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.

Employment

Dec 25 – Present — **Visiting Fellow (Postdoctoral Researcher)** at STCS, TIFR Mumbai.
Host: Prof. Jatin Batra.

Sep 17 – Mar 19 — **Staff Consultant,** Oracle Financial Services Software Limited, Bangalore.

Education

2019 – 2025 — **Ph.D.** in Computer Science and Engineering.
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.

Invited Talks

Oct 2025 — STCS seminar, TIFR Mumbai.
Generalization bounds for dependent data using online-to-batch conversion.

May 2025 — CS Colloquium, TIFR Mumbai.
Efficient quantum agnostic improper learning of decision trees.

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.

Research Visits and Internships

Aug 24– Sep 24 — **ACMU, Indian Statistical Institute**, Kolkata.
Host: Prof. Sourav Chakraborty.

Jul 23– Aug 23 — **Czech Technical University**, Prague.
Host: Prof. Jakub Marecek, Prof. Vyacheslav Kungurtsev.

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 — **STACS** ('25); **NeurIPS** ('24, '25); **ICLR** ('25,'26); **AISTATS** ('25,'26); **ICML** ('25).

Journal — **Scientific Reports** ('24); **Quantum** ('24, '25).

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

Prof Debajyoti Bera — Associate Professor,
Indraprastha Institute of Information Technology, Delhi (IIIT-D),
`dbera@iiitd.ac.in`

Prof Manuj Mukherjee — Assistant Professor,
Indraprastha Institute of Information Technology, Delhi (IIIT-D),
`manuj@iiitd.ac.in`

Prof Syamantak Das — Assistant Professor,
Indraprastha Institute of Information Technology, Delhi (IIIT-D),
`syamantak@iiitd.ac.in`