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# Atul Mantri — Curriculum Vitae

## Education

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|---|---|
| Aug '23 – Present | **Assistant Professor**, *Dept. of Computer Science, Virginia Tech* |
| Jan '20 – July '23 | **Research Associate**, *University of Maryland, College Park, USA* |
| Feb '19 – Dec '19 | **Research Associate**, *University of Edinburgh, UK* |
| Jan – Feb 2018 | **Visiting Researcher**, *Yukawa Institute for Theoretical Physics, Kyoto University, Japan* |
| Apr – Jun 2017 | **Visiting Researcher**, *University Pierre and Marie Curie (UPMC), Paris, France* |
| Aug '14 – Feb '19 | **Ph.D. in Quantum Computing**, *Center for Quantum Technologies (CQT), National University of Singapore* |
| May – Jul 2014 & 2013 | **Summer Research Intern**, *Center for Quantum Technologies (CQT), NUS, Singapore* |
| Aug '09 – May '14 | **B.S.-M.S. Dual Degree in Physics**, *Indian Institute of Science Education and Research (IISER), Mohali, India* |

## Doctoral Thesis

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| Title | *Secure Delegated Quantum Computing* |
| Supervisor | Prof. Joseph Fitzsimons, Singapore University of Technology and Design (SUTD) and Center for Quantum Technologies (CQT), NUS |
| Focus | Designing protocols for information-theoretic secure delegation of quantum computation and studying the role of interaction in client-server settings. |

## Master's Thesis

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| Title | *Study of Magnetic Traps and Radio Frequency Dressed State Potentials* |
| Supervisor | Prof. Mandip Singh, IISER Mohali |
| Focus | Studying the radio frequency dressed state potential for Bose-Einstein Condensation and its practical implications for atom interferometry. |

## Awards, Honors, and Fellowships

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| 2020 | Outstanding Graduate Research Award at the SUTD FIRST Industry Workshop |
| 2014 – 2019 | President's Graduate Fellowship, Singapore |
| 2009 | Inspire Fellowship, Department of Science and Technology, India |

## Preprints/Peer-reviewed articles/Book Chapters

- Listed in reverse chronological order.
- 'IF' = Impact factor of the journal.
- Total citations from Google Scholar (Sep 2024) $= 450+$.

[1] Y. Alnawakhtha, A. Mantri, C. A. Miller, and D. Wang, Lattice-Based Quantum Advantage from Rotated Measurements em Quantum, vol. 8, p. 1399, 2024. **(IF = 6.770)**.

[2] P. Drmota, D. P. Nadlinger, D. Main, B. C. Nichol, E. M. Ainley, D. Leichtle, A. Mantri, E. Kashefi, R. Srinivas, G. Araneda, C. J. Ballance, and D. M. Lucas, Verifiable blind quantum computing with trapped ions and single photons," *Physical Review Letters*, vol. 132, no. 15, p. 150604, 2024. **(IF = 9.206)**.

[3] S. Singh, M. Doosti, N. Mathur, M. Delavar, A. Mantri, H. Ollivier, and E. Kashefi, "Towards a unified quantum protocol framework: Classification, implementation, and use cases," *arXiv preprint*, arXiv:2310.12780, 2023.

[4] M. Vyvlecka, M. Bozzio, Y. Cosacchi, C. Nawrath, S.-E. Lerchbaumer, A. Mantri, T. Seidelmann, J. C. Loredo, S. L. Portalupi, V. M. Axt, P. Michler, and P. Walther, "Optimizing quantum dots for quantum cryptography and blind quantum computing," *Proceedings Volume PC12243, Photonics for Quantum 2022*, PC1224311, 2022.

[5] *The Quantum Internet: The Second Quantum Revolution* (edited by Peter Rohde) To be published by the Cambridge University Press, September 2021

[6] Michele Ciampi, Alexandru Cojocaru, Elham Kashefi, Atul Mantri. Secure Quantum Two-Party Computation: Impossibility and Constructions *arXiv preprint* arXiv:2010.07925, 2020.

