

Everett A. Patterson

Languages: French and English (Fluent)
University of Waterloo
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Education and Visiting Positions

- **University of Waterloo** Waterloo, ON
PhD in Physics (Quantum Information) 2023 - present
 - Topic: Relativistic Quantum Information,
 - Supervisor: Prof. Robert B. Mann,
 - Funded by NSERC CGS-D, OGS, O'Brien Foundation Fellowship
- **Perimeter Institute for Theoretical Physics** Waterloo, ON
Associate PhD Student 2024 - Present
- **IQOQI Vienna / University of Vienna** Vienna, AUT
Visiting Doctoral Researcher 2025
 - Topic: Quantum Reference Frames,
 - Supervisor: Prof. Časlav Brukner,
 - Funded by NSERC CGS-MSFSS
- **University of Waterloo** Waterloo, ON
MSc. in Physics 2020 - 2023
 - MSc Thesis: *Analysis of the Thermal Fisher Information in 2+1 Dimensional Black Hole Spacetimes*, Supervised by Prof. Robert B. Mann
 - Funded by NSERC CGS-M, OGS
- **Mount Allison University** Sackville, NB
B.Sc. Honours in Mathematics and Physics 2016 - 2020
 - Thesis: *Linear Inequalities Related to Quantum Entanglement Theory*, Supervised by Prof. Nathaniel Johnston

Publications

7. **E. A. Patterson**, S. Wang, R. B. Mann. Entanglement transference and non-inertial quantum reference frames *arXiv pre-print, submitted to Quantum*, <https://arxiv.org/abs/2603.23601>, 2026
6. R. B. Mann, J. Foo, **E. A. Patterson**, M. R. Preciado-Rivas. From Quantum Foundations to Quantum Gravity: A Brief History of Relativistic Quantum Information *Physics in Canada*, 81, 2, 174, <https://pic-pac.cap.ca/index.php/Issues/showpdf/article/v81n2.0-a4275.pdf>, 2025
5. **E. A. Patterson** and R. B. Mann. Thermal Fisher Information for a Rotating BTZ Black Hole. *Entropy*, 27(5), 478, <https://doi.org/10.3390/e27050478>, 2025
4. L. Goel, **E. A. Patterson**, M. R. Preciado-Rivas, M. Torabian, R. B. Mann, and N. Afshordi. Accelerated detector in a superposed spacetime. *Physical Review D*, 111, 025015 <https://doi.org/10.1103/PhysRevD.111.025015>, 2025

3. C. Lima, **E. Patterson**, E. Tjoa, and R. B. Mann. Unruh phenomena and thermalization for qudit detectors. *Physical Review D*, 108, 105020 <https://doi.org/10.1103/PhysRevD.108.105020>, 2023
2. **E. Patterson** and R. B. Mann. Fisher information of a black hole spacetime. *Journal of High Energy Physics*, 2023, 214 [https://doi.org/10.1007/JHEP06\(2023\)214](https://doi.org/10.1007/JHEP06(2023)214), 2023
1. N. Johnston and **E. Patterson**. The inverse eigenvalue problem for entanglement witnesses. *Linear Algebra and Its Applications*, 550:1–27, 2018

Presentations

Invited:

6. **The Life and Times of Black Holes**
Astronomy On Tap (Kitchener-Waterloo) 2026
5. **Quantum Probes of Spacetime: A Brief Introduction to RQI**
Youth Quantum Symposium (Institute for Quantum Computing) 2026
4. **The Unruh Effect and Relativistic Quantum Information**
Mount Allison University Colloquium 2024
3. **A Spotlight on Quantum Physics**
Rotary Club of Moncton West and Riverview 2022
2. **Pleins Feux sur la Physique Quantique**
École L'Odyssée 2022
1. **Théorie de l'Information Quantique: algèbre linéaire et produit tensoriel**
Club de mathématiques de l'Université de Moncton 2019

