

Curriculum Vitae

Abhranil Chatterjee, Assistant Professor, IIT Kanpur

About Me

I am an **assistant professor** in the **Department of Computer Science and Engineering** at **Indian Institute of Technology, Kanpur**. Here is my contact details:

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Past Employment

I was an INSPIRE faculty in **Advanced Computing and Microelectronics Unit** at **Indian Statistical Institute, Kolkata** before joining IIT Kanpur (May, 2023 - December, 2024). Previously, I was a visiting faculty in the **School of Computer Sciences at National Institute of Science Education and Research, Bhubaneswar** (November, 2022 - April, 2023). I was a postdoctoral research fellow in the **Department of Computer Science and Engineering** at **Indian Institute of Technology, Bombay** from September, 2021 to October, 2022.

Past Education

I did Ph.D. in **Theoretical Computer Science** under the guidance of **V. Arvind** and **Partha Mukhopadhyay** from **The Institute of Mathematical Sciences, Chennai (Homi Bhabha National Institute)** (2016 – 2021). I completed M.E. in **Computer Science and Engineering** from **Jadavpur University** in 2016. I did B.Tech in **Computer Science and Engineering** from **Kalyani Government Engineering College** in 2013.

Research Interests

My research interest broadly lies in computational complexity theory and algorithm design. Specifically, I am interested in algebraic complexity theory, designing algorithms with algebraic techniques and interplay between circuit complexity theory and algorithm design.

Research Publications

in reverse chronological order.

1. **On Lifting Lower Bounds for Noncommutative Circuits using Automata**,
with V. Arvind,
Chicago Journal of Theoretical Computer Science, 2025.
2. **Characterizing and Testing Principal Minor Equivalence of Matrices**,
with Sumanta Ghosh, Rohit Gurjar, and Roshan Raj,
STOC, 2025.
3. **Trading Determinism for Noncommutativity in Edmonds' Problem**,
with V. Arvind, and Partha Mukhopadhyay,
FOCS, 2024.
4. **Black-box Identity Testing of Noncommutative Rational Formulas in Deterministic Quasipolynomial-time**,
with V. Arvind and Partha Mukhopadhyay,
STOC, 2024
invited to STOC 2024 Special Issue, in SIAM Journal on Computing (SICOMP).
5. **Determinants vs. Algebraic Branching Programs**,
with Mrinal Kumar, and Ben Lee Volk,
ITCS, 2024; Computational Complexity, 2024.
6. **Border Complexity of Symbolic Determinant under Rank One Restriction**,
with Sumanta Ghosh, Rohit Gurjar, and Roshan Raj,
CCC, 2023.

7. **On Black-box Rational Identity Testing and Noncommutative Rank over the Free Skew Field**,
with V. Arvind, Utsab Ghosal, Partha Mukhopadhyay, and C. Ramya,
ITCS, 2023.
8. **Black-box Identity Testing of Noncommutative Rational Formulas of Inversion Height Two in Deterministic Quasipolynomial-time**,
with V. Arvind and Partha Mukhopadhyay,
RANDOM, 2022.
9. **Equivalence Testing of Weighted Automata over Partially Commutative Monoids**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
MFCS, 2021.
10. **A Special Case of Rational Identity Testing and the Brešar-Klep Theorem**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
MFCS, 2020.
11. **Fast Exact Algorithms Using Hadamard Product of Polynomials**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
FSTTCS, 2019; ALGORITHMICA, 2022.
12. **On Explicit Branching Programs for the Rectangular Determinant and Permanent Polynomials**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
ISAAC, 2019, Chicago Journal of Theoretical Computer Science, 2020.
13. **Efficient Black-Box Identity Testing for Free Group Algebras**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
RANDOM, 2019.
14. **Univariate Ideal Membership Parameterized by Rank, Degree, and Number of Generators**,
with V. Arvind, Rajit Datta and Partha Mukhopadhyay,
FSTTCS, 2018; ToCS, 2021.

Teaching Experience

Below I outline the courses I have taught.

- **Computational Complexity:** An elective course on theory offered for B.Tech, M.Tech, and PhD students at IIT Kanpur (even semester, 2024-2025).
- **Design and Analysis of Algorithms:** A compulsory course offered for M.Tech CS and PhD students at ISI Kolkata (odd semester, 2024-2025).
- **Computational Complexity:** An elective course on theory offered for M.Tech CS and PhD students at ISI Kolkata (even semester, 2023-2024).
- **Algorithms for Big Data:** An elective course on theory and data science offered for M.Tech CS and PhD students at ISI Kolkata (odd semester, 2023-2024).
- **Programming and Data Structures-II (Theory):** A second course of computer programming for all undergraduate first year students of NISER, Bhubaneswar (even semester, 2022-2023).
- **Programming and Data Structures-II (Lab):** The lab class for the Programming and Data Structures-II course in the even semester of 2023.

Research and Travel Grant

- I am a recipient of **INSPIRE Research Grant** (2023 - 2028) awarded by *Department of Science and Technology, Government of India*.
- I have been awarded **Google Research Travel Grant** to attend STOC, 2024 held in Vancouver, Canada.
- I have also been awarded **Microsoft Research Travel Grant** to attend FOCS, 2024 held in Chicago, US.
- I obtained a travel grant from **IARCS-ACM India**.

Professional Recognition

- I have served as one of the area chairs at **ACM India ARCS 2025**.
- I was one of the speakers for **CALDAM 2025 Indo-Spain Pre-Conference School on Algorithms and Combinatorics** during February 10-11, 2025.
- I am a recipient of INSPIRE Faculty fellowship (2022) awarded by Department of Science and Technology, Government of India.
- **Talks:** I have presented our work in the following conferences, workshops, and seminars.
 - **Conferences:** RANDOM(2019) @MIT, FSTTCS(2019) @IIT Bombay, MFCS(2020) @online, MFCS(2021) @online, RANDOM(2022) @online, ITCS(2023) @pre-recorded, ITCS(2024) @pre-recorded, STOC(2024), FOCS(2024).
 - **Workshops:** WACT(2019) @ICTS, WACT(2023) @Warwick.
- I was one of the co-organisers of the workshop **Recent Trends in Algorithm** held at NISER, Bhubaneswar (July 26–28, 2023).
- I have reviewed papers as a subreviewer in the following conferences: STACS(2020), ESA(2020), STOC(2021), SODA(2021), CCC(2022), LATIN(2022), WALCOM(2023), ISAAC(2023), ITCS(2024), STACS(2024), FSTTCS(2024) and journals: ACM TOCT, STOC(2025).