[7] Christian Badertscher, Alexandru Cojocaru, Léo Colisson, Elham Kashefi, Dominik Leichtle, Atul Mantri, Petros Wallden. Security Limitations of Classical-Client Delegated Quantum Computing *Advances in Cryptology – ASIACRYPT*, 2020.

[8] Jack K. Fitzsimons, Atul Mantri, Robert Pisarczyk, Tom Rainforth, Zhikuan Zhao. A note on blind contact tracing at scale with applications to the COVID-19 pandemic *ARES '20: Proceedings of the 15th International Conference on Availability, Reliability and Security*, 2020.

[9] The Quantum Protocol Zoo Manuscript, 2019, `https://atulmantri.github.io/files/Qprotocolzoo.pdf`

[10] Yuki Takeuchi, Atul Mantri, Tomoyuki Morimae, Akhiro Mizutani, and Joseph F Fitzsimons. Resource-efficient verification of quantum computing using Serfling's bound *npj Quantum Information*, 5(1):27, 2019 **(IF = 9.206)**.

[11] Corsin Pfister, M Adriaan Rol, Atul Mantri, Marco Tomamichel, and Stephanie Wehner. Capacity estimation and verification of quantum channels with arbitrarily correlated errors. *Nature Communications*, 9(1):27, 2018 **(IF = 12.353)**.

[12] Atul Mantri, Tommaso F Demarie, Nicolas C Menicucci, and Joseph F Fitzsimons. Flow ambiguity: A path towards classically driven blind quantum computation. *Physical Review X*, 7(3):031004, 2017 **(IF = 14.385)**.

[13] Atul Mantri, Tommaso F Demarie, and Joseph F Fitzsimons. Universality of quantum computation with cluster states and (x,y)-plane measurements. *Scientific Reports*, 7:42861, 2017 **(IF = 4.122)**.

[14] C Pfister, J Kaniewski, M Tomamichel, A Mantri, R Schmucker, N McMahon, G Milburn, and S Wehner. A universal test for gravitational decoherence. *Nature Communications*, 7, 2016 **(IF = 12.353)**.

[15] Atul Mantri, Carlos A Pérez-Delgado, and Joseph F Fitzsimons. Optimal blind quantum computation. *Physical Review Letters*, 111(23):230502, 2013 **(IF = 8.839)**.

[16] Mayank Mishra, Atul Mantri, Priyank Mishra, P.K. Panigrahi Non-Standard Probabilistic Teleportation through Conventionally Non-Teleporting Channels. *arXiv preprint* arXiv:1108.0080, 2011.

## Academic Service

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| Steering Committee | DeCompute - The Conference on Decentralized Security with Multi Party Computation (2024 & 2023) |
| Moderator | *The Quantum Protocol Zoo* (`https://wiki.veriqloud.fr`) (2020 - Present) |
| Program Committe | 2024 IEEE Workshop on Quantum IntelLigence, Learning & Security (QUILLS), CIFRIS24 & CIFRIS23 - an international event, supported and organized by De Cifris (2024 & 2023), Q-turn - International quantum information workshop (2020) |
| Reviewer/ Sub-reveiwer | ISAAC (2024), STOC (2021), FOCS (2019), QIP (2023, 2019), QCrypt (2024, 2019, 2017), TQC (2022,2019, 2020), AQIS (2019), Nature Quantum Information (npjQI), Quantum, QIC, Scientific Reports, Quantum Science and Technology, QINP, Cryptography. |

## Student and Postdoc Advising

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| 2024 – Present | **Postdoctoral Researcher Advisor**, *Dr. Chen Bai*, Computer Science, Virginia Tech |
| 2024 – Present | **Ph.D. Advisor**, *Ezekiel Cochran*, Computer Science, Virginia Tech |
| 2024 – Present | **Ph.D. Advisor**, *Mehdi Esmaili*, Computer Science, Virginia Tech |
| 2024 – Present | **Ph.D. Advisor**, *Keshav Bhateja*, Computer Science, Virginia Tech |

## Conference Panel and Judging

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| 2023 | Reviewed ANR (Agence Nationale de la Recherche) grant. |

## Grant Details

### Security vs Performance Trade-offs for Symmetric Ciphers in the Quantum World

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| Jul'24 - Jun'25 | Principal Investigator: Dr. Atul Mantri (atulmantri@vt.edu). Funding Agency: Commonwealth Cyber Initiative Southwest Virginia Node. Grant Number: 469117. Funding Amount: $50,000. |

## Conference Presentations

### Cryptography in a Quantum World

Apr'24 Invited Talk: Secure and Trustworthy Data and Technology: Evolution to a New Era (STDT) Workshop 2024, Virginia Tech.

### Blind Quantum Computation

Nov'23 Invited Talk: Virginia Tech Center for Quantum Information Science and Engineering Symposium, Virginia Tech.

Oct'23 Invited Talk: Applied Algebra Seminar, Virginia Tech.

Jan'18 Invited Talk: Yukawa Institute for Theoretical Physics, Kyoto University, Japan.

### On the Power of Trapdoor Claw-Free Functions

Oct'23 Invited Talk: Applied Algebra Seminar, Virginia Tech (Two-part Talk).

### Unlocking the Quantum Frontier: A Journey into Computing and Cryptography

May'22 Invited Seminar: Computer Science Graduate Seminar, Virginia Tech.

### Secure Computing in the Quantum World

May'22 Invited Talk: CS Seminar (Zoom), Virginia Tech.

### Quantum Cryptography on Solid Foundations

Mar'22 Invited Talk: Imperial College London (Remote).

### Progress on Verification of Quantum Computations

Jan'22 Invited Talk: MURI Annual Review Meeting (Remote).

### Abstract Cryptography and Delegated Quantum Computation

Apr'20 Oral Presentation (Zoom): QuICS Quantum Cryptography Reading Group.

### Secure Quantum Computing

Jun'21 Invited Tutorial: ATAL One-week Online FDP On Quantum Computing, Birla Institute of Technology, Mesra, Ranchi, India (Online).

### What Makes Quantum Computers Powerful?

Jan'21 Invited Lecture: TU Darmstadt, Germany.

### Secure Quantum Computation over Classical Networks

Feb'21 Colloquium Talk (Zoom): DIMAP seminar of the Centre for Discrete Mathematics and its Applications, The University of Warwick, United Kingdom.

Nov'21 Oral Presentation (Zoom): University of Maryland.

### Secure Remote State Preparation and Its Applications

Nov'20 Oral Presentation (Zoom): University of Maryland's Crypto Reading Group.

Nov'20 Invited Talk: MURI Annual Review Meeting (Remote).

### Security Limitations of Classical-Client Delegated Quantum Computing

Sep'20 Invited Talk (Zoom): Workshop on Quantum Information, Computation, and Foundation 2020, Yukawa Institute for Theoretical Physics, Kyoto University, Japan.

### Classically Driven Blind Quantum Computing

May'18 Seminar: Google, Bangalore, India.

Apr'18 Oral Presentation: Quantum Frontiers and Fundamentals: Experimental Studies and Theoretical Ramifications (QFF), Bangalore, India.

Jan'18 Seminar: Yukawa Institute for Theoretical Physics, Kyoto University, Japan.

### Optimal Blind Quantum Computing

May'15 Invited Talk: Second Workshop on Secure Computing, University of Tokyo, Japan.

## Industry Collaboration

Quantum Industry RTX (US), NTT Communication Science Laboratories (Japan), Horizon Quantum (Singapore), Entropica Labs (Singapore) , VeriQcloud (France)

Non-Quantum Industry ObliviousAI (Ireland), IOHK (Switzerland), Silence Laboratories (Singapore)