



Rohit Sarma Sarkar

Contact

Phone

+91-9163696002

Email

rohit15sarkar@yahoo.com,
rohitsarmasarkar95@iitkgp.ac.in

Address

P.O. Fingapara, Kankinara, P.S -
Jagaddal, District- North 24
Parganas, PIN- 743129, West
Bengal, India

Website

[Google Scholar](#)

[LinkedIn](#)

Skills

- Python
- C
- MATLAB
- R
- Qiskit
- Cirq

Expertise

- Quantum circuit synthesis/Quantum compiling
- Quantum walks
- Quantum algorithms (NISQ)
- Computational Linear Algebra
- Probability Theory

Language

Bengali (Native)

English (C1)

Hindi (Highly Proficient)

Education

2019 - 2024

Indian Institute of Technology Kharagpur

Ph.D. in Mathematics (Quantum Computing), Thesis Title : Scalable quantum circuit representation of unitary matrices

CGPA : 8.5/10 (coursework) and offered Prime Minister's Research Fellowship

2017 - 2019

Indian Institute of Technology Kharagpur

Master of Science (M.Sc.) in Mathematics

CGPA : 9.26/10 (Best Master's Thesis)

2014 - 2017

Presidency University, Kolkata

Bachelor of Science Honours (B.Sc. Hons.) in Mathematics

- CGPA Major : 8.33/10 (Mathematics)
- CGPA Minor: 8.20/10 (Physics, GenEd)

2012 - 2014

West Bengal Council of Higher Secondary Education (WBCHSE)

Higher Secondary (10+2)

- Total percentage: 84% with A+ Grade
- Subjects: Mathematics, Physics, Chemistry, Biology, Bengali, English

2011 - 2012

West Bengal Board Of Secondary Education (WBBSE)

Secondary Examination

- Total percentage: 91.57% with AA Grade

Experience

- Visiting researcher, Department of Physics, Indian Institute of Technology Hyderabad, under Prof. Alok Kumar Pan, September 2024 - November 2024.

Publications

- Chakraborty, S., Sarma Sarkar, R., and Majumder, S., *Scalable quantum circuit simulation of a chaotic Ising chain in light induced transverse field*, 16th International Conference on Fiber Optics and Photonics, Accepted, (2024) (Awarded Best Paper).
- Sarma Sarkar, R., and Adhikari, B., *Quantum circuit model for discrete-time three-state quantum walks on Cayley graphs*, *Physical Review A*, vol. 110 (1), pp. 012617, doi: 10.1103/PhysRevA.110.012617, (2024).
- Sarma Sarkar, R., and Adhikari, B., *Discrete time quantum walks on Cayley graphs of dihedral groups using generalized Grover coins*, *Quantum Information Processing*, vol. 23 (5), pp. 172, doi: <https://doi.org/10.1007/s11128-024-04385-y>, (2024).

- Sarma Sarkar, R., Adhikari, B., *Scalable quantum circuits for N-qubit unitary matrices*, IEEE QCE23, IEEE Xplore digital library, vol. 1, pp. pp. 1078-1088, doi: 10.1109/QCE57702.2023.00122, (2023).
- Mandal A., Sarma Sarkar R., and Adhikari B., *Localization of two dimensional quantum walks defined by generalized Grover coins*, Journal of Physics A : Mathematical and Theoretical, vol. 56(2), pp. 025303, doi: 10.1088/1751-8121/acb304, (2023).
- Mandal A., Sarma Sarkar R., Chakraborty S., and Adhikari B., *Limit theorems and localization of three state quantum walks on a line defined by generalized Grover coins*, Physical Review A, vol. 106(4), pp. 042405, doi: 10.1103/PhysRevA.106.042405, (2022).
- Sarma Sarkar R., Mandal A., and Adhikari B., *Periodicity of lively quantum walks on cycles with generalized Grover coin*, Linear Algebra and its Applications (SCI), vol. 604(17), pp. 399-424, doi: https://doi.org/10.1016/j.laa.2020.07.006, (2020).

PREPRINTS AND UPCOMING PAPERS

- Sarma Sarkar, R., and Adhikari, B., *A quantum neural network framework for scalable quantum circuit approximation of unitary matrices*, arXiv:2405.00012, (2024).
- Sarma Sarkar, R., Chakraborty S., and Adhikari, B., *Quantum circuit model for Hamiltonian simulation via Trotter decomposition*, arXiv: 2405.13605, (2024).
- Sarma Sarkar, R., Chakraborty, S., Majumder, S. and Adhikari, B., *A Pauli decomposer algorithm and its applications to continuous-time quantum walks*, (2024) (Under submission).

