Sayantan Chakraborty

School of Technology and Computer Science
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Research Interests

Classical and Quantum Information Theory, Sampling and Randomized Algorithms
One shot information transmission protocols, quantum network information theory, quantum coding theory, markov chain monte carlo, perfect sampling algorithms

Education

Tata Institute of Fundamental Research — Registered for PhD : Jan, 2018
PhD Candidate in Computer Science — Ongoing, Expected in 2022
Advisor : Prof. Pranab Sen

Indian Institute of Technology Kanpur — 2014-2016
MTech in Electrical Engineering — CGPA : 8.25
Advisor : Prof. Pradip Sircar

Institute of Engineering and Management, Kolkata — 2010-2014
BTech in Electronics and Communication Engineering — CGPA : 8.47

Awards and Honours

1. Danny Lewin Best Student Paper Award at the 52nd Annual ACM Symposium on Theory of Computing (STOC 2020) jointly with Siddharth Bhandari

Publications

All authors are listed in alphabetical order, following convention in theoretical computer science.

1. Novel one-shot inner bounds for unassisted fully quantum channels via rate splitting
with Aditya Nema and Pranab Sen
Submitted to ISIT 2021
Arxiv link : https://arxiv.org/abs/2102.01766
2. One-shot multi-sender decoupling and simultaneous decoding for the quantum MAC
with Aditya Nema and Pranab Sen
Submitted to ISIT 2021
Arxiv link: https://arxiv.org/abs/2102.02187v2
3. Improved bounds for perfect sampling of k-colorings in graphs with Siddharth Bhandari
In Proceedings of STOC 2020, Pages 631-642
https://doi.org/10.1145/3357713.3384244
Invited to to the Special Issue of the SIAM Journal of Computing (Currently under revision)
4. A novel approach for signal decomposition along a wide class of orthogonal polynomial bases
with Prof. Pradip Sircar, IIT Kanpur
Computational and Mathematical Methods, Vol.2 Issue 4, 2020
https://doi.org/10.1002/cmm4.1105

Conference and Workshop Talks

1. Contributed talk at Beyond IID 8 :
One-shot inner bounds for the unassisted quantum multiple access channel via simultaneous decoding and rate splitting.
Video

2. Talk at STOC 2020 :
   Improved bounds for perfect sampling of k-colorings in graphs
   Short version, Long version

Theses and Reports

1. Remote State Preparation — Master's Report submitted to STCS,TIFR
   with Pranab Sen
2. QRS Complex and Heartrate Detection in ECG Using a Novel Orthogonal Polynomial Decomposition Approach — MTech Thesis, IIT Kanpur
   with Pradip Sircar

Miscellaneous Achievements

1. Secured All India Rank (AIR) 171 in GATE (ECE) 2014
2. Secured AIR 24 in Indian Statistical Institute PhD Computer Science written test, 2016

Other Academic Details

Talks Given at TIFR (including student seminars)

1. Improved bounds for perfect sampling of proper k -colorings of graphs
   based on BC'20, at the STCS Annual Symposium, 2020
2. The Propp-Wilson Perfect Sampling Algorithm
   based on PW'96
3. The Classical Wiretap Channel in the One-Shot Regime
   based on RSW'17
4. Rate Distortion in the One-Shot Setting
   based on unpublished communications with Pranab Sen and Aditya Nema
5. Entanglement Distillation in Quantum Information Theory
   based on BD'10
6. The Convex Split Lemma and its Applications to Message Compression
   based on ADJ'17
7. Alternate Characterisations of Compact Spaces
   based on readings of Topology by James Munkres

Workshops and Conferences Attended

1. Beyond IID in Information Theory 8 (virtual, 2020)
2. STOC 2020 (virtual)
3. Bombay Information Theory Seminar (BITS) 2020
   (IIT Bombay, Mumbai, India, 2020)
4. FSTTCS (IIT Bombay 2019, virtual 2020)
5. Advances in Probability II (virtual, 2021)
6. Sensitivity, Query Complexity, Communication Complexity and Fourier Analysis of Boolean Function
   (Indian Statistical Institute, Kolkata, India Feb 2020)
7. Indo-US Joint Centre Workshop on Pseudorandomness
   (IISc Bangalore, 2019)
8. Web and Internet Economics (WINE) 2017 (IISc Bangalore, 2017)

Organisational Activities

I helped Piyush Srivastava and Umang Bhaskar along with Siddharth Bhandari and Neha Sangwan to organise the STCS Annual Symposium, 2020.

Key Courses taken at TIFR

1. Quantum Computation and Information — Spring 2017
   by Pranab Sen
2. Classical Information Theory — Spring 2017
   by Pranab Sen

3. Computational Complexity — Spring 2019
   by Pranab Seb
4. Markov Chains — Autumn 2017
   by Piyush Srivastava
5. Toolkit for CS — Autumn 2018
   by Piyush Srivastava and Prahladh Harsha
6. Pseudorandomness — Audit, Autumn 2018
   by Ramprasad Saptharishi

Personal Details

- DOB : 7th Oct, 1991
- Place of Birth : Kolkata, India

References

1. Prof. Pranab Sen
   School of Technology and Computer Science
   TIFR,Mumbai
   psen@tifr.res.in / pranab.sen.73@gmail.com
2. Prof. Piyush Srivastava
   School of Technology and Computer Science
   TIFR,Mumbai
   piyush.srivastava@tifr.res.in / piyushsriva@gmail.com
3. Prof. Jaikumar Radhakrishnan
   School of Technology and Computer Science
   TIFR,Mumbai
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4. Prof. Pradip Sircar
   Department of Electrical Engineering,
   Indian Institute of Technology, Kanpur
   UP, India-208016
   sircar@iitk.ac.in / pradipsircar@gmail.com