Abhranil Chatterjee

National Institute of Science Education and Research, Bhubaneswar

About Me

I am a visiting faculty in the School of Computer Science at National Institute of Science Education and Research, Bhubaneswar since November, 2022. Previously, I was a postdoctoral researcher in Department of Computer Science and Engineering at Indian Institute of Technology, Bombay from September, 2021 to October, 2022.

Contact Information

- **address:** School of Computer Science, NISER Bhubaneswar.
- **homepage:** https://cabhranil.bitbucket.io.
- **email id:** abhneil@gmail.com.

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). 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. **Univariate Ideal Membership Parameterized by Rank, Degree, and Number of Generators**,
   with V. Arvind, Rajit Datta and Partha Mukhopadhyay,
   FSTTCS, 2018; ToCS, 2021.

2. **Efficient Black-Box Identity Testing for Free Group Algebras**,
   with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
   RANDOM, 2019.

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.

4. **Fast Exact Algorithms Using Hadamard Product of Polynomials**,
   with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
   FSTTCS, 2019; ALGORITHMICA, 2022.

5. **A Special Case of Rational Identity Testing and the Brešar-Klep Theorem**,
   with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
   MFCS, 2020.

6. **Equivalence Testing of Weighted Automata over Partially Commutative Monoids**,
   with V. Arvind, Rajit Datta, and Partha Mukhopadhyay,
   MFCS, 2021.

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.

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.

Preprints

1. **Border Complexity of Symbolic Determinant under Rank One Restriction**,
with Sumanta Ghosh, Rohit Gurjar, and Roshan Raj,
manuscript in preparation.

2. **A Unified Lower Bound Technique for Noncommutative Computation**,
with V. Arvind,
manuscript in preparation.

Professional Experiences

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

- 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).

- 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 Mathemetical Sciences, Chennai,
email id : arvind@imsc.res.in.

2. Partha Mukhopadhyay, Associate Professor, Chennai Mathematical Institute,
email id : partham@cmi.ac.in.

3. Mrinal Kumar, Assistant Professor, Indian Institute of Technology, Bombay,
email id : mrinal@cse.iitb.ac.in.

4. Rohit Gurjar, Assistant Professor, Indian Institute of Technology, Bombay,
email id : rgurjar@cse.iitb.ac.in.

5. Meena Mahajan, Professor, The Institute of Mathemetical Sciences, Chennai,
email id : meena@imsc.res.in.