

RESEARCH INTERESTS

Topological Quantum Field Theory, Category Theory, Groupoids, Representation Theory,
Low-Dimensional Topology, Combinatorics

EDUCATION

- June 2007** PhD in Mathematics – Thesis Title *Extended TQFTs and Quantum Gravity*
University of California, Riverside, USA – Thesis Advisor, John Baez
- February 2001** M.Sc. in Mathematics - Thesis Title: *Existence and Nonexistence Theorems for Solutions to the Einstein-Dirac-Maxwell Equations*
McGill University, Montreal, Canada – Thesis Advisor, Niky Kamran
- June 1998** B.Math - Double Major in Honours Pure Math, Honours Combinatorics & Optimization
University of Waterloo, Waterloo, Canada
- President of the *Pure Math Club*: organized club activities, arranged faculty and invited talks, and organized a “conference” series of short student talks.

WORK EXPERIENCE

- June 2016 - present** Assistant Professor
SUNY Buffalo State (Buffalo, USA)
- Taught Topics in Abstract Algebra *Summer 2016*
 - Taught Category Theory Independent Study Course for Jared Renzi *Fall 2018*
 - Supervised Independent Study in Number Theory for Radomir Pupovac *Spring 2019*
 - Taught Complex Variables (MAT 411) Course by Contract for Ann Buffington and Hayden Gooding *Fall 2019*
 - Taught Calculus III (MAT 263) *Fall 2016, Winter 2017, Fall 2019*; Calculus III Labs (MAT 264) *Fall 2016, Winter 2017, Fall 2019*; Elementary Number Theory (MAT 351) *Winter 2017, Fall 2017, Fall 2018*; Techniques of Proof *Fall 2017*; Elementary Abstract Algebra (MAT 301) *Fall 2017, Spring 2018, Spring 2019, Fall 2019*; Discrete Math (MAT 270) *Spring 2018, Fall 2018*; Complex Variables (MAT 411) *Spring 2019*; Real Analysis (MAT 417) *Spring 2019*
 - Served on College-wide Awards Committees
 - President's Award Review Committee--Teaching, Graduate Research Mentor *Spring 2018*
 - Student Leadership & Humanitarian Awards, President's Medal and Chancellor's Award *Spring 2019*
 - Served on Mathematics Department Committees
 - Served on Curriculum Committee *Fall 2017-present*
 - Technology *Fall 2018-present*
 - Pure Math Committee *Fall 2017-present*
 - Served as Faculty Advisor for the Math Club *Fall 2017-Spring 2018*
 - Served as Secretary for Math Department meetings *Fall 2016*

- August 2015
- May 2016 **Visiting Assistant Professor**
University of Toledo (Toledo, USA)
- Taught Mathematics for Liberal Arts (Fall 2015), Mathematical Modelling and Problem Solving (Fall/Winter 2015 – 4 sections), and its freshman success class, Study Skills for Math 1200 (Fall 2015), Calculus II and III—two sections—(Winter 2016) using “Flipped” classrooms and other innovative andragogy
 - Colloquium - University of Toledo Mathematics Department: “Topological Quantum Field Theory and Frobenius Algebras” (November 2015)
- August 2014
- July 2015 **McCain Teaching Postdoc**
Mount Allison University (Sackville, Canada)
- Taught Linear Algebra (Fall 2014), Multivariable Calculus (Fall 2014), Probability and Statistics (Winter 2015)
 - Assisted undergrad students in preparation for the Putnam Mathematics Competition
- September 2012
- August 2014 **Postdoctoral Researcher, Graduiertenkolleg/Research Training Group 1670**
Universität Hamburg (Hamburg, Germany)
- Co-taught a course for graduate students entitled Topics in Category Theory For Geometry (Spring 2013)
 - Co-organizer of half-semester seminar series on Infinity-n Categories, for Research Seminar of Christoph Schweigert, Ingo Runkel, Christoph Wockel
 - Mentored graduate students with research projects
- September 2010
- September 2012 **Postdoctoral Researcher, CAMGSD**
Instituto Superior Técnico (Lisbon, Portugal)
- On the organizing committee for the workshop *Higher Gauge Theory, TQFT and Quantum Gravity*, held at IST February 2011
- July 2007
- June 2010 **Postdoctoral Fellow and Assistant Professor**
University of Western Ontario (London, Canada)
- Taught Introduction to Linear Algebra (Fall 2008, Fall 2009), Complex Variables (Winter 2008, Winter 2009), Topology (Fall 2007)
 - Organized a Seminar on Stacks, Groupoids and Algebras in 2009-2010
- September 2002
- June 2007 **Graduate Teaching Assistant (2002 - 2007)**
Teaching Associate in Mathematics (2004 - 2006)
University of California, Riverside (Riverside, USA)
- TA'd Precalculus (regular and for Life Sciences), First Year Calculus parts A,B, C (regular and for Business), Multidimensional Calculus parts A, B, Linear Algebra (Advanced, and for Business), Introduction to Differential Equations, and Set Theory
 - Taught Introduction to Discrete Structures (Summer 2005/2006), Complex Analysis Qualifying Exam Seminar (Spring 2005), First Year Calculus Part C (Summer 2004) as Teaching Associate
 - Mentor to new Graduate Teaching Assistants in UC Riverside Math Department
- Fall 2001 **Lecturer**
McGill University (Montreal, Canada)
- Taught Vectors, Matrices and Geometry (Fall 2001)
 - Taught 1st year Calculus as TA
- Summer 2001
- Fall 2002 **Lecturer**
Dawson College (Montreal, Canada)
- Taught Precalculus (Summer 2002) and Calculus II (Summer 2001)