Contributed:

15. **Alice and Rob Revisited (Perspectival Entanglement Degradation)**
CAP Congress 2026 (U. Ottawa) 2026
14. **Alice and Rob Revisited (Perspectival Entanglement Degradation)**
RQI Circuit 2026 (U. Waterloo) 2026
13. **Unruh in Superposed Spacetime**
CAP Congress 2025 (U. Saskatchewan) 2025
12. **Unruh in Superposed Spacetime**
IQC Student Summer Conference (U. Waterloo) 2025
11. **Multipartite Superposition of Spacetime from an Operational Perspective**
Theory Canada 17 (U. Regina) 2025
10. **Accelerated Detector in a Quantum Superposition of Minkowski Spacetime**
RQI-N 14 (Charles U., Prague) 2024
9. **Unruh Phenomena and Thermalization for Qudit Detectors**
QFTCS Workshop III (Instituto Superior Tecnico, Lisbon) 2024
8. **Unruh Phenomena and Thermalization for Qudit Detectors**
CAP Congress 2024 (Western U.) 2024
7. **Fisher Information of Thermal Black Hole Parameter**
Golden Wedding of Black Holes and Thermodynamics (Virtual) 2023
6. **Rotational Effects on Fisher Information of Thermal Black Hole Parameter**
CAP Congress 2023 (U. of New Brunswick) 2023

5. **Probing BTZ Black Hole via Fisher Information**
CAP Congress 2022 (McMaster U.) 2022
4. **Probing BTZ Black Hole via Fisher Information**
Canadian-Cuban-American-Mexican Graduate Student Conference (Virtual) 2022
3. **Probing BTZ Black Hole via Fisher Information**
RQI-N Online 2022 (Virtual) 2022
2. **The Physics of Quantum Cryptography**
Atlantic Universities Physics and Astronomy Conference (St Francis Xavier U.) 2020
1. **Using Linear Algebra in Quantum Entanglement Theory**
Science Atlantic Mathematics, Statistics, and Computer Science Conference (Dalhousie U.) 2019

Poster:

7. **Perspectival Entanglement Degradation**
Observers and Causality in Quantum Gravity (Bratislava, Slovakia) 2026
6. **Alice and Rob Return (Perspectival Entanglement Degradation)**
PATH 2026 Symposium (U. Waterloo) 2026
5. **Superposed spacetime as perceived by an accelerated detector**
QISS 2025 (IQOQI-Vienna, Vienna) 2025
4. **Superposed spacetime as perceived by an accelerated detector**
QSimFP 2025 (U. Nottingham, Nottingham) 2025
3. **Fisher Information of Black Hole Parameter**
Hong Kong Laureate Forum (Hong Kong) 2023
2. **Unruh Phenomena for SU(2) Qudit Detectors**
RQI-N 13 (Technical U. of Crete, Greece) 2023
1. **From Math to Physics and Back**
Waterloo Mathematics Undergraduate Research Conference (U. of Waterloo) 2019

Other:

- **Perspectives on Quantum Reference Frames**
IQC Student Seminar 2026
- **Graduate School Info Session (Panel)**
Mount Allison University 2024
- **Unruh phenomena and thermalization for qudit detectors**
IQC Student Seminar 2024
- **Oh, the Places You'll Go (with Physics)! (Panel)**
Mount Allison University 2022

Mentoring

Undergraduate Students:

- **Wu YuanZhe** University of Waterloo
Research Project in Progress 2025 - Present
- **Lakshay Goel** University of Waterloo
Project title: "Accelerated detector in a superposed spacetime" 2024 - 2025
- **Anonymous** Mount Allison University
First-Generation Alumni Mentorship Program 2024 - 2025

