

CV – João F. Doriguello

João Fernando Doriguello Diniz (Brazilian) / Joao Fernando da Silva Doriguello (Spaniard), 33 years old
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FORMAL EDUCATION

- Feb. 2024 - **Research Fellow**
Ongoing HUN-REN Alfréd Rényi Institute of Mathematics, Budapest, Hungary
Advisor: Dr. András Gilyén
- Mar. 2021 - **Research Fellow**
Jan. 2024 Centre for Quantum Technologies, National University of Singapore, Singapore
Advisor: Prof. Dr. Miklos Santha
- Sep. 2016 - **Ph.D in Physics (Quantum Engineering Center for Doctoral Training)**
Sep. 2021 University of Bristol, Bristol, United Kingdom
Title: Quantum Communication Complexity
Advisor: Prof. Dr. Ashley Montanaro
Grades (from 0 to 100): Quantum Information (94), Quantum Computation (97),
Quantum Optics (90).
- Mar. 2014 – **Master's in Physics**
Jun. 2016 University of Campinas (UNICAMP), Campinas, Brazil
Average weighted grade (from 0.0 to 4.0): 4.0
Title: Implementation of Two-Dimensional Quantum Walks
Advisor: Dr. Marcos César de Oliveira
- Mar. 2010 – **B.Sc. Degree in Physics**
Dec. 2013 University of Campinas (UNICAMP), Campinas, Brazil
Average weighted grade (from 0.0 to 1.0): 0.9731
Monograph Title: Study of Fluctuation Relations in Non-equilibrium Statistical
Mechanics
Advisor: Prof. Dr. Alex Antonelli

PUBLICATIONS

- 1) Srinivasan Arunachalam and Joao F. Doriguello. **Matrix hypercontractivity, streaming algorithms and LDCs: the large alphabet case**. ACM Trans. Comput. Theory, aug 2024.
- 2) João F. Doriguello, Alessandro Luongo, Jinge Bao, Patrick Reberntrost, and Miklos Santha. **Quantum Algorithm for Stochastic Optimal Stopping Problems with Applications in Finance**. In François Le Gall and Tomoyuki Morimae, editors, 17th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2022), volume 232 of Leibniz International Proceedings in Informatics (LIPIcs), pages 2:1-2:24, Dagstuhl, Germany, 2022.
- 3) João F. Doriguello and Ashley Montanaro. **Quantum Random Access Codes for Boolean Functions**. Quantum, 5:402, March 2021.
- 4) João F. Doriguello and Ashley Montanaro. **Exponential Quantum Communication**

Reductions from Generalizations of the Boolean Hidden Matching Problem. In Steven T. Flammia, editor, 15th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2020), volume 158 of Leibniz International Proceedings in Informatics (LIPIcs), pages 1:1-1:16, Dagstuhl, Germany, 2020.

- 5) João Fernando Doriguello and Ashley Montanaro. **Quantum sketching protocols for Hamming distance and beyond.** Phys. Rev. A, 99:062331, Jun 2019. (editor’s pick)

PRE-PRINTS

- 1) Joao F. Doriguello, George Giapitzakis, Alessandro Luongo, Aditya Morolia. **On the practicality of quantum sieving algorithms for the shortest vector problem.** arXiv preprint arXiv:2410.13759 (2024).
- 2) András Gilyén, Chi-Fang Chen, Joao F. Doriguello, Michael J. Kastoryano. **Quantum generalizations of Glauber and Metropolis dynamics.** arXiv preprint arXiv:2405.20322 (2024).
- 3) Jonathan Allcock, Joao F. Doriguello, Gábor Ivanyos, Miklos Santha. **Beyond Bell sampling: stabilizer state learning and quantum pseudorandomness lower bounds on qudits.** arXiv preprint arXiv:2405.06357 (2024).
- 4) Joao F. Doriguello, Debbie Lim, Chi Seng Pun, Patrick Reberstrost, Tushar Vaidya. **Quantum algorithms for the pathwise Lasso.** arXiv preprint arXiv:2312.14141 (2023).
- 5) João F. Doriguello, Alessandro Luongo, Ewin Tang. **Do you know what q-means?** arXiv preprint arXiv:2308.09701 (2023).
- 6) Jonathan Allcock, Jinge Bao, João F. Doriguello, Alessandro Luongo, Miklos Santha. **Constant-depth circuits for Uniformly Controlled Gates and Boolean functions with application to quantum memory circuits.** arXiv preprint arXiv:2308.08539 (2023). (Presented at TQC’24)
- 7) Debbie Lim, João F. Doriguello and Patrick Reberstrost. **Quantum algorithm for robust optimization via stochastic-gradient online learning.** arXiv preprint arXiv:2304.02262 (2023).
- 8) João F. Doriguello. **Decoding probabilistic syndrome measurement and the role of entropy.** arXiv preprint arXiv:2302.11631 (2023).
- 9) Srinivasan Arunachalam, João F. Doriguello and Rahul Jain. **A note on the partition bound for one-way classical communication complexity.** arXiv preprint arXiv:2302.10431 (2023).

EVENTS and PROJECTS

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|--------------------------|---|
| Dec. 2022 –
Oct. 2024 | Joint project between Centre for Quantum Technologies (CQT) and Singaporean Government on “Quantum Attacks on Post-Quantum Cryptographic Schemes”. |
| Apr. 2019 | Local Organising Committee in Quantum Computing Theory in Practice 2019. |
| Jun. 2018 –
Mar. 2019 | Quantum Innovation Lab (QIL) 2019
Organized the Quantum Innovation Lab (QIL) 2019 event, a collaborative event between industry partners and academics. Participating companies: Microsoft, Siemens, Jisc, GSK, Gemalto, Airbus, NPL, Fraunhofer CAP. |

CONFERENCES

2024

- Accepted short talk in Quantum Techniques in Machine Learning conference (QTML 2024), Melbourne, Australia, titled “Quantum algorithms for the pathwise Lasso”.
- Accepted talk in the 19th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), Okinawa, Japan, titled “Constant-depth circuits for Boolean functions and quantum memory devices using multi-qubit gates”.
- Invited talk in Quantum Computing in Finance Q4Q (Quantum for Quants) conference, Abu Dhabi, United Arab Emirates, titled “Quantum algorithms for the pathwise Lasso”.

2023

- Accepted long talk in Quantum Techniques in Machine Learning conference (QTML 2023), CERN, Switzerland, titled “Constant-depth circuits for Uniformly Controlled Gates and Boolean functions with application to quantum memory circuits”.
- Accepted short talk in Quantum Techniques in Machine Learning conference (QTML 2023), CERN, Switzerland, titled “Quantum algorithm for robust optimization via stochastic-gradient online learning”.
- Invited talk in Quantum Innovators 2023 workshop organised by IQC, Waterloo, Canada, titled “Quantum algorithms for the pathwise Lasso”.
- Invited talk in the 7th ZIB-IMI-ISM-NUS-RIKEN-MODAL “Workshop on Future Algorithms and Applications”, Berlin, Germany, titled “Quantum algorithms for the pathwise Lasso”.

2022

- Accepted talk in the 17th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), Urbana-Champaign, USA, titled “Quantum Algorithm for Stochastic Optimal Stopping Problems with Applications in Finance”.
- Invited talk in the 6th RIKEN-IMI-ISM-NUS-ZIB-MODAL-NHR “Workshop on Future Algorithms and Applications”, Tokyo, Japan, titled “Quantum algorithms for the pathwise Lasso”, titled “Quantum algorithm for stochastic optimal stopping problems with applications in finance”.

2020

- Accepted talk in the 15th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), Riga, Latvia, titled “Exponential Quantum Communication Reductions from Generalizations of the Boolean Hidden Matching Problem”.

2019

- Invited talk in the 2nd QuantAlgo Workshop, Amsterdam, Netherlands, titled “Exponential quantum communication reductions from generalisations of the Boolean Hidden Matching problem”.

2018

- Invited talk in the 1st QuantAlgo Workshop, Paris, France, titled “Quantum sketching protocols for Hamming distance and beyond”.

HONOURS AND AWARDS

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| 2017 | Boeing Prize for best academic achievement among the students from Cohort 3 of the Quantum Engineering Center for Doctoral Training at the University of Bristol |
| 2012 | Silver Medal in the 2012 IFT-ICTP Prize for Young Physicists |
| 2012 | FAPESP Scientific Initiation Scholarship
Merit-based funding for students to develop scientific or technological research |

2011	PIBIC/CNPq Scientific Initiation Scholarship Merit-based funding for students to develop scientific or technological research
2011	Honorable Mention in the 33 rd Brazilian Mathematical Olympiad (OBM), University Level
2009	Silver Medal in the XII Brazilian Olympiad of Astronomy and Astronautics (OBA)
2009	Honorable Mention in the 2009 Brazilian Physics Olympiad (OBF), 3 rd year
2009	Gold Medal in the 6 th Mathematical Olympiad of the ABC Region (OMABC), Level 4
2009	Gold Medal in the 3 rd OSA Physics Olympiad in UNICAMP, 3 rd year
2008	Silver Medal in the XI Brazilian Olympiad of Astronomy and Astronautics (OBA)
2008	Gold Medal in the 2 nd OSA Physics Olympiad in UNICAMP, 2 nd year
2007	Bronze Medal in the 4 th Mathematical Olympiad of the ABC Region (OMABC), Level 3
2006	Silver Medal in the 3 rd Mathematical Olympiad of the ABC Region (OMABC), Level 2

TEACHING EXPERIENCE

Dec. 2022 - Oct. 2024 – **Co-PI in a joint project between CQT and Singaporean Government on “Quantum Attacks on Post-Quantum Cryptographic Schemes”.**
Centre for Quantum Technologies, National University of Singapore, Singapore
Description: supervised two hired Master’s level students in writing a piece of code and a paper.

Hourly Paid Teaching Contract (Homework marking)

University of Bristol, Bristol, United Kingdom

Feb. 2020 – May 2020	Discipline: Statistical Mechanics Supervisor: Prof. Dr. Tanniemola B. Liverpool
Feb. 2020 – May 2020	Discipline: Quantum Computation Supervisor: Prof. Dr. Ashley Montanaro
Oct. 2019 – Dec. 2019	Discipline: Quantum Information Theory Supervisor: Prof. Dr. Noah Linden
Feb. 2019 – May 2019	Discipline: Calculus of Variations 3 Supervisor: Dr. Yves Tourigny
Feb. 2019 – May 2019	Discipline: Quantum Computation Supervisor: Prof. Dr. Ashley Montanaro
Oct. 2018 – Dec. 2018	Discipline: Quantum Information Theory Supervisor: Prof. Dr. Noah Linden

Feb. 2018 – Discipline: Analytical Mechanics
May 2018 Supervisor: Prof. Dr. James Annett

Feb. 2017 – Discipline: Mechanics 23
May 2017 Supervisor: Dr. Isaac V. Chenchiah

PED Student (Teacher Internship Program) - Graduate Monitor

University of Campinas, Campinas, Brazil

Mar. 2015 – Discipline: Experimental Physics III (2 hours/week)
Jul. 2015 Supervisor: Prof. Dr. Flávio Caldas da Cruz

Aug. 2014 – Discipline: Quantum Mechanics I (2 hours/week)
Dec. 2014 Supervisor: Prof. Dr. Eduardo Granado Monteiro da Silva

PAD Student (Didactic Program of Support) - Undergraduate Monitor

University of Campinas, Campinas, Brazil

Mar. 2011 – Discipline: Calculus I (8 hours/week)
Jul. 2011 Supervisor: Prof. Dr. Adriano Adrega de Moura

TESTS' RESULTS

GRE Test (Subject – Physics), 24/10/2015

Total score: 960

Percentile: 91%