
Personal Profile

I am passionate about engaging with and contributing towards the flourishing field of quantum information and computation. I hope to apply my training in mathematics, computer science and physics to provide useful insights into the underlying foundational and theoretical questions, whilst also maintaining an understanding of experimental developments, applications in industry, and their significance for society at large.

Education

- **University of Bristol, UK – PhD at Quantum Engineering Center for Doctoral Training**
Sep 2019 - Nov 2023

This programme consists of an initial training year followed by a 3-year PhD project. My supervisors are Dr Paul Skrzypczyk and Professor Noah Linden. During the training year, my experimental projects included a Bell experiment in bulk optics, and four-wave mixing in integrated silicon photonics. Taught courses included advanced quantum optics, quantum error correction, and advanced algorithms. From August 2020 – June 2021 I visited the group of Nicolas Brunner at the Université de Genève in Switzerland. My PhD work has thus far focused on topics in quantum steering, measurement incompatibility, and resource theories for quantum computation.

- **Durham University, UK - MMath Mathematics (European Studies), 1st Class (85%)**
Oct 2014 - Jun 2018

This was an integrated masters in mathematics, which included a year studying abroad. My final year project report was on differential geometry and quantum field theory. I was part of St. John's College: activities included captaining several sports teams, helping first-year students settle in, and working in the college bar.

- **Université de Neuchâtel, Switzerland - Mathematics Year Abroad, 5.6/6**
Sep 2016 - Jun 2017

In the third year of my degree I studied at the Université de Neuchâtel in Switzerland, taking pure mathematics courses taught in French. I achieved high marks and became near fluent in French.

- **Thomas Rotherham College, Rotherham, UK - A Levels**
Sep 2012 - Jun 2014

3 A*'s at A level, in Mathematics, Further Mathematics and Physics,
2 A's at AS level, in French and Music.

Publications

- 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." *arXiv:2207.04080* (2022).
- M. Ioannou, P. Sekatski, S. Designolle, B.D.M. Jones, R. Uola, N. Brunner. "Simulability of high-dimensional quantum measurements" *In Phys. Rev. Lett.* 129, no. 19, 190401. (2021).
- B.D.M. Jones, I. Šupić, R. Uola, N. Brunner, and P. Skrzypczyk. "Network quantum steering." *In Phys. Rev. Lett.* 127, no. 17, 170405. (2021).
- 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." *In Proceedings of the Genetic and Evolutionary Computation Conference*, pp. 1223-1231. (2019).

Experience

- **Phasecraft, UK - Quantum Software Consultant**
November 2022 – Present

Phasecraft is a quantum computing startup based in London and Bristol, UK, focusing on near-term applications of quantum computers. I work for one day a week continuing to work on topics related to my internship project.

- **Phasecraft, UK - Quantum Software Intern**
June 2022 – October 2022

This project focused on classical optimisers for variational algorithms. I provided valuable data and insights into the company, under the supervision of Professor Ashley Montanaro and Dr Lana Mineh.

- **Entropica Labs, Singapore - Quantum Software Intern**
Jul 2019 – Aug 2019

Entropica Labs is a quantum computing startup based in Singapore focused on quantum machine learning and variational algorithms. I delivered a 15-page report detailing my findings and some accompanying Python code.

- **The University of Sheffield, UK - Research Assistant**
Sep 2018 – May 2019

This role involved undertaking research looking at the overlap between AI (evolutionary computation) and quantum computing (quantum circuits, quantum simulation). I was based in the Department of Computer Science with Professor John Clark. Our work led to an accepted peer-reviewed paper, of which I was the lead author. I co-presented this work at two invited talks at the University of Stirling and the University of Kent.

Additional Professional Experiences:

- Teaching Assistant: *Analysis in Many Variables II 2017-18,* Durham University.
 Algebra II 2017-18, Durham University.
 Quantum Information 2020 & 2021, University of Bristol.
 Quantum Computation 2021 & 2022, University of Bristol.
- I have reviewed one paper for the journal *Quantum*.
- I tutored Mathematics to A-Level students from 2015 to 2018.

Interests & Skills

Academically, I am focused on applying my mathematical background to develop our understanding of quantum computation, information, and foundations. The technological applications and emergence of quantum computing companies are extremely exciting, as well as the prospect of applying these near-term machines to useful problems. Quantum mechanics is surprising and counter-intuitive, and I find the quest to better understand and quantify this “weirdness” fascinating, for example through studying the incompatibility of quantum measurements. It is also remarkable that this theory facilitates computational speed-up, and I have growing interests in examining the resources required (such as “magic”). I hold interests more generally in software development and machine learning.

Technical skills:

Proficient: Python (numpy, pandas, matplotlib), Matlab, Git, LaTeX, quantum packages (qiskit, pyquil).
Familiar: Java, Bash, C++, machine learning (sci-kit learn), HTML/CSS.

I am near fluent in French and possess conversational Spanish skills. I am interested in sustainability and creating a future that treats our planet and future generations with respect. I hold a clean UK driving licence and passport. In my spare time I play sports and create music.

References available upon request.