

# Nathaniel Johnston

University of Guelph  
Guelph, Ontario, Canada

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## Education

- **University of Guelph** Guelph, ON  
*Ph.D. Mathematics* 2008 – present
  - Advisor: David W. Kribs
  - Relevant courses: Matrix Analysis at University of Houston (Houston, TX), Quantum Information Theory
- **University of Guelph** Guelph, ON  
*M.Sc. Mathematics* 2007 – 2008
  - Advisors: John Holbrook and David W. Kribs
  - Thesis: Stabilized Distance Measures and Quantum Error Correction
  - Graduated with a 98.3% average
  - Relevant courses: Operator Algebras at Fields Institute (Toronto, ON), Quantum Information Theory at University of Waterloo (Waterloo, ON)
- **University of Guelph** Guelph, ON  
*B.A.H. Mathematics* 2003 – 2007
  - Graduated with a Major in Mathematics and a Minor in Statistics
  - Graduated with Honours, a 98.6% cumulative average, and Dean’s Honour List each year
  - Relevant courses: Functional Analysis, Operations Research, Quantum Error Correction

## Awards, Grants & Honours

NSERC Canada Graduate Scholarship (CGS D) (\$35 000)	2008 - 2010
Brock Doctoral Scholarship (\$30 000)	2008 - 2010
Ontario Graduate Scholarship (OGS) (\$15 000, declined)	2008
Mathematics Graduate Scholarship (\$500)	2008
NSERC Canada Graduate Scholarship (CGS M) (\$17 500)	2007
Ontario Graduate Scholarship (OGS) (\$15 000, declined)	2007
Governor General’s Academic Silver Medal	2007
Mathematics Graduation Prize (\$250)	2007
College of Physical and Engineering Sciences Graduation Prize (\$250)	2007
NSERC Undergraduate Student Research Award (\$5 625)	2007
Class of 1970 Scholarship (\$1 400)	2006
Moffat Mathematics & Statistics Award (\$900)	2006
NSERC Undergraduate Student Research Award (\$5 625)	2006
Dean’s Scholarship (\$1 000)	2005
Moffat Mathematics & Statistics Award (\$900)	2005
Dean’s Scholarship (\$1 000)	2004
Ted Newton Memorial Scholarship (\$1 500)	2004
WebCT Conferencing Prize (\$250)	2004
Board of Governors’ Scholarship (\$2 000)	2003 - 2006
University of Guelph Entrance Scholarship (\$2 000)	2003

## Teaching Experience

- **Math Help Desk** University of Guelph  
*Teaching Assistant* *Sept. 2005 – present*
  - Provided one-on-one and group tutoring to students in first and second year math courses.
- **Set Theory** University of Guelph  
*Teaching Assistant* *Fall 2006, Fall 2007*
  - Led seminars guiding students through difficult problems and reviewing course material.
  - Marked assignments for the course.

## Publications (available at [www.nathanieljohnston.com/publications](http://www.nathanieljohnston.com/publications))

- N. Johnston and D. W. Kribs, *A Family of Norms With Applications In Quantum Information Theory II*. Preprint (2010).
- N. Johnston, *The B36/S125 “2 × 2” Life-Like Cellular Automaton*. In *Game of Life Cellular Automata* chapter 7, A. Adamatzky, Springer-UK, 99–114 (2010).
- N. Johnston and D. W. Kribs, *Schmidt Operator Norms and Entanglement Theory*. Fourth International Conference on Quantum, Nano and Micro Technologies, 92–95 (2010).
- N. Johnston and D. W. Kribs, *Generalized Multiplicative Domains and Quantum Error Correction*. Proceedings of the American Mathematical Society. To appear (2010).
- N. Johnston and D. W. Kribs, *A Family of Norms With Applications In Quantum Information Theory*. Journal of Mathematical Physics. To appear (2010).
- M.-D. Choi, N. Johnston, and D. W. Kribs, *The Multiplicative Domain in Quantum Error Correction*. Journal of Physics A: Mathematical and Theoretical **42**, 245303 (2009).
- N. Johnston, D. W. Kribs, and V. Paulsen, *Computing Stabilized Norms for Quantum Operations*. Quantum Information & Computation **9** 1 & 2, 16–35 (2009).
- N. Johnston, D. W. Kribs, and C.-W. Teng, *An Operator Algebraic Formulation of the Stabilizer Formalism for Quantum Error Correction*, Acta Applicandae, 0167–8019 (2009).

## Presentations

- *The Multiplicative Domain in Quantum Error Correction*. Canadian Quantum Information Student Conference – Toronto, Ontario (August 2009).
- *The Multiplicative Domain in Quantum Error Correction (Poster)*. 4th Workshop on Theory of Quantum Computation, Communication and Cryptography – Waterloo, Ontario (May 2009).
- *The Multiplicative Domain in Quantum Error Correction*. Canadian Mathematical Society Winter 2008 Meeting – Ottawa, Ontario (December 2008).
- *The Multiplicative Domain in Quantum Error Correction*. Quantum Information & Geometric Statistics Seminar (QuIGS) – University of Guelph (July 2008).

- *Completely Bounded Norms in Quantum Information*. Quantum Information & Geometric Statistics Seminar (QuIGS) – University of Guelph (August 2007).

## Participation in Workshops and Conferences

- **Workshop on Operator Structures in Quantum Information** Toronto, ON  
*Fields Institute* July 6 – 10, 2009
- **Workshop on Trends and Developments in Linear Algebra** Trieste, Italy  
*International Centre for Theoretical Physics* June 22 – 26, 2009
- **4th Workshop on Theory of Quantum Computation** Waterloo, ON  
*Institute for Quantum Computing* May 11 – 13, 2009
- **Canadian Mathematical Society Winter 2008 Meeting** Ottawa, ON  
*Carleton University* December 4 – 6, 2008
- **36th Canadian Operator Symposium** Toronto, ON  
*Fields Institute* May 20 – 24, 2008
- **Workshop on Noncommutative Dynamics and Applications** Toronto, ON  
*Fields Institute* July 16 – 20, 2007
- **35th Canadian Operator Symposium** Guelph, ON  
*University of Guelph* June 5 – 9, 2007
- **Seventh Canadian Summer School on Quantum Information** Waterloo, ON  
*Institute for Quantum Computing* May 27 – 31, 2007

## Other Research Experience

- **NSERC Undergraduate Student Research Award** University of Guelph  
*Quantum Computing* May 2007 - Aug. 2007
  - Searched for new methods of quantum error correction.
  - Implemented an algorithm for estimating the completely bounded norm of linear maps.
- **NSERC Undergraduate Student Research Award** University of Guelph  
*Quantum Computing* May 2006 - Aug. 2006
  - Searched for new methods of quantum error correction.

## Academic Service and Contributions

- Ontario Representative of the **Canadian Mathematical Society Student Committee**.  
*October 2008 – June 2010*
- Language Editor for the **Central European Journal of Mathematics**.  
*December 2008 – present*
- Creator and maintainer of **ConwayLife.com**, a widely used tool for exploring Conway's Game of Life and an online encyclopedia containing over 950 articles about cellular automata.  
*January 2009 – present*

- Contributor to the **On-Line Encyclopedia of Integer Sequences**.  
Sequences: A003558, A046994, A061342, A076965, A145156, A145157, A156228, A160240, A160241, A160657, A162458

## Skills

- Markup Languages
  - CSS, (X)HTML,  $\text{\LaTeX}$
- Programming Languages
  - C, Classic ASP, Java, Javascript, PHP, Python, SQL, Visual Basic
- Specialized Software
  - Maple, MATLAB, S-Plus