Teaching Experience

Guest Lecturer

- **Quantum School for Young Scientists** IQC, University of Waterloo
Interactive lecture on Quantum Entanglement Summer 2023, Summer 2024
- **Quantum Computing Career Accelerator** QUETZAL
Virtual lecture on Quantum Entanglement to International Audience Fall 2023
- **Classical Mechanics (ECE 105)** University of Waterloo
Lecture on Mechanics for first-year Engineering students Fall 2023
- **General Physics II (PHYS 1551)** Mount Allison University
Lecture on Standard Model Winter 2020

Teaching Assistant

- **Introductory Astronomy (SCI 238)** University of Waterloo
Developed Plagiarism Flagging for Online Submissions; Marked Midterms Fall 2025
- **Physics 1 (PHYS 111)** University of Waterloo
Marked assignments, midterm, and final Winter 2022, Fall 2022
- **Modern Physics (PHYS 124)** University of Waterloo
Marked assignments, midterm, and final Winter 2021
- **Electricity and Magnetism 2 (PHYS 342)** University of Waterloo
Created assessment questions; Marked assessments Fall 2020
- **General Physics II (PHYS 1551)** Mount Allison University
Lab Assistant and Marker Winter 2020
- **General Physics I (PHYS 1051)** Mount Allison University
Lab Assistant and Marker Fall 2019
- **Calculus I (MATH 1111)** Mount Allison University
Weekly tutorial lead and marker Winter 2017, Fall 2017, Fall 2018, Fall 2019
- **Calculus II (MATH 1121)** Mount Allison University
Weekly tutorial lead and marker Winter 2018, Winter 2019

Tutor

- **Math Help Center** Mount Allison University
Weekly drop-in tutor for 1st and 2nd year math courses Oct. 2018 - Feb. 2020
- **Advanced mathematics for 9 year-olds (Private Tutoring)** Mount Allison University
Prepared and delivered weekly "fun math" lessons for two gifted kids 2017 - 2018

Prizes, Grants & Honours

Total value of competitive awards accepted is over \$225,000 CAD.

Declined additional \$60,000 CAD.

Awards primarily recognize academic/research excellence with some outreach/community service.

NSERC CGS-D	2024 - present
NSERC CGS-MSFSS	2025
OGS/QEII-GSST (Declined)	2024 - 2025
Boris P. Stoicheff Memorial Graduate Scholarship	2024
Julian Schwinger Foundation Travel Award	2024
David Johnston Award	2024
Club Sport Leadership Award	2024
Ontario Graduate Scholarship (OGS)	2022 - 2024
O'Brien Foundation Fellowship	2023
NSERC CGS-M Award	2021 - 2022
OGS/QEII-GSST (Declined)	2022
Don Norton Memorial Award	2020
A. Jane Avard Eaton Student Leadership Award	2020
Allison Calvert Memorial Award	2020
Physics Departmental Award	2020
MASU TA Excellence Award	2020
Math TA Certificate	2020
Physics TA Certificate	2020
Bell Family Achievement Award	2016 - 2020
Dean's List Standing (GPA > 3.7/4.3)	2016 - 2020
NSERC Undergraduate Student Research Award	2019
NSERC Student Ambassador Grant (x2)	2019
Jeff 'Skip' Fraser Memorial Scholarship	2019
Academic Leadership Award for the Math & CS Dept.	2018 - 2019
U Sports Academic All-Canadian	2016 - 2019
Dr. George Anderson Prize in Physics	2018
Greater Moncton Chamber of Commerce Scholarship	2018
Nathaniel Morgan Scholarship for Math	2017
Community Leader Award	2016
Bourse Allain Bourget	2016
Bourse Roméo-Leblanc (Declined)	2016
Bourses d'entrées (Declined)	2016
Governor General's Medal (Bronze)	2016

Service

Scientific Meeting Organizing

Secured \$15,000 CAD in sponsorships and support across the following events.

