Benjamin Lovitz

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Employment

Fall 2022—	**Department of Mathematics, Northeastern University** –NSF Postdoctoral Fellow –Mentor: Harm Derksen

Education

Spring 2018 —Winter 2022	**Institute for Quantum Computing, University of Waterloo** –PhD in Applied Math (Quantum Information) –Advisors: William Slofstra and John Watrous –Comprehensive exam topics (April 2020): Algebraic geometry, linear algebraic groups, matrix product states –Thesis: *Tensors: Entanglement, Geometry, and Combinatorics*
Fall 2015 —Fall 2018	**Institute for Quantum Computing, University of Waterloo** –MSc in Physics (Quantum Information) –Advisor: Norbert Lütkenhaus –Thesis: *Practical quantum fingerprinting and appointment scheduling*
Fall 2011 —Winter 2015	**Bates College** –BA double degree in Math and Physics (Honors) –Magna Cum Laude –Math advisor: Adriana Salerno –Math capstone project: *The discrete log problem for elliptic curves* –Physics advisor: Nathan Lundblad –Physics honours thesis: *Optical frequency doubling*

Research Interests

Tensors, applied algebraic geometry, combinatorics, quantum information theory, entanglement theory, algebraic statistics.

Publications

Entangled subspaces and generic local state discrimination with pre-shared entanglement
Benjamin Lovitz and Nathaniel Johnston
Quantum, 2022

New techniques for bounding stabilizer rank
Benjamin Lovitz and Vincent Steffan
Quantum, 2022

The non-m-positive dimension of a positive linear map
Nathaniel Johnston, Benjamin Lovitz, and Daniel Puzzuoli
Quantum, 2019

On decomposable correlation matrices
Benjamin Lovitz
Linear and Multilinear Algebra, 2019

Families of quantum fingerprinting protocols
Benjamin Lovitz and Norbert Lütkenhaus
Physical Review A, 2018

Practical quantum appointment scheduling
Dave Touchette, Benjamin Lovitz, and Norbert Lütkenhaus
Physical Review A, 2018

Perfect state transfer in Laplacian quantum walk
Rachael Alvir, Sophia Dever, Benjamin Lovitz, James Myer, Christino Tamon, Yan Xu, and Han-meng Zhan
Journal of Algebraic Combinatorics, 2016

Preprints

A generalization of Kruskal's theorem on tensor decomposition
Benjamin Lovitz and Fedor Petrov
arXiv preprint, 2021

Toward a generalization of Kruskal's theorem on tensor decomposition
Benjamin Lovitz
arXiv preprint, 2020

Presentations

September 2022	SIAM Conference on Mathematics of Data Science Talk: *Tensor Decompositions: Algorithms and Uniqueness*	
September 2022	Kickoff workshop for AGATES, a semester-long program on algebraic geometry and tensors held at the Banach Center and the University of Warsaw Talk: *TBD*	
May 2022	QLunch Seminar at QMATH, University of Copenhagen Talk: *A splitting theorem for product tensors*	
March 2022	AMS Special Session on Nonlinear Algebra with Applications to Statistics Talk: *A generalization of Kruskal's theorem*	
March 2022	Random Tensors at CIRM Talk: *New techniques for bounding stabilizer rank*	

March 2022	QIP 2022 Talk: *New techniques for bounding stabilizer rank*
January 2022	GIC seminar at the Universitat Autonoma de Barcelona Talk: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
December 2021	Theory Lunch Seminar at Northeastern University Talk: *A generalization of Kruskal's theorem*
November 2021	IDEAL Seminar at Northwestern University Talk: *A generalization of Kruskal's theorem*
November 2021	Algebra Seminar at Auburn University Talk: *A generalization of Kruskal's theorem*
April 2021	IPAM Tensor Methods weekly seminar Talk: *A generalization of Kruskal's theorem*
April 2021	IPAM Workshop: Tensor Methods and their Applications in the Physical and Data Sciences Poster: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
March 2021	Copenhagen QIT group meeting Talk: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
February 2021	IQST seminar at the University of Calgary Talk: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
January 2021	24th Annual Conference on Quantum Information Processing (QIP) Poster: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
January 2021	Quantum information seminar at the Perimeter Institute Talk: *Entangled subspaces and generic local state discrimination with pre-shared entanglement*
April 2015	Mount David Summit, Bates College Poster: *The discrete log problem for elliptic curves*
October 2014	Bates College Talk: *Laplacian quantum walk on graphs*
August 2014	Mathematical Association of America (MAA) Mathfest Talk: *Laplacian quantum walk on graphs*

Teaching

Fall 2021	QIC 820: Theory of Quantum Information *Teaching Assistant, University of Waterloo*
Fall 2019	Math 127: Calculus 1 for the sciences *Instructor, University of Waterloo*

Advising

Fall 2021	Mentor to undergraduate student Daniel Han, in collaboration with William Slofstra *Undergraduate Research Assistantship program, University of Waterloo*

Further education

March 2021 —June 2021	Tensor Methods and Emerging Applications to the Physical and Data Sciences *Industry for Pure and Applied Mathematics, UCLA*
2018—2020	Fundamentals of University Teaching Program *Centre for Teaching Excellence, University of Waterloo*

Awards and achievements

September 2022—	NSF Mathematical Sciences Postdoctoral Research Fellowship (MSPRF) *National Science Foundation* 150,000 USD
September 2021 —April 2022	Ontario Graduate Scholarship (international competition) *Government of Ontario, Canada* 10,000 CAD
September 2021 —April 2022	President's Graduate Scholarship *University of Waterloo* 3,332 CAD
April 2021	3rd place in the "Cut to the Chase" video competition *Banff international research station* 50 CAD
September 2015	Entrance award for academic excellence and research potential *Institute for Quantum Computing* 5000 CAD
May 2015	Percy D. Wilkins Award for highest mathematics GPA *Bates College* 125 USD
June 2014 —July 2014	Rawlings grant for summer mathematics research *Bates College* 3000 USD

August 2014	Travel grant for Mathfest 2014
	Mathematical Association of America
	500 USD
May 2011	Mathematics award
	Catlin Gabel School

Service

Reviewer, Mathematial Reviews - American Mathematical Society
Referee, Linear and Multilinear Algebra - Taylor and Francis
Referee, Journal of Physics A: Mathematical and Theoretical - IOP Publishing
Referee, Machine Learning: Science and Technology - IOP Publishing

References

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Owen Woody (teaching reference)
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