Kaumudibikash Goswami

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Education

2017-2021	Ph.D., Quantum Information**,** *University of Queensland, Brisbane, Australia.*
	Thesis title: *Application of higher order quantum maps. (Link)*
2013-2015	M.Tech., Optical Engineering, *Indian Institute of Space Science and Technology (IIST), Trivandrum, India* (GPA: 8.71/10).
	Thesis title: *Free space optical communication using variance matrix analysis.*
2008-2012	B.Tech. Electronics and Communication Engineering, *Techno India, Salt Lake, West Bengal University of Technology, Kolkata, India*. *(*GPA: 8.64/10*)*

Employment history

2023- present	**Postdoc researcher,** The University of Hong Kong, Hong Kong.
	Job Description: Research on quantum causal structure, and higher order quantum process.
2022-2033	**Scientist C**, Raman Research Institute, Bangalore, India.
	Job Description: Worked on the satellite QKD project funded by the Indian Space Research Organisation (ISRO).
2021-2022	**Postdoc researcher**, University of Queensland, Brisbane, Australia.
	Job Description: Worked on Quantum secret sharing, established information-theoretical bounds for imperfect secret sharing schemes.

2018	**Tutor** in ‘Laser Physics and Quantum Optics’ course, University of Queensland, Brisbane Australia. ***Job Description:*** Marked the assignments, helped students with difficulty in understanding the course materials.
2016-2017	**Project Assistant**, Indian Institute of Science, Bangalore, India. ***Job Description:*** Worked on Quantum Shannon Theory, particularly studied the optimal decoder to observe super-additivity of classical capacity.
2014	**Intern**, Indian Space Research Organisation, Ahmedabad, India. ***Job Description:*** optical designing using Zeemax and TracePro.

Scholarship and Prizes

2017-2021	Australian Government *Research Training Program (RTP)* Scholarship for international students.
2014	Won the first prize for my work during Internship at Indian Space Research Organisation.
2012	M.Tech. scholarship from Department of Space, Government of India

Biography

I completed both my B. Tech. and M. Tech. in India. My M.Tech. was focused on free space optical communication. During the tenure I got fascinated by the possibilities of quantum computers. After a short stint of project assistantship at Indian Institute of Science, where I worked on Quantum Shannon Theory, I moved to Australia to pursue Ph.D. under the guidance of Prof. Andrew White, Dr. Jacqui Romero, and Dr. Fabio Costa. My research was on experimental (photonics-based) and theoretical aspects of quantum causal structure. I am interested in addressing fundamental issues in quantum mechanics and developing quantum information technologies.

Presentations

- K. Goswami, Indefinite causal order, presented a talk at Quantum Software and Information (QSI) online seminar (November 2020).
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- K. Goswami, Exploring indefinite causal order, presented a talk at Quantum Foundations, Technology and Applications (QFTA) (October 2019).
- K. Goswami, J. Romero, A. White, Communicating via ignorance, APS March Meeting Abstracts, R28.002 (2019).
- 15+ talks at different conferences, workshops, and other online platforms.

Publication URL:

Google scholar: https://scholar.google.com.au/citations?user=3iOJzncAAAAJ&hl=en

Orcid ID: https://orcid.org/0000-0002-6603-8082

Publications

- Y. Ouyang, K. Goswami, J. Romero, B. C. Sanders, Min-Hsiu Hsieh, M. Tomamichel, Approximate reconstructability of quantum states and noisy quantum secret sharing schemes (under peer-review). Open access via arXiv:2302.02509.
- S. Chatterjee, K. Goswami, R. Chatterjee, U. Sinha, Polarization correction towards satellite-based QKD without active feedback (under peer-review). Open access via arXiv:2208.09124.
- K. Goswami, C. Giarmatzi, C. Monterola, S. Shrapnel, J. Romero, F. Costa, Experimental characterisation of a non-Markovian quantum process, *Physical Review A* **104**, 022432 (2021). Open access via arXiv:2102.01327.
- K. Goswami, and F. Costa, Classical communication through quantum causal structures, *Physical Review A* **103**, 042606 (2021). Open access via arXiv:2007.05051.
- K. Goswami, J. Romero, Experiments on quantum causality, *AVS Quantum Science* **2**, 037101 (2020). Open access via arXiv:2009.00515. Review article commissioned by the Editor.
- K. Goswami, Y. Cao, G. A. Paz-Silva, J. Romero, and A. G. White, Increasing communication capacity via superposition of order, *Physical Review Research* **2**, 033292 (2020). Open access via arXiv:1807.07383.
- K. Goswami, C. Giarmatzi, M. Kewming, F. Costa, C. Branciard, J. Romero, and A. G. White, Indefinite Causal Order in a Quantum Switch, *Physical Review Letters* **121**, 090503 (2018). Open access via arXiv:1803.04302.
- J. S. Ivan, and K. Goswami, Free space optical communication using beam parameters with translational and transverse rotational invariance, *JOSA A* **32**, 6, (2015).

Machine Learning, optimisation, and programming Skills

- **Convex optimisation:** CVX, CVXPY
- **Programming language:** Python (NumPy, SciPy, Pandas).
- **Machine learning:** Logistic regression, Polynomial regression, Random Forest, K-nearest neighbor and so on.
- **Deep learning:** Sequential Artificial neural network, Convolutional neural network, Recurrent Neural Network.
- **Machine learning and AI packages:** Scikit-learn, Tensorflow, Keras.
- **Scientific computing:** MATLAB, Mathematica.

References

Prof. Andrew White, (Ph.D. supervisor)

ARC Australian Laureate Fellow

School of Mathematics and Physics, The University of Queensland.

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Dr. Jacqui Romero (Ph.D. supervisor)

Associate Professor

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Dr. Fabio Costa (Ph.D. supervisor)

Senior Research Fellow

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