Curriculum Vitae

Peter Brown

Personal Information

Email:	firstname.lastname@telecom-paris.fr
Scholar:	Publications/preprints
Orcid id:	0000-0001-9593-0136
Github:	peterjbrown519
Website:	peterjbrown519.github.io

Research Positions

Dec. 2021 - Present	Assistant Professor, QTY group - Télécom Paris, France.
Dec. 2019 - Dec. 2021	Postdoctoral researcher, ENS de Lyon, France. Supervisor: Prof. Omar Fawzi.
May 2019 - Nov. 2019	Research Associate in Quantum Information Theory, University of York, UK. Supervisor: Dr. Roger Colbeck.

Education

Oct. 2015 - May 2019	PhD in Mathematics, University of York, UK. Thesis title: On constructions of quantum-secure device-independent randomness expansion protocols. Supervisor: Dr. Roger Colbeck.
Oct. 2011 - July 2015	MMath degree in Mathematics, University of York, UK. Thesis title: Negative energy densities in quantum field theory Supervisor: Prof. Christopher Fewster. Award: First Class
Sep. 2009 - Aug. 2011	A-Levels, Sunderland College, UK. Subjects: Mathematics, Further Mathematics, Biology. Grades: A*, A, A.

Publications and Preprints

- F. Mazzoncini, B. Bauer, P. Brown, R. Alléaume, Hybrid Quantum Cryptography from Communication Complexity. (2023) (arXiv)
- L. Wooltorton, P. Brown, R. Colbeck, Device-independent quantum key distribution with arbitrarily small nonlocality. (2023) (arXiv)
- L. Wooltorton, P. Brown, R. Colbeck, Expanding bipartite Bell inequalities for maximum multi-partite randomness. (2023) (arXiv)
- A. Tavakoli, A. Pozas-Kerstjens, P. Brown, M. Araújo, Semidefinite prgramming relaxations for quantum correlations. (2023) (arXiv)
- L. Wooltorton, P. Brown, R. Colbeck, Tight analytical bound on the trade-off between device-independent randomness and nonlocality. Physical Review Letters 129.15 (2022) (Journal / arXiv)
- P. Brown, H. Fawzi and O. Fawzi, Device-independent lower bounds on the conditional von Neumann entropy. (2021) (arXiv)
- W-Z. Liu, M-H. Li, S. Ragy, S-R. Zhao, B. Bai, Y. Liu, P. Brown, J. Zhang, R. Colbeck, J. Fan,

Q. Zhang and J-W. Pan, Device-independent randomness expansion against quantum side information. Nature Physics 17.4 (2021) (Journal / arXiv)

- A. Denys, P. Brown and A. Leverrier, Explicit asymptotic secret key rate of continuous-variable quantum key distribution with an arbitrary modulation. Quantum 5, 540 (2021) (Journal / arXiv)
- P. Brown, H. Fawzi and O. Fawzi, Computing conditional entropies for quantum correlations. Nature communications 12.1 (2021) (Journal / arXiv)
- P.J. Brown and R. Colbeck, Arbitrarily many independent observers can share the nonlocality of a single maximally entangled qubit pair. Physical Review Letters 125.9 (2020) (Journal / arXiv)
- P.J. Brown, S. Ragy and R. Colbeck, A framework for quantum-secure device-independent randomness expansion. IEEE Transactions on Information Theory, 66.5 (2020) (Journal / arXiv)
- P.J. Brown, C.J. Fewster and EA. Kontou, Classical and quantum strong energy inequalities and the Hawking singularity theorem. To appear in 15th Marcel Grossmann conference proceedings (2019). (arXiv)
- P.J. Brown, C.J. Fewster and EA. Kontou, A singularity theorem for Einstein-Klein-Gordon theory. Gen Relativ Gravit (2018) 50: 121. (Journal / arXiv)

Talks and Seminars

Invited Talks and Seminars:

Jan. 2024 – QSI School on quantum cryptography (invited lecture) – Padova
Title: Semidefinite programming for quantum communication

Dec. 2023 – Workshop on Gaussian and non-Gaussian Quantum Correlations (GnGQC) 2023 – Copenhagen
Title: On the finite-size security of QKD

Sep. 2023 – Workshop on security proofs – IQC Waterloo
Title: Computing quantities device-independently / On a new finite-size security proof

May. 2023 – QCOMMs summer school (invited lecture) – University of Padova
Title: Device-independent cryptography

Sep. 2022 – Workshop on security proofs – IQC Waterloo
Title: Variational bounds on the von Neumann entropy

Jun. 2022 – LIP6 QI internal seminar – Sorbonne University
Title: Variational bounds on the von Neumann entropy

May. 2022 – QI internal seminar – Quandela
Title: Variational bounds on the von Neumann entropy

Aug. 2021 – eDICT workshop on device-independent cryptography – ETH Zurich
Title: Computing rates of device-independent protocols

Oct. 2020 – Düsseldorf Quantum Info online Seminars – Heinrich Heine University Düsseldorf
Title: Computing rates of device-independent protocols

Contributed Talks:

Nov. 2023 – Quantum certification conference (QUACC) – Center for Theoretical physics, Warsaw
Title: On the finite-size security of QKD

Apr. 2022 – 2SQRT2 Tsirelson memorial workshop – IQOQI Vienna, Austria
Title: Variational bounds on the relative entropy and their applications

Mar. 2022 – QIP 2022 – Caltech, USA
Title: Variational bounds on the relative entropy and their applications

Sep. 2021 – Beyond IID 9 (Online)
Title: Device-independent lower bounds on the conditional von Neumann entropy

