

Abhranil Chatterjee

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ABOUT ME

I am an INSPIRE Faculty fellow in [Advanced Computing and Microelectronics Unit](#) at [Indian Statistical Institute, Kolkata](#). Here is my contact details:

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PAST EMPLOYMENT

Previously, I was a visiting faculty in the [School of Computer Sciences](#) at [National Institute of Science Education and Research, Bhubaneswar](#). 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

9. **Border Complexity of Symbolic Determinant under Rank One Restriction**, with Sumanta Ghosh, Rohit Gurjar, and Roshan Raj, *CCC*, 2023.
8. **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.
7. **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.
5. **A Special Case of Rational Identity Testing and the Brešar-Klep Theorem**, with V. Arvind, Rajit Datta, and Partha Mukhopadhyay, *MFCS*, 2020.
4. **Fast Exact Algorithms Using Hadamard Product of Polynomials**, with V. Arvind, Rajit Datta, and Partha Mukhopadhyay, *FSTTCS*, 2019; *ALGORITHMICA*, 2022.
3. **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.
2. **Efficient Black-Box Identity Testing for Free Group Algebras**, with V. Arvind, Rajit Datta, and Partha Mukhopadhyay, *RANDOM*, 2019.
1. **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. **The Noncommutative Edmonds' Problem Re-visited**,
with Partha Mukhopadhyay,
manuscript under review.
2. **Determinants vs. Algebraic Branching Programs**,
with Mrinal Kumar, and Ben Lee Volk,
manuscript in preparation.
3. **On Lifting Lower Bounds for Noncommutative Circuits using Automata**,
with V. Arvind,
manuscript in preparation.
4. **On the Black-box Identity Testing of Well-behaved Noncommutative Rational Formulas**,
with V. Arvind, and Partha Mukhopadhyay,
manuscript in preparation.

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.
 - **Workshops:** WACT(2019) @ICTS, WACT(2023) @Warwick.
 - **Seminars:** at IMSc, IIT Kanpur, IIT Bombay, ISI Kolkata, IIT Hyderabad, NISER Bhubaneswar, IIT Palakkad.
- I am 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).
- I will be teaching **Algorithms for Big Data** at ISI, Kolkata this semester.
- I taught **Programming and Data Structures-II** at NISER, Bhubaneswar (even semester, 2023).
- I was the teaching assistant for the course **Computational Complexity Theory** taught by V. Arvind at IMSc, Chennai (2019, Jan-May).
- I have also taught at summer school (2019) organized at IMSc.

REFERENCES

1. **V. Arvind**, Professor, The Institute of Mathematical Sciences, Chennai, India.
Email: arvind@imsc.res.in.
2. **Partha Mukhopadhyay**, Professor, Chennai Mathematical Institute, India.
Email: partham@cmi.ac.in.
3. **Mrinal Kumar**, Reader, Tata Institute of Fundamental Research, Mumbai, India.
Email: mrinal.kumar@tifr.res.in.
4. **Rohit Gurjar**, Assistant Professor, Indian Institute of Technology, Bombay, India.
Email: rgurjar@cse.iitb.ac.in.
5. **Meena Mahajan**, Professor, The Institute of Mathematical Sciences, Chennai, India.
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