Previous Projects

- *Guest Research Worker* at the Centre for Astroparticle Physics, Bose Institute, Kolkata, on the project titled *Study of Magnetized Accretion Flow around Astrophysical Black Holes* under Dr. S. Ghosh and Dr. P. Joarder, Associate Professor, Centre for Astroparticle Physics and Space Science(CAPSS), EN-80, Sector V, Bidhannagar, Kolkata - 700091, India, 2016.
- Master's Thesis titled *Chip Firing Problems with Kronecker Products and Quantum Walks* supervised by Dr. Bibhas Adhikari, Associate Professor, IIT Kharagpur, 2019. (Dr. Adhikari is currently employed as a Principal Researcher at Fujitsu Research of America).

Current Projects

- Designing quantum Algorithms for solving generalized eigenvalue problems in collaboration with Dr. Bibhas Adhikari, Principal Researcher, Fujitsu Research of America, Santa Clara, CA, USA.
- Constructing efficient quantum circuits for the exponential of arbitrary matrices with Prof. Sonjoy Majumder and Mr. Sabyasachi Chakraborty, Department of Physics, IIT Kharagpur.
- Studying facial quantum walks on 2-cell embeddings using generalized Grover coins with Prof. Etsuo Segawa, Yokohama National University, Japan.

Conferences/Workshops

- Presented a technical paper in the *IEEE International conference on Quantum Computing and Engineering (QCE23)*, in Bellevue, USA, 2023.
- Presented a talk titled *On Generalized Grover Walks* at the *10th International Workshop of Quantum Simulation and Quantum Walks(QSQW2023)*, in Tsukuba, Japan, 2023.

Contributed Talks

- Presented a talk titled *On scalable quantum circuits and quantum compilation* at the 45th lecture of Q.E.D series, Department of Mathematics, Presidency University Kolkata, 86/1 College Street, Kolkata-700073, West Bengal, India, 2023.
- Presented a talk titled *On Generalized Grover Walks* at the 48th lecture of Q.E.D series, Department of Mathematics, Presidency University Kolkata, 86/1 College Street, Kolkata-700073, West Bengal, India, 2023.
- Presented a talk titled *On scalable quantum circuit representation of unitary matrices* at the Institute of Mathematical Sciences (IMSc), CIT Campus, Tharamani, Chennai, Tamil Nadu-600113, 2024.

Academic Awards and Achievements

- Obtained highest marks in mathematics in West Bengal Board of Secondary Education, 2012.
- Secured position in top 1% of class in B.Sc.(Hons.) Mathematics, Presidency University Kolkata, 2014.
- Qualified IIT JAM examination with All India Rank 145, 2017.
- Secured top 3 position in MSc. Mathematics, IIT Kharagpur, 2019.
- Qualified CSIR NET June 2018 in Mathematical Sciences with JRF and All India Rank 47, 2018.
- Qualified the all India examination GATE with All India Rank-209, 2019.
- Received Prof. Prabodh Chandra Sanyal Award cum Endowment Prize by IIT Kharagpur for best Master's thesis/project in Mathematics , 2019.
- Qualified GRE general with score 317, 2019.
- Qualified TOEFL iBT with score 106, 2018.
- Qualified IELTS examination with overall band score 8.0 and CEFR Level- C1 (Advanced), 2019.
- Received the Prime Minister's Research Fellowship (PMRF ID-2400610), Cycle 5, 2020.

Extra curricular activities

Contract bridge, Elocution, Writing

Reference

Dr. Bodhayan Roy

Assistant Professor, Indian Institute of Technology Kharagpur, Kharagpur, India

Phone: +91-3222-283668

Email : bodhayan.roy@gmail.com

Prof. Sonjoy Majumder

Professor, Indian Institute of Technology Kharagpur, Kharagpur, India

Email : sonjoym@phy.iitkgp.ac.in

Dr. Bibhas Adhikari

Principal Researcher, Fujitsu Research of America, Santa Clara, California, USA

Phone: +1(401)316-023

Email : bibhas.adhikari@gmail.com, badhikari@fujitsu.com

Prof. Sudebkumar Prasant Pal

Professor, Indian Institute of Technology Kharagpur, Kharagpur, India

Email : spp@cse.iitkgp.ac.in