

SUMEET KHATRI

CURRICULUM VITAE

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HIGHLIGHTS

Research

- Areas of interest: Quantum information theory, quantum communication, quantum networks, quantum computing, quantum algorithms and complexity theory, machine learning.
- 10 peer-reviewed publications and 3 pre-prints. ([Google Scholar Page](#)) ([Papers on arXiv](#))
- Participant in the 2018 quantum computing summer school at LANL ([PR5], [PR8]).

Teaching & mentorship

- Co-author of the book “*Principles of Quantum Communication Theory: A Modern Approach*” – preliminary version [here](#).
- Designed and delivered a mini-course on quantum communication theory in Brazil. ([course information](#)) ([videos](#))
- Mentored four undergraduate research students (Aliza Siddiqui, Renée Desporte, Manon Bart, Corey Matyas; see [PR7], [PR10]).

Other items

- Recipient of the NSERC Postgraduate Scholarship.
- Creator of the Python package [QuTIpy](#).

EDUCATION

Louisiana State University, Baton Rouge, LA, USA

2017–2021

PhD Physics

- Advisor: Mark M. Wilde
- Thesis title: *Towards a General Framework for Practical Quantum Network Protocols*

University of Waterloo, Waterloo, ON, Canada

2014–2016

MSc Physics (Quantum Information)

- Advisor: Norbert Lütkenhaus
- Thesis title: *Symmetric Extendability of Quantum States and the Extreme Limits of Quantum Key Distribution*

University of Waterloo, Waterloo, ON, Canada

2009–2014

BSc Honours Mathematical Physics (Co-operative), Astrophysics Specialization, Pure Mathematics Minor

- Graduated on the Dean’s Honours List
- Research advisors: Michael J. Hudson, Robert König

RESEARCH

Graduate Research Assistant, Department of Physics and Astronomy, Baton Rouge, LA, USA

2018–PRESENT

Quantum Science and Technologies Group, Hearne Institute for Theoretical Physics. Supervisor: Mark M. Wilde. (PhD Research)

Quantum Computing Summer School Fellow, Los Alamos National Laboratory, Los Alamos, NM, USA

SUMMER 2018

Theoretical Division. Supervisor: Patrick Coles. (Summer internship)

Graduate Research Assistant, Institute for Quantum Computing, Waterloo, ON, Canada

2014–2016

Optical Quantum Communications Theory Group. Supervisor: Norbert Lütkenhaus. (MSc Research)

PUBLICATIONS (GOOGLE SCHOLAR PAGE) (PAPERS ON ARXIV)

PEER-REVIEWED ARTICLES

- [PR10] **Sumeet Khatri**, Anthony J. Brady, Renée A. Desporte, Manon P. Bart, Jonathan P. Dowling. “Spooky action at a global distance: analysis of space-based entanglement distribution for the quantum internet”. *npj Quantum Information* 7, 4 (2021).
- [PR9] **Sumeet Khatri**, Kunal Sharma, Mark M. Wilde. “Information-theoretic aspects of the generalized amplitude damping channel”. *Physical Review A* 102, 012401 (2020).
- [PR8] Kunal Sharma, **Sumeet Khatri**, M. Cerezo, Patrick J. Coles. “Noise Resilience of Variational Quantum Compiling”. *New Journal of Physics* 22, 043006 (2020).
- [PR7] **Sumeet Khatri**, Corey T. Matyas, Aliza U. Siddiqui, Jonathan P. Dowling. “Practical figures of merit and thresholds for entanglement distribution in quantum networks”. *Physical Review Research* 1, 023032 (2019).
- [PR6] Ludovico Lami, **Sumeet Khatri**, Gerardo Adesso, Mark M. Wilde. “Extendibility of bosonic Gaussian states”. *Physical Review Letters* 123, 050501 (2019).
- [PR5] **Sumeet Khatri**, Ryan LaRose, Alexander Poremba, Lukasz Cincio, Andrew T. Sornborger, Patrick J. Coles. “Quantum-assisted quantum compiling”. *Quantum* 3, 140 (2019).
- [PR4] Siddhartha Das, **Sumeet Khatri**, Jonathan P. Dowling. “Robust quantum network architectures and topologies for entanglement distribution”. *Physical Review A* 97, 012335 (2018).
- [PR3] Siddhartha Das, **Sumeet Khatri**, George Siopsis, Mark M. Wilde. “Fundamental limits on quantum dynamics based on entropy change”. *Journal of Mathematical Physics* 59, 012205 (2018).
- [PR2] **Sumeet Khatri**, Norbert Lütkenhaus. “Numerical evidence for bound secrecy from two-way postprocessing in quantum key distribution”. *Physical Review A* 95, 042320 (2017).
- [PR1] Paul J. L. Charlton, Michael J. Hudson, Michael L. Balogh, **Sumeet Khatri**. “The dependence of halo mass on galaxy size at fixed stellar mass using weak lensing”. *Monthly Notices of the Royal Astronomical Society*, 472(2), 2367-2387 (2017).

