	LaTeX(Advanced), Python (Intermediate), Qiskit (Intermediate), Haskell (Basic), Java (Basic), C (Basic), Unix/Linux Shell Scripting, HTML (Basic), CSS (Basic).
Tools	Git, Basic works in terminal, VIM, Obsidian