Outside Academia

- **WNY Peace Center** (Buffalo, USA) Volunteer tabling at various events including the Youth Action Climate Summit at SUNY Buffalo State 2019
- **The Lisbon Players** (Lisbon, Portugal) Volunteer at a non-profit, English theatre. Painted the stage, tended bar, was Narrator in "The Happy Prince" 2011-2012
- **HBE** (Montreal, Canada) Internet programming in Perl and SQL *Part time 1999-2000*
- **Open Text** (Waterloo, Canada) Developed experimental search-engine algorithms using Perl 2 *One-Semester Co-op Work Placements, 1996-1997*
- **RIM** (Waterloo, Canada) Testing, mathematical programming for cryptography and signal processing using C, chip-specific assembler language 3 *One-Semester Co-op Work Placements, 1994-1996*
- **Revenue Canada** (Ottawa, Canada) Statistical programming in mainframe environment *Co-op Work Placement, 1994*

SERVED AS REFEREE FOR...

- *Applied Categorical Structures*
- *Communications in Mathematical Physics*
- *Differential Geometry and its Applications*
- *Foundations of Science*
- *Hacettepe Journal of Mathematics and Statistics*
- *Journal of Mathematics Physics*
- *Letters in Mathematical Physics*
- *Reviews in Mathematical Physics*
- *Science China Mathematics*
- *Theory and Applications of Categories*

GRANTS & FUNDING

- Travel support for attending numerous conferences, research visits, and residencies
- **New Geometry and Topology Project:** participant in project funded by Portuguese Foundation for Science and Technology (FCT) for which funding was renewed
- **Graduiererkolleg/Research Training Group 1670:** contributed documentation towards successful funding review

RESEARCH & PUBLICATIONS**Projects**

www.theoreticalatlas.net: a record of thoughts that arise from my research, experiences as a mathematician, and whatever else I find interesting to share

Select Articles

- Released preprint of article "2-Group Actions and Moduli Spaces of Higher Gauge Theory" (with Roger Picken), arXiv:1904.10865
- Submitted above to *Journal of Mathematical Physics*
- "The Categorized Heisenberg Algebra I: A Combinatorial Representation" with Jamie Vicary, *Journal of Pure and Applied Algebra* vol. 222, no. 3, pp. 703-745, 2018, arXiv:1207.2054. <https://doi.org/10.1016/j.jpaa.2017.05.004>.
- "Transformation Double Categories Associated to 2-Group Actions" with Roger Picken, *Theory and Applications of Categories*, vol. 30, no. 43, pp. 1429-1468, 2015, arXiv:1401.0149. <http://www.tac.mta.ca/tac/volumes/30/43/30-43.pdf>.
- "Cohomological Twisting of 2-Linearization and Extended TQFT," *Journal of Homotopy and Related Structures*, vol. 10, no. 3, pp. 127-187, 2013, <https://doi.org/10.1007/s40062-013-0047-2>.
- "2-Vector Spaces and Finite Groupoids", *Applied Categorical Structures*, vol. 19, no. 4, pp. 659-707, 2011, <https://doi.org/10.1007/s10485-010-9225-0>.
- "Double Bicategories and Double Cospans", *Journal of Homotopy and Related Structures*, vol. 4, no. 1, pp. 389-428, 2009, arXiv:math/0611930.
- "Categorized Algebra and Quantum Mechanics", *Theory and Applications of Categories*, vol. 16, pp. 785-854, 2006, doi:10.1.1.69.5789.

SERVICE

<p>SUNY Buffalo State</p> <p>University of Toledo</p> <p>Mount Allison University</p> <p>Universität Hamburg</p> <p>Instituto Técnico Lisboa</p> <p>University of Western Ontario</p> <p>University of California</p> <p>University of Waterloo</p>	<ul style="list-style-type: none"> • Served on College-wide Awards Committees <ul style="list-style-type: none"> ◦ President's Award Review Committee--Teaching, Graduate Research Mentor (Spring 2018) ◦ Student Leadership & Humanitarian Awards, President's Medal and Chancellor's Award (Spring 2019) • Served on Mathematics Department Committees <ul style="list-style-type: none"> ◦ Served on Curriculum Committee (Fall 2017-present) ◦ Technology (Fall 2018-present) ◦ Pure Math Committee (Fall 2017-present) • Served as Faculty Advisor for the Math Club (Fall 2017-Spring 2018) • Served as Secretary for Math Department meetings (Fall 2016) • Taught the freshman success class, Study Skills for Math 1200 (Fall 2015) • Assisted undergrad students in preparation for the Putnam Mathematics Competition • Co-organizer of half-semester seminar series on Infinity-n Categories • Mentored graduate students with research projects • Co-organizer of 2012 GRK1670 TQFT Research Seminar • Organizing