- Waterloo RQI Seminar Series**
Co-Founder, Co-Organizer
 – One of 3 graduate students running seminar series
 - Gravity, Particles, and Information Conference**
Chair, Local and Scientific Organizing Committees
 – Led the organization of international research conference, attended by 60 participants
 – Created conference webpage and managed all correspondences with participants
 - 2024 IQC Student Conference**
Local Organizing Committee Member

University of Waterloo

2024 - present

University of Waterloo

2025 - 2026

Institute for Quantum Computing

2024

- **Theory Canada 16** CAP DTP
Local Organizing Committee Member 2024
– Only student on the 3 member local organizing committee for this annual national conference hosting theoretical physicists from across Canada.
- **Inaugural RQI Circuit** ISRQI
Local Organizing Committee Member 2023
– One of 4 graduate students organizing the first leg of the inaugural RQI Circuit: a research exchange for members of the International Society for Relativistic Quantum Information (ISRQI) to share the work of their hub with the world.

Refereed papers for the following journals:

- Physical Review A
- Journal of High Energy Physics
- npj Quantum Information
- Quantum Information Processing
- Scientific Reports

Committee Work

- **Division for Theoretical Physics Executive** Canadian Association of Physicists
Student Representative 2023 - 2025
- **Science Faculty Council** University of Waterloo
Graduate Student Representative 2021 - 2026
- **Student Advisory Council** Canadian Association of Physicists
Committee Member 2023 - 2025
- **University Senate** University of Waterloo
Graduate Student Senator 2024

Outreach

- **PI Outreach Team** Perimeter Institute
Volunteer 2025 - present
- **IQC Outreach Team** Institute for Quantum Computing
Volunteer 2022 - present
- **Unentangled** Institute for Quantum Computing
Volunteer 2020 - 2022

Student Governance

- **Graduate Student Association** University of Waterloo
Director of the Board, Physics Counsellor 2021 - 2024
- **Physics Graduate Student Association** University of Waterloo
Physics Representative, Secretary 2020 - 2023
- **Mount Allison Students' Union** Mount Allison University
Science Senator, Board of Regents Representative 2017 - 2020
- **Orientation Week** Mount Allison University
Logistics Committee 2018 - 2019

- **Math/CS Society**
Underclassman Representative, President
- **WUSC - Student Refugee Program**
Coordinator

Mount Allison University
2017 - 2020

Mount Allison University
2017 - 2019

Employment Experience

- **Quantum School for Young Students** Institute for Quantum Computing, Waterloo, ON
Head Chaperone 2022 - 2023
 - Helped review and rank 500 applications from talented high school students from around the world
 - Facilitated in-person programming for 40 participants selected to attend the all-inclusive week-long summer program
- **Shad** Mount Allison University, Sackville, NB
Recreation Coordinator 2019
 - Was responsible for the preparation and execution of regular recreational activities for the 52 participants including a weekend camping trip to Nova Scotia
 - Helped run the programming with a special focus on risk management
- **Camps de Math de l'Acadie** Saint-Quentin, NB
Camp Counsellor 2018
 - Helped create a fun learning environment for kids between the grades 5 and 8 during an overnight math camp
 - Helped lead various activities including math games and building a 2 metre tall Sierpinski pyramid out of sticks and strings.
- **Math and CS Dept.** Mount Allison University, Sackville, NB
Research Assistant 2017 - 2019
 - Quantum Entanglement Theory research for two summers under the supervision of Dr. Nathan Johnston. Used semi-definite programming and MATLAB.
 - Geometric Quantization research for one summer under the supervision of Dr. Mark Hamilton. Worked on understanding the complex Lagrangian Grassmanian with symplectic geometry.

Interests

- Soccer: Mount Allison University Men's Varsity Team (3 years), Club Nationals, Team New Brunswick, Coaching and Refereeing experience
- Ultimate (frisbee): Ultimate Canada Club Season, Assistant Coach for École L'Odyssée's High School Team, University of Waterloo Team Captain and Club President, Mount Allison Club Team, Intramural referee