PRE-PRINT ARTICLES

- [PP3] Dawei Ding, **Sumeet Khatri**, Yihui Quek, Peter W. Shor, Xin Wang, Mark M. Wilde. “Bounding the forward classical capacity of bipartite quantum channels”. arXiv:2010.01058, October 2020.
- [PP2] **Sumeet Khatri**. “Policies for elementary link generation in quantum networks”. arXiv:2007.03193, July 2020.
- [PP1] Mark M. Wilde, **Sumeet Khatri**, Eneet Kaur, Saikat Guha. “Second-order coding rates for key distillation in quantum key distribution”. arXiv:1910.03883, October 2019.

CONTRIBUTED TALKS

- 15th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), 2020 (Latvia)
 - ★ *“Extendibility of bosonic Gaussian states.”* (Based on [PR6].)
- Southwest Quantum Information and Technology (SQuInT), 2020 (Eugene, USA).
 - *“Practical figures of merit and thresholds for entanglement distribution in quantum networks.”* (Based on [PR7].)
- Workshop: The Nature of Quantum Networks (Erwin Schrödinger Institute, Vienna, Austria).
 - *“Practical figures of merit and thresholds for entanglement distribution in quantum networks.”* (Based on [PR7].)
- 1st International Workshop on Quantum Network Science (Tuscon, USA).
 - *“Robust network architectures and figures of merit for large-scale entanglement distribution”.* (Based on [PR4] and [PR7].)
- APS March Meeting, 2019 (Boston, USA).
 - *“Information-theoretic aspects of the generalized amplitude damping channel”.* (Based on [PR9].)
- Southeast Quantum Computing Workshop, 2018 (Athens, USA).
 - *“Robust Quantum Network Architectures and Topologies for Entanglement Distribution”.* (Based on [PR4].)
- Southwest Quantum Information and Technology (SQuInT), 2018 (Santa Fe, USA).
 - ★ *“Robust Quantum Network Architectures and Topologies for Entanglement Distribution”.* (Based on [PR4].)
- Conference on Quantum Information and Quantum Control VII (CQIQC-VII), 2017 (Toronto, Canada).
 - *“Fundamental Limits on Quantum Dynamics Based on Entropy Change”.* (Based on [PR3].)
- APS March Meeting, 2017 (New Orleans, USA).
 - *“Symmetric Extendability of Quantum States, Bound Secrecy, and the Extreme Limits of Quantum Key Distribution”.* (Based on [PR2].)

POSTERS

- Southwest Quantum Information and Technology (SQuInT), 2019 (Albuquerque, USA).
 - *“Quantum-assisted quantum compiling”* (Based on [PR5].)
- 22nd Annual Conference on Quantum Information Processing (QIP), 2019 (Boulder, USA).
 - *“Quantum-assisted quantum compiling”.* (Based on [PR5].)
- International Conference on Quantum Communication, Measurement and Computing (QCMC), 2019 (Baton Rouge, USA).
 - *“Robust Quantum Network Architectures and Topologies for Entanglement Distribution”.* (Based on [PR4].)
 - ★ *“Fundamental limits on quantum dynamics based on entropy change”.* (Based on [PR3].)
- 2nd Workshop for Quantum Repeaters and Networks (WQRN), 2017 (Seefeld, Austria).
 - *“Long-distance communication with memoryless quantum repeaters”.* (Based on [PR4].)
- 7th International Conference on Quantum Cryptography (QCrypt), 2017 (Cambridge, UK).

- “Numerical Evidence for Bound Secrecy from Two-Way Post-Processing in Quantum Key Distribution”. (Based on [PR4].)
- Southwest Quantum Information and Technology (SQuInT), 2017 (Baton Rouge, USA).
 - “Symmetric Extendability of Quantum States and the Extreme Limits of Quantum Key Distribution”. (Based on [PR2].)
- International Conference on Quantum Communication, Measurement and Computing (QCMC), 2016 (Singapore).
 - “Symmetric Extendability of Quantum States and the Extreme Limits of Quantum Key Distribution”. (Based on [PR2].)

ACADEMIC SERVICE

- Reviewing for journals.
 - IEEE Transactions on Information Theory
 - Quantum Information Processing
 - Reviews in Mathematical Physics
 - New Journal of Physics
 - Quantum
 - Communications Physics
- Program committee member for the Sixth International Conference for Young Quantum Information Scientists (6-YQIS 2021).

TEACHING

Visiting Lecturer

NOVEMBER 2019

International Institute of Physics, Natal, Brazil

- Delivered a five-lecture mini-course on quantum communication theory.
- Information about the course [here](#); video recordings of the lectures [here](#).
- Trip funded by the Brazil-US Student & Postdoc Visitation Program.

Graduate Teaching Assistant

2017–2018

Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA, USA

- Supervised two sections of the second-year physics laboratory course.
- Graded homework assignments for the graduate-level statistical mechanics course.
- Graded homework assignments for the fourth-year undergraduate electromagnetism course.

Fundamentals of University Teaching Certificate

Teaching training program for graduate students at the Centre for Teaching Excellence, University of Waterloo, Waterloo, ON, Canada

- Program consists of six workshops and three 15-minute teaching sessions.
- Selected workshops: Effective lesson plans, creating memorable lectures, teaching with confidence.

Laboratory Teaching Assistant

2014–2015

Department of Physics and Astronomy, University of Waterloo, Waterloo, ON, Canada

- Supervised three sections of the first-year mechanics laboratory course for Biology and Chemistry majors in the Fall 2014 and Fall 2015 terms.
- Graded students' lab reports.

Math & Physics Learning Assistant, Sheridan College, Brampton, ON, Canada

WINTER 2012

Four-month co-op employment.

- Conducted weekly tutorials for four sections of the first-semester Math course for engineering students.
- Prepared and graded weekly quizzes administered during the tutorial.
- Conducted appointments and drop-in sessions at the Learning Centre to assist students with Math and Physics questions ranging from first- to fourth-semester courses.

AWARDS

Title	Value	Duration
APS Brazil-US Student & Postdoc Visitation Program	\$3,000 (USD)	November 2019
NSERC Postgraduate Scholarship—Doctoral	\$21,000/year	2018–2021
Quantum Computing Summer School Fellowship (LANL)	\$12,200 (USD)	Summer 2018
Ontario Graduate Scholarship	\$15,000	2015–2016
NSERC Canada Graduate Scholarship—Master's	\$17,500	2014–2015
President's Graduate Scholarship	\$10,000/year	2014–2016
Marie Curie Award	\$4,525/year	2014–2016
NSERC Undergraduate Student Research Award ($\times 2$)	\$4,500	2012, 2014

TECHNICAL SKILLS

- Creator of the Python package `QuTiPy`.
- **Programming languages:** Python, Matlab/Octave, \LaTeX
- **Software:** Matlab/Octave, Maple, Mathematica
- **Quantum computing packages:** `pyQuil` (Rigetti), `Qiskit` (IBM)