Benjamin DM Jones

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jenjaminbones.github.io

Quantum information researcher with expertise in quantum algorithms, quantum error correction, and scientific computing.

Experience leading international research collaborations and contributing to industry-focused quantum computing projects. Seeking opportunities to apply my expertise in quantum research and software development.

Strong background in mathematical optimisation, software development (Python), and machine learning fundamentals.

Beyond professional work, I enjoy playing sports, teaching, creating music, and learning languages. Causes I care about include mental health, education, and homelessness.

References

Paul Skrzypczyk
(PhD Supervisor),

Ashley Montanaro
(Phasecraft CEO).

Dated: 12/03/25.

Education

Jan 2025 | Sep 2019 **PhD in Quantum Information** – *University of Bristol, UK.*
- Research in quantum computation, nonlocality, and measurement incompatibility.
- Led international collaborations and published in high-impact journals [2-6].
- Part of the QE-CDT, taking advanced theoretical courses and experimental projects.
- Teaching assistant for quantum information classes, including lecturing.

Jun 2018 | Sep 2014 **Integrated Masters in Mathematics** – *Durham University, UK.*
- Bachelors and masters combined, obtained a high first-class degree classification.
- Part of St Johns College, captained several sports teams and worked in the bar.

Jun 2017 | Sep 2016 **Exchange Program** – *Université de Neuchâtel, Switzerland.*
- Studied pure mathematics courses taught in French.

Jun 2014 | Sep 2007 **A Levels/GCSEs** – *Thomas Rotherham College and Aston Academy, UK.*
- Achieved 14 A* at GCSE, and 3A* and 2A's at A-level.

Experience

Present | Jan 2025 **Consultant and Tutor** – *Freelance, Remote.*
- Consulting on mathematics and quantum computing, and teaching mathematics to students of various ages.

Dec 2024 | Jun 2022 **Quantum Software Researcher** – *Phasecraft, UK.*
- Led a project on optimisers (e.g. SPSA, CMAES, Momentum, ADAM) for near-term quantum algorithms (VQE) first as an intern, then as a consultant.
- Performed large-scale numerical experiments, resulting in a publication [1].

Jun 2021 | Aug 2020 **Visiting Researcher** – *Université de Genève, Switzerland.*
- Paid secondment in the group of Nicolas Brunner, leading international research collaborations in quantum foundations (see [4-6] in publications).

Sep 2019 | Jul 2019 **Quantum Software Intern** – *Entropica Labs, Singapore.*
- Worked on variational quantum algorithms, improved coding and teamwork skills.
- Delivered a 15-page report with accompanying Python code.

Jun 2019 | Sep 2018 **Research Assistant** – *University of Sheffield, UK.*
- Based in computer science department, working with John Clark and Earl Campbell.
- Developed software, project management, and collaboration skills.
- Led a project on optimisation in quantum simulation, leading to a paper [7].

Skills

- **Programming:**
Proficient in Python (Numpy, Pandas, Stim, Pytorch).
Familiar with CI/CD, HPC, Bash, and Git.

- **Mathematics:**
Linear algebra, calculus, quantum mechanics, probability, quantum information and computation, algorithms and data structures, machine learning.

- **Collaboration:**
Led international research projects, co-organised a careers event, volunteering experience at a local homeless shelter.

- **Presenting and teaching:**
Delivered conference talks, lectured a graduate course, tutored high school maths, taught guitar, piano, and drums.

- **Languages:**
Conversational in French and Spanish.

Publications

[1] **B.D.M. Jones**, L. Mineh, and A. Montanaro.
"Benchmarking a wide range of optimisers for solving the Fermi-Hubbard model using the variational quantum eigensolver."
arXiv preprint arXiv:2411.13742 (2024).

[2] **B.D.M. Jones** and A. Montanaro.
"Testing multipartite productness is easier than testing bipartite productness".
arXiv preprint arXiv:2406.16827 (2024).

[3] **B.D.M Jones**, P. Skrzypczyk, and N. Linden.
"*The Hadamard gate cannot be replaced by a resource state in universal quantum computation.*"
Quantum 8, 1470. (2024).

[4] **B.D.M Jones**, R, Uola, T. Cope, M. Ioannou, S. Designolle, P. Sekatski, and N. Brunner.
"*Equivalence between simulability of high-dimensional measurements and high-dimensional steering.*"
Physical Review A 107 (5), 052425 (2023).

[5] M. Ioannou, P. Sekatski, S. Designolle, **B.D.M. Jones**, R. Uola, and N. Brunner
"*Simulability of high-dimensional quantum measurements*"
Physical Review Letters 129 (19), 190401 (2022).

[6] **B.D.M. Jones**, I. Šupić, R. Uola, N. Brunner, and P. Skrzypczyk.
"*Network quantum steering.*"
Physical Review Letters 127 (17), 170405 (2021).

[7] **B.D.M. Jones,** D.R. White, G.O. O'Brien, J.A. Clark, and E.T. Campbell.
"*Optimising Trotter-Suzuki decompositions for quantum simulation using evolutionary strategies.*"
Proceedings of the Genetic and Evolutionary Computation Conference, pp. 1223-1231 (2019).

Presented talks and posters at multiple international conferences.