

Education

- 2019–Present **PhD Pure Mathematics**,
Quantum Information, University of Waterloo, Canada.
- 2017–2018 **MSc Mathematics**,
Quantum Information, University College Cork, Ireland.
- 2013–2017 **BSc Physics and Mathematics**,
First Class Honours, University College Cork, Ireland.

Experience

- 2019–Present **PhD Research**, PURE MATH DEPT, UNIVERSITY OF WATERLOO.
Studying under Dr. Michael Brannan and Dr. David Kribs. Formerly supervised by Dr. Vern Paulsen. Part of the Institute for Quantum Computing. Researching quantum superchannels and maps on the space of quantum channels. Using tools from Operator Algebras and quantum information theory.
- 2017–2018 **Masters Thesis**, MATHEMATICS DEPT. UNIVERSITY COLLEGE CORK.
Studied under Dr. Stephen Wills and wrote a thesis on the topic of "Quantum Information Theory". Passed with no corrections.
- 2017 **Final Year Projects for BSc**, PHYSICS AND MATHS DEPTS. UNIVERSITY COLLEGE CORK.
I did two final year projects. For physics I worked with Prof. Stephen Fahy studying "Topological Invariants and the Quantum Hall Effect". For mathematics I worked with Dr. Martin Kilian on the "Global Properties of Curves". Both projects involved working with lecturers to study and research a topic. Presentations had to be given for each and a thesis/report was written.
- June/July 2016 **Undergraduate Research Project**, MATHEMATICS DEPT. UNIVERSITY COLLEGE CORK.
Studied under Dr. Martin Kilian on an eight week project "How does smoke evolve?". Studied the differential geometry of curves, created graphical models of smoke rings by numerically evolving the "vortex filament equation". Made a poster and wrote a report for the project.
- June/July 2015 **Undergraduate Research Project**, PHYSICS DEPT. UNIVERSITY COLLEGE CORK.
Studied under Dr. Andreas Ruschhaupt on the project "Quantum Mechanics of Time". Worked alongside PhD students and physics researchers, studied quantum mechanics, gave presentations to department, modelled quantum systems in Mathematica, and wrote project report. Project was awarded based on 2nd year exam results.

Teaching

- Winter 2022 **Instructor/Lecturer**, *University of Waterloo*.
Taught MATH 137 Calculus 1 for Honours Mathematics. Both online and in person lectures. Wrote assignments, practice problems, exams, and organised markers.
- 2019–Present **Teaching Assistant**, *University of Waterloo*.
 - I get 5 TA job assignments per year for a wide range of math courses (16 TA's so far). Basic and advanced courses in calculus, linear algebra, real and complex analysis. Graduate course in Lie Groups.
 - Duties involve marking, office hours, in person and online tutoring, proctoring, answering questions on piazza.
- 2017 - 2018 **Tutor**, *University College Cork*.
Gave tutorials covering assignments and course material for courses on calculus, analysis, physics.
- 2015 - 2018 **Lab Instructor**, *University College Cork*.
In charge of running the first year physics lab experiments every week. Explained and ran the experiments, and marked lab reports. Also supervised the end of term experiments for the lab module. Also did this for engineering labs.

Awards

- 2019–Present **International Doctoral Student Award**, *University of Waterloo*.

- 2020-Present **Pure Math Grad Award**, *University of Waterloo*.
2019-Present **Graduate Research Studentship**, *University of Waterloo*.
2019-2020 **Math Faculty Award**, *University of Waterloo*.
2019-2021 **UW Grad Scholarship**, *University of Waterloo*.
2019 **Pure Math Departmental Scholarship**, *University of Waterloo*.
2017/2018 **Title of College Scholar**, *University College Cork*.
2015 & 2016 **Quercus College Scholarship**, *University College Cork*.
2013 **Entrance Scholarship**, *University College Cork*.

Talks

- 27th January **Quantum Data Compression**,
2022 *Pure Math Graduate Student Colloquia*, *University of Waterloo*.
28th July **Quantum Superchannels**,
2021 *Analysis Seminar*, *University of Waterloo*.
December **Quantum Superchannels**,
2020 *PMath 871 Project*, *University of Waterloo*.
December **Quantum Self-testing**,
2019 *PMath 945 Project*, *University of Waterloo*.
December **De Rhams Theorem**,
2019 *PMath 665 Project*, *University of Waterloo*.
April 2019 **Toeplitz Operators**,
PMath 810 Project, *University of Waterloo*.