Aug. 2021 – QCRYPT 2021 (Online)
Title: Device-independent lower bounds on the conditional von Neumann entropy

Feb. 2021 – Quantum information days 2020 (Online)
Title: An unbounded number of independent observers can share the nonlocality of one half of a maximally entangled qubit pair

Jan. 2021 – QIP 2021 (Online / Plenary talk)
Title: New quantum Rényi divergences and their application to device-independent cryptography and quantum Shannon theory

Nov. 2020 – Q-Turn 2020 (Online)
Title: An unbounded number of independent observers can share the nonlocality of a single maximally entangled qubit pair

Jan. 2019 – Northern Quantum Meeting IV – University of Leeds, UK
Title: A framework for device-independent randomness expansion

Nov. 2018 – Q-Turn – Universidade Federal de Santa Catarina, Brazil
Title: A framework for device-independent randomness expansion

July 2018 – Quantum Roundabout – University of Nottingham, UK
Title: A framework for device-independent randomness expansion

Poster Presentations:

Jun. 2019 – SwissMap Workshop - Mathematical Physics meets Quantum Information
Title: A framework for device-independent randomness expansion

Aug. 2018 – QCRYPT 2018 – University of Science and Technology of China
Title: A framework for device-independent randomness expansion

Aug. 2018 – QuICC 2018 – University of York, UK
Title: A framework for device-independent randomness expansion

Apr. 2018 – QCALL Secure Quantum Communications school – Universidad de Vigo, Spain
Title: A framework for device-independent randomness expansion

Teaching Experience

Lecture courses

2024 – Introduction to quantum information and quantum computing
Level: M1.

2023 – Quantum information and quantum cryptography
Level: M2. Total hours: 24.

– Optimization and numerical analysis
Level: M1. Total hours: 18.

– PAF – Programming a real quantum computer
Level: L3. Total hours: 4.

– Introduction to quantum information and quantum computing
Level: M1. Total hours: 9.

2022 – Quantum information and quantum cryptography
Level: M2. Total hours: 18.

– Optimization and numerical analysis
Level: M1. Total hours: 18.

– PAF – Programming a real quantum computer
Level: L3. Total hours: 6.

– Introduction to quantum information and quantum computing
Level: M1. Total hours: 9.

Seminars

2019 – Algebra undergraduate seminars (16 hours).

– Calculus undergraduate seminars (16 hours).

2018 – Algebra undergraduate seminars (16 hours).

– Applied Probability undergraduate seminars (12 hours).

– Calculus undergraduate seminars - (16 hours).

2017 – Applied Probability undergraduate seminars (8 hours).

– Groups, Rings and Fields undergraduate seminars (8 hours).

2016 – Cryptography undergraduate seminars (16 hours).

Student Supervision

PhD students

Sep. 2023 - Ongoing	Tristan Le Roy-Deloison (cosupervised with Omar Fawzi) Title: Device-independent quantum key distribution
Nov. 2022 - Ongoing	Tristan Nemoz (cosupervised with Romain Alléaume) Title: Computational models in quantum cryptography

Master students

Sep. 2023 - Ongoing	Ali Almasi (Project) Title: Positive but not completely positive maps
Sep. 2023 - Jan 2024	Kriss Lady Stephanie Gutierrez Anco (Project) Title: Intrinsic randomness with Rényi entropies
Sep. 2023 - Jan 2024	Rola Saidi (Project) Title: Analysis of cross-talk in quantum computers
Sep. 2022 - Jan 2023	Gabriel Silva Vieira de Melo (Project) Title: QSVT for quantum search
Sep. 2022 - Jan 2023	Jules Dany (Project) Title: Blind randomness
Apr. 2021 - July 2021	Mohamed Bassiouny (Internship) Title: Feasibility of DIQKD
Apr. 2020 - Aug. 2020	Uta Meyer (Internship / co-supervised with Omar Fawzi) Title: A classical entropy accumulation theorem

Bachelor students

Jan. 2023 - Mar. 2023	Evdokia Gneusheva (Internship) Title: Entanglement vs secret key

Academic Citizenship

Outreach

- 2019 – Quantum technologies ambassador - conduct physics classes in local schools promoting the study of quantum theory. (sponsored by the UK Quantum Communications Hub)
- 2019 – Royal Institute's Masterclass Volunteer - helped with the running of sessions promoting mathematics to secondary school students.
- 2018 – STEM Fair volunteer – Ran stall discussing cryptography at Sunderland College STEM event.
- 2017 – Postgraduate seminar organiser – Organised and ran research seminars for postgraduate students within the mathematics department.

Reviews

- Refereed papers for journals: NPJ Quantum Information; Physical Review Letters; Physical Review A; Physical Review Research; Quantum.
- Refereed submissions for conferences: QCRYPT; QIP

Funding and Awards

- 2023 – Quantum Secure Networks Partnership (QSNP) (Shared with Romain Alléuame) Total: 400k euros
- 2020 – Anand Ramachandran Memorial Prize for the best PhD thesis in the Department of Mathematics.
- 2017 – KM Stott Memorial Prize for excellence in PhD research, University of York.
- 2016 – Departmental postgraduate teaching prize.
- 2015 – WW Smith Fund - PhD (3 years).
- 2015 – PB Kennedy Prize for outstanding performance in Mathematics Masters degree, University of York.

Computing Skills

Proficient:	Python, Mathematica
Adequate:	OS - Linux/Windows, HPC - SGE/SLURM, Matlab, C++, Julia