Sagnik Chatterjee

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Research Areas and Interests

🔖 Quantum algorithms and statistical learning theory; with an emphasis on learning w.r.t. various noise models, and proving theoretical bounds for convergence, generalization error, and speedups.

Education

2019 – 2025	🔖 **Ph.D.** in Computer Science and Engineering. (**Defended:** May 2025.) **Advisor:** Prof. Debajyoti Bera. Indraprastha Institute of Information Technology, Delhi (IIIT-Delhi).
2013 – 2017	🔖 **B.Tech.** in Computer Science and Engineering. Maulana Abul Kalam Azad University of Technology, West Bengal (MAKAUT). **GPA:** *8.10/10*.

Research

Ph.D. Thesis

1. **S. Chatterjee**, "Designing quantum learning algorithms for classical objects," Available at `https://repository.iiitd.edu.in/xmlui/handle/123456789/1758`, PhD thesis, IIIT-Delhi, May 2025.

Conference Proceedings

1. **S. Chatterjee**, M. Mukherjee, and A. Sethi, "Generalization bounds for dependent data using online-to-batch conversion," in *Proceedings of the 28th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2025. 🔗 URL: `https://proceedings.mlr.press/v258/chatterjee25b.html`.

2. **S. Chatterjee**, T. SAPV, and D. Bera, "Efficient quantum agnostic improper learning of decision trees," in *Proceedings of the 27th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024. 🔗 URL: `https://proceedings.mlr.press/v238/chatterjee24a.html`.

Journal Articles

1. **S. Chatterjee**, R. Bhatia, P. S. Chani, and D. Bera, "Quantum boosting using domain-partitioning hypotheses," *Quantum Machine Intelligence*, vol. 5, no. 2, pp. 1–20, 2023. 🔗 DOI: `10.1007/S42484-023-00122-3`.

Under Review

1. **S. Chatterjee**, "The quantum learning menagerie (quantum learning for classical concepts)," 2025.

2. Y. Saxena, **S. Chatterjee**, and T. Sapv, "Realization of maximally-entangling two-qutrit gates using the cross-resonance scheme," 2025.

Workshop Papers and Posters

1. **S. Chatterjee** and V. Kungurtsev, *Quantum solutions to the privacy vs. utility tradeoff*, 2023. arXiv: `2307.03118`.

2. **S. Chatterjee**, R. Bhatia, P. S. Chani, and D. Bera, *Quantum boosting using domain-partitioning hypotheses*, Short Talk at the 6th Quantum Techniques in Machine Learning (QTML 2023). Poster presented at the 25th International conference on Quantum Information Processing (QIP 2022)., 2022. arXiv: `2110.12793`.

3. **S. Chatterjee** and D. Bera, *Applying the quantum alternating operator ansatz to the graph matching problem*, Extended Abstract at the The 20th Asian Quantum Information Science (AQIS) Conference, 2020. arXiv: `2011.11918`.

Research Visits

Aug 24– Oct 24		**ACMU, Indian Statistical Institute**, Kolkata. **Host:** Prof. Sourav Chakraborty.
Jul 23– Sep 23		**Czech Technical University**, Prague. **Host:** Prof. Jakub Marecek, Prof. Vyacheslav Kungurtsev.

Invited Talks

Mar 2025		Quantum Computing Workshop by Edunautic, IIT Delhi. *Full day workshop from fundamentals to hands-on instruction.*
Jan 2025		Young Scientists Session at QAC 2025 symposium, C-DAC and DIAT Pune. *Modern Algorithmic Primitives in Quantum Computing.*
Oct 2024		ACMU seminar, ISI Kolkata. *Generalization bounds for dependent data using online-to-batch conversion.*
July 2024		Recent Trends in Algorithms Workshop 2024. *Efficient quantum agnostic improper learning of decision trees.*
June 2024		ACMU seminar, ISI Kolkata. *Efficient quantum agnostic improper learning of decision trees.*
Februrary 2024		Quantum Computing Semester, Chennai Mathematical Institute. *Quantum Algorithms for Linear Algebra.* *Block Encodings and Linear Combination of Unitaries.*
September 2023		Center for Quantum Computing Science, University of Latvia. *Efficient quantum agnostic improper learning of decision trees.*
		IDA Seminar, Czech Technical University. *Efficient quantum agnostic improper learning of decision trees.* *Quantum boosting using domain-partitioning hypotheses.*
March 2022		Theory Seminar, Indian Institute of Information Technology Delhi. *Quantum boosting using domain-partitioning hypotheses.*
December 2020		Faculty Development Programme, JNTU Anantapur. *Quantum Machine Learning.*

Teaching

Instructor (Short Courses)

Feb 2024		Designed and taught 3 lectures at the **Chennai Mathematical Institute**. **Topic 1:** The Harrow-Hassidim-Lloyd Algorithm and its extensions. **Topic 2:** Block Encoding and Linear Combination of Unitaries.
Aug 2022		Designed and taught 3 lectures for a refresher module at **IIIT-Delhi**. **Topic:** C programming for Operating Systems.

Teaching Assistantship at IIIT-Delhi

Data Structures and Algorithms		Summer 2022. **[Head TA]**
Intro to Quantum Computing		Winter 2023. **[Sole TA]**
Modern Algorithm Design		Monsoon 2020, Monsoon 2021. **[Sole TA]**
Theory of Computation		Winter 2020, Winter 2021, Winter 2024. **[Head TA]**

My duties included designing and conducting tutorials, creating assignments, and holding office hours and remedial sessions for all the above courses.

Industry Experience

Sep 17 – Mar 19	🔖	**Staff Consultant,** Oracle Financial Services Software Limited.
Feb 17 – Apr 17	🔖	**Systems Engineering Intern**, Infosys Limited.
Jun 16– Jul 16	🔖	**Data-Science Intern**, AlCircle Pte Ltd.

Miscellaneous

Awards and Achievements

Aug 24	🔖	**IIITD Dean's List** for Best Teaching Assistant (Theory of Computation).
Apr 24	🔖	AISTATS 2024 Registration Grant.
Jan 22	🔖	QIP 2022 Student Travel Award (Not availed due to COVID restrictions).
Feb 20	🔖	**Runners Up, IBMQ Awards** - Teach Me Quantum 2019.
Oct 19	🔖	Accepted to the 4th Winter School in CSE organized by the IIAS, HUJI, Jerusalem. https://iias.huji.ac.il/SchoolCSE4.

Reviewing

Conference	🔖	**NeurIPS** 2024, 2025; **ICLR** 2025, **AISTATS** 2025, **ICML** 2025.
Journal	🔖	**Scientific Reports** (2024), **Quantum** (2024, 2025).

Mentoring

Jan 24 – May 25	🔖	Alhad Sethi. B.Tech student at IIIT-Delhi.
Jan 24 – Jan 25	🔖	Neeshu Rathi. Ph.D. student at IIT-Roorkee.
Jan 21 – Jul 23	🔖	Parmeet Singh Chani. B.Tech student at DTU, Delhi.
	🔖	Rohan Bhatia. B.Tech student at DTU, Delhi.

Organisation

Workshops	🔖	Co-organised (only student organiser) and Webadmin for the QISE workshop at FSTTCS 2021.
Seminars organized	🔖	Talks on Quantum Computing at IIIT-D.
	🔖	Spectral Graph Theory at IIIT-D.
	🔖	Theory Reading Group talks at IIIT-D.
	🔖	Ketchup talks at IIIT-D.

References

Available on Request