Nikhil S. Mande

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Education and work experience

Nov 2020–Dec 2022	**Postdoc**, *Algorithms and Complexity group, CWI (Centrum Wiskunde & Informatica)*, Amsterdam, The Netherlands, Host: Ronald de Wolf.
Dec 2018–Sep 2020	**Postdoc**, *Georgetown University*, Washington D.C., USA, Host: Justin Thaler.
Aug 2013–Nov 2018	**Ph.D.**, *TIFR (Tata Institute of Fundamental Research)*, Mumbai, India. Computer Science
July 2011–May 2013	**M.Sc.**, *CMI (Chennai Mathematical Institute)*, Chennai, India. Applications of Mathematics with a specialization in Computational Mathematics.
July 2007–May 2010	**B.Math. (Hons.)**, *ISI (Indian Statistical Institute)*, Bengaluru, India.

Theses and projects

Nov 2018	*Communication Complexity of XOR Functions*, Ph.D. thesis, TIFR Mumbai. Advisor: Arkadev Chattopadhyay
May 2013	*Spectral Graph Theory*, M.Sc. thesis, CMI, Chennai. Advisor: Prajakta Nimbhorkar
June 2009	*Minimum variance hedging of American and European options using the binomial model*, Summer project, Tata Consultancy Services, Hyderabad. Advisor: M. Vidyasagar. Sponsored by the Indian Academy of Sciences.

Awards and honors

2019	TIFR Alumni Association-Sasken Best Thesis Award for the Best PhD Thesis in Technology and Computer Sciences
2013	CMI Gold Medal of Excellence
July 2016–June 18	TCS Research Scholar Fellowship

Research interests

I am broadly interested in the area of computational complexity theory. More specifically, I have an interest in classical and quantum query complexity and communication complexity, approximation theory, quantum computing, Boolean circuit complexity, Fourier analysis of Boolean functions, and the connections between them.

Professional service

Reviewer/subreviewer for FOCS, STOC, QIP, FSTTCS, SODA, CCC, ICALP, STACS, TQC, RANDOM, ISAAC, SICOMP, IEEE Trans. IT, ToC, QIC, Comput. Comp., ACM ToCT, DISOPT

I have been a member of the Science Popularization and Public Outreach Committee of TIFR.

Coordinator of the Student Seminar ($\approx$ Theory lunch) in STCS, TIFR from 2014-18.

Teaching experience

2016 TA for Arkadev Chattopadhyay for the course *Automata and Computability*

2013 TA for Prajakta Nimbhorkar for the course *Design and Analysis of Algorithms*

Extracurricular activities

I have held several national records in the category of blindfolded speedcubing and solving the Rubik's cube in the fewest number of moves (fewest moves challenge) in the past. My full speedcubing profile is here. I have been associated with the World Cube Association as a senior delegate for India and South East Asia, and as a member of the WCA Regulations Committee.

Links

- DBLP
- Google Scholar

Publications

As is conventional in my area of research, all author lists in the following sections are sorted alphabetically by last name. Publications are listed reverse chronologically in year of publication. All of my papers are available (or are soon to be available) in the public domain: either on arXiv, or on ECCC, or on both.

Journal Publications

[1] Arkadev Chattopadhyay and Nikhil S. Mande. "A Short List of Equalities Induces Large Sign Rank". In:
SIAM Journal on Computing (2022).
Earlier version in **FOCS'18**.
ECCC Report.

[2] Mark Bun, Nikhil S. Mande, and Justin Thaler. "Sign-rank Can Increase under Intersection". In:
ACM Transactions on Computation Theory (2021).
Earlier version in **ICALP'19**.
ECCC Report.

[3] Arkadev Chattopadhyay, Meena Mahajan, Nikhil S. Mande, and Nitin Saurabh. "Lower bounds for linear decision lists". In:
Chicago Journal of Theoretical Computer Science (2020).
ECCC report.

[4] Arkadev Chattopadhyay, Nikhil S. Mande, and Suhail Sherif. "The Log-Approximate-Rank Conjecture Is False". In:
Journal of the ACM (2020).
Earlier version in **STOC'19**.
Invited talk at **HALG 2020**.
ECCC report.

[5] Arkadev Chattopadhyay and Nikhil S. Mande. "Separation of Unbounded-Error Models in Multi-Party Communication Complexity". In:
Theory of Computing (2018).
ECCC report.

Conference Publications

[6] Arkadev Chattopadhyay, Nikhil S. Mande, Swagato Sanyal, and Suhail Sherif. "Lifting to Parity Decision Trees via Stifling". In:
ITCS. 2023.

[7] Sourav Chakraborty, Arkadev Chattopadhyay, Peter Høyer, Nikhil S. Mande, Manaswi Paraashar, and Ronald de Wolf. "Symmetry and Quantum Query-to-Communication Simulation". In:
STACS. 2022.
arXiv preprint.

[8] Arjan Cornelissen, Nikhil S. Mande, and Subhasree Patro. "Improved Quantum Query Upper Bounds Based on Classical Decision Trees". In:
FSTTCS. 2022.
Presented at **TQC 2022** (workshop track).
arXiv preprint.

[9] Nikhil S. Mande, Swagato Sanyal, and Suhail Sherif. "One-way communication complexity and non-adaptive decision trees". In:
STACS. 2022.
ECCC Report.

[10] Sourav Chakraborty, Nikhil S. Mande, Rajat Mittal, Tulasimohan Molli, Manaswi Paraashar, and Swagato Sanyal. "Tight Chang's-lemma-type bounds for Boolean functions". In:
FSTTCS. 2021.
arXiv preprint.

[11] Sourav Chakraborty, Arkadev Chattopadhyay, Nikhil S. Mande, and Manaswi Paraashar. "Quantum Query-To-Communication Simulation Needs a Logarithmic Overhead". In:
CCC. 2020.
Presented at **QIP 2020**.
ECCC report.

[12] Nikhil S. Mande and Swagato Sanyal. "On Parity Decision Trees for Fourier-Sparse Boolean Functions". In:
FSTTCS. 2020.
ECCC report.

[13] Nikhil S. Mande, Justin Thaler, and Shuchen Zhu. "Improved Approximate Degree Bounds for k-Distinctness". In:
TQC. 2020.
ECCC report.

[14] Andrej Bogdanov, Nikhil S. Mande, Justin Thaler, and Christopher Williamson. "Approximate Degree, Secret Sharing, and Concentration Phenomena". In:
APPROX/RANDOM. 2019.
ECCC Report.

[15] Arkadev Chattopadhyay and Nikhil S. Mande. "A Lifting Theorem with Applications to Symmetric Functions". In:
FSTTCS. 2017.
ECCC Report of an extended version.

Preprints

[16] Arjan Cornelissen, Nikhil S. Mande, Maris Ozols, and Ronald de Wolf. *Exact Quantum Query Complexity of Computing Hamming Weight Modulo Powers of Two and Three*. 2021.
arXiv preprint.

[17] Nikhil S. Mande and Ronald de Wolf. *Tight Bounds for the Randomized and Quantum Communication Complexities of Equality with Small Error*. 2021.
ECCC Report.

References

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