

PEDRO FIGUEROA-ROMERO

10/2025

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Australia

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Experience

SILICON QUANTUM COMPUTING

Sydney, Australia.

From 05/2025 — *Quantum Computer Verification and Validation Scientist*

- ▷ Development, testing, and implementation of Quantum Characterisation, Verification and Validation (QCVV) techniques on near-term silicon quantum computers.
- ▷ Design of strategies for *in-situ* benchmarking and characterisation of quantum devices, with emphasis on spatial and temporal noise correlations, both at the gate and (scalable) quantum-processor level.
- ▷ Multi-disciplinary collaboration, scientific research, and early implementation of QCVV for logical qubits and fault-tolerance in silicon-based quantum computer devices.

IQM QUANTUM COMPUTERS

Munich, Germany.

10/2024 to 05/2025 — *Senior Quantum Engineer*

05/2022 to 09/2024 — *Quantum Engineer*

- ▷ QCVV theory and implementation on superconducting hardware.
- ▷ Scientific research, collaborative coding, technical guidance and mentoring, and advising strategic decisions regarding full-stack benchmarks and benchmarking standards.
- ▷ Led the establishment of a QCVV software suite (open-sourced in 12/2024 as [IQM Benchmarks](#)) and a respective roadmap for IQM from Noisy Intermediate regime to Fault Tolerance.
- ▷ Version control with Git: bug tracking, software requests, task management and documentation.
- ▷ Author in 4 scientific articles and main inventor in 1 filed patent application.

FOXCONN TECHNOLOGY GROUP

Taipei, Taiwan.

03/2021 to 04/2022 — *Postdoctoral Research Associate*

- ▷ Research on characterisation and benchmarking of quantum devices with temporally correlated noise.

MONASH UNIVERSITY

Melbourne, Australia.

04/2017 to 02/2021 — *Doctoral Researcher*

- ▷ Research on the emergence and typicality of memorylessness in quantum stochastic processes.

Education

MONASH UNIVERSITY

Melbourne, Australia.

04/2017 to 02/2021 — *PhD in Science (Quantum Information Science - Theory)*

Thesis: [Equilibration and typicality in quantum processes](#)

Supervision: Prof. Kavan Modi and Dr. Felix A. Pollock.

THE UNIVERSITY OF EDINBURGH

Edinburgh, Scotland.

09/2015 to 09/2016 — *MSc in Mathematical Physics*

Dissertation: *Feynman diagram generation for colour-kinematics duality*

Supervision: Prof. Donal O'Connell.

UNIVERSIDAD AUTÓNOMA METROPOLITANA

Mexico City, Mexico.

09/2010 to 09/2014 — *BSc in Physics (Licenciatura en Física)*

Dissertation: [La geometría de los espacios \(A-\)dS](#)
Supervision: Prof. Román Linares Romero.

Patents

- (1) P. Figueroa-Romero, *Scalable estimation of noise coherence*. PCT/EP2024/051822, filed 25/01/2024. Patent pending.
- (2) M. Papič (10%), P. Figueroa-Romero (10%) & A. Calzona (80%), *Multi-layer Cycle Benchmarking for Efficient Noise Characterization*. FI20240011, filed 28/02/2024. Patent pending.

Research Articles

- [1] A. Calzona, M. Papič, P. Figueroa-Romero & Adrian Auer, *Multi-Layer Cycle Benchmarking for high-accuracy error characterization* (2024). [arXiv:2412.09332](#) [quant-ph].
- [2] P. Figueroa-Romero, M. Papič, A. Auer, & I. de Vega, *Estimating the coherence of noise in mid-scale quantum systems* (2024). [arXiv:2409.02110](#) [quant-ph].
- [3] L. Abdurakhimov et al., *Technology and performance benchmarks of IQM's 20-qubit quantum computer* (2024). [arXiv:2408.12433](#) [quant-ph]
- [4] P. Figueroa-Romero, M. Papič, A. Auer, M.-H. Hsieh, K. Modi & I. de Vega, *Operational Markovianization in randomized benchmarking*. [Quantum Sci. Technol.](#) **9** 035020 (2023).
- [5] N. Dowling, P. Figueroa-Romero, F. A. Pollock, P. Strasberg & K. Modi, *Relaxation of multitime statistics in quantum systems*. [Quantum](#) **7**, 1027 (2023).
- [6] N. Dowling, P. Figueroa-Romero, F. A. Pollock, P. Strasberg & K. Modi, *Equilibration of non-Markovian quantum processes in finite time intervals*. [SciPost Phys. Core](#) **6**, 043 (2023).
- [7] S.-X. Yang, P. Figueroa-Romero & M.-H. Hsieh, *Machine learning of average non-Markovianity from randomized benchmarking* (2022). [arXiv:2207.01542](#) [quant-ph].
- [8] P. Figueroa-Romero, K. Modi, & M.-H. Hsieh, *Towards a general framework of Randomized Benchmarking incorporating non-Markovian Noise*. [Quantum](#) **6**, 868 (2022)..
- [9] P. Figueroa-Romero, K. Modi, R. J. Harris , T. M. Stace & M.-H. Hsieh, *Randomized benchmarking for non-Markovian noise*. [PRX Quantum](#) **2**, 040351 (2021).
- [10] P. Figueroa-Romero, *Equilibration and typicality in quantum processes*. Monash University - [Doctoral Thesis](#) (2021).
- [11] P. Figueroa-Romero, F. A. Pollock & K. Modi, *Markovianization with approximate unitary designs*. [Commun. Phys.](#) **4**, 127 (2021).
- [12] P. Figueroa-Romero, K. Modi & F. A. Pollock, *Equilibration on average of temporally non-local observables in quantum systems*. [Phys. Rev. E](#) **102**, 032144 (2020).
- [13] P. Figueroa-Romero, K. Modi & F. A. Pollock, *Almost Markovian processes from closed dynamics*. [Quantum](#) **3**, 136 (2019).

Main Computer Software Experience and Usage

Quantum Environment: Qiskit, mainly at circuit and algorithm level.
Programming and Analytics: Python. Version control through Gitlab.
CAS: Wolfram Mathematica.

Certifications

06/2021 — [IBM Exploratory Data Analysis for Machine Learning](#), Coursera.
12/2020 — [IBM Quantum Challenge Foundational](#), IBM.
08/2020 — [Python Basic](#), Hackerrank.

Supervision and Teaching Experience

Supervision at Foxconn Technology Group (Quantum Computing Research Center)

09/2021 to 04/2022 — Leading project on *Machine Learning with Tensor Network Techniques for Randomized Benchmarking* with Mr. Shih-Xian Yang (currently [PhD candidate at INFN](#), Bari, Italy).

Teaching Associate at Monash University: tutoring, planning and marking

04/2020 to 07/2020 — PHS1001 *Foundation Physics*.

08/2019 to 11/2019 — PHS3101 (s2) *Statistical and condensed matter physics*.

03/2019 to 06/2019 — PHS3101 (s1) *Quantum Mechanics*.

08/2018 to 11/2018 — PHS3062 *Fundamental particle physics*.

03/2018 to 06/2018 — PHS2061 *Quantum and thermal physics*.

08/2017 to 11/2017 — PHS3062 *Fundamental particle physics*.

Awards and Honours

2021 — *Outstanding paper award*, Foxconn Education Foundation.

2017/2020 — MGS and MIPRS scholarships at Monash University.

2015/2016 — *Becas Conacyt al extranjero*, Mexican Science Council scholarship for MSc studies.

2015 — *Medalla al Mérito Universitario* (highest average grade honor), UAM-I, Mexico City.

2013 — *Academic Excellence*, Secretaría de Educación Pública, Mexico City.

Events — Participation / Organization / Presentation

04/2024 — *Poster presentation*, QCTiP24, The University of Edinburgh. Edinburgh, UK.

06/2023 — *Guest Talk*, TU Hamburg, Germany.

03/2023 — *APS March Meeting 2023* (presentation), Las Vegas, USA.

04/2022 — *Guest Talk* (online presentation), Forschungszentrum Jülich, Germany.

03/2022 — *Guest Talk*, NCKU, Taiwan.

03/2022 — *QIP 2022* (online presentation), Caltech, USA.

10/2021 — *Guest talk* (online presentation), QICI, The University of Hong Kong.

10/2021 — *BIID'9* (organizing committee member and online presentation), NTU, Taiwan.

09/2021 — *AQIS 2021* (online presentation), U. Tokyo, Japan.

09/2021 — *Guest talk* (online presentation), CQSE, NTU, Taiwan.

08/2021 — *Guest talk* (online presentation), Photon Science Center, U. Tokyo, Japan.

07/2021 — *TQC 2021* (session chair, online presentation), University of Latvia.

04/2021 — *Guest talk*, (online presentation) Universidade Federal Fluminense, Brazil.

10/2020 — *Quantum Thermodynamics of Non-Equilibrium systems* (online presentation), DIPC.

12/2019 — *AIP Summer Meeting* at RMIT. Melbourne, Australia.

11/2019 — *Qiskit Camp Asia* at IBM Tokyo Labs (hackathon participation). Tokyo, Japan.

07/2019 — *Guest talk and group visit* at Trinity College Dublin. Dublin, Ireland.

06/2019 — *Conference on Taming Non-Equilibrium Systems* at ICTP. Trieste, Italy.

06/2018 — *Quantum Thermodynamics Conference* at KITP, UC Santa Barbara. California, USA.

01/2018 — *Sydney Quantum Information Theory Workshop* at Coogee Bay. Sydney, Australia.

04/2016 — *QCD meets gravity* at The University of Edinburgh. Edinburgh, UK.

07/2014 — *5th Summer School on Mathematics*, CIMAT. Guanajuato, Mexico.

07/2014 — *Workshop on Soft Matter, Hard Matter and Dark Matter*, UAM-I. Mexico City, Mexico.

01/2014 — *6th Colloquium of the Mathematics Department*, UAM-I. Puebla, Mexico.

06/2013 — *School on Mathematical Modelling/Numerical Methods*, CIMAT. Guanajuato, Mexico.

Languages

Spanish (native), English (fluency), German (B1/intermediate), French (B1/intermediate).