

Abhranil Chatterjee

Indian Statistical Institute, Kolkata

ABOUT ME

I am an INSPIRE Faculty in **Advanced Computing and Microelectronics Unit** at **Indian Statistical Institute, Kolkata**. Here is my contact details:

- **address:** Office: 610, 6th floor, PJA building, ISI Kolkata.
- **homepage:** <https://cabhranil.bitbucket.io>.
- **email id:** abhneil [at] gmail [dot] com.

PAST EMPLOYMENT

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.

PUBLICATIONS

1. **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).
2. **Determinants vs. Algebraic Branching Programs**,
with Mrinal Kumar, and Ben Lee Volk,
ITCS, 2024.
3. **Border Complexity of Symbolic Determinant under Rank One Restriction**,
with Sumanta Ghosh, Rohit Gurjar, and Roshan Raj,
CCC, 2023.
4. **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.
5. **Black-box Identity Testing of Noncommutative Rational Formulas of Inversion Height Two in Deterministic Quasipolynomial-time**,
with V. Arvind and Partha Mukhopadhyay,
RANDOM, 2022.
6. **Equivalence Testing of Weighted Automata over Partially Commutative Monoids**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
MFCS, 2021.
7. **A Special Case of Rational Identity Testing and the Brešar-Klep Theorem**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
MFCS, 2020.

8. **Fast Exact Algorithms Using Hadamard Product of Polynomials**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
FSTTCS, 2019; ALGORITHMICA, 2022.
9. **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.
10. **Efficient Black-Box Identity Testing for Free Group Algebras**,
with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
RANDOM, 2019.
11. **Univariate Ideal Membership Parameterized by Rank, Degree, and Number of Generators**,
with V. Arvind, Rajit Datta and Partha Mukhopadhyay,
FSTTCS, 2018; ToCS, 2021.

PREPRINTS

1. **Trading Determinism for Noncommutativity in Edmonds' Problem**,
with V. Arvind, and Partha Mukhopadhyay,
manuscript under submission.
2. **On Lifting Lower Bounds for Noncommutative Circuits using Automata**,
with V. Arvind,
manuscript under submission.

TEACHING EXPERIENCE

- I taught **Computational Complexity** at ISI, Kolkata last semester (graduate course).
- I taught **Algorithms for Big Data** at ISI, Kolkata in the even semester of 2023 (graduate course).
- I taught **Programming and Data Structures-II** at NISER, Bhubaneswar in the even semester of 2023 (undergraduate course).
- I was the teaching assistant for the course **Computational Complexity** taught by V. Arvind at IMSc, Chennai (2019, Jan-May).
- I have also taught at summer school (2019) organized at IMSc.

RESEARCH GRANT

- I am a recipient of **INSPIRE Research Grant** (2023 - 2028) awarded by *Department of Science and Technology, Government of India*.

PROFESSIONAL RECOGNITION

- 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.
 - **Workshops:** WACT(2019) @ICTS, WACT(2023) @Warwick.
 - **Seminars:** at IMSc, Chennai, IIT Kanpur, IIT Bombay, ISI Kolkata, IIT Hyderabad, NISER Bhubaneswar, IIT Palakkad, TIFR, Mumbai, IACS, Kolkata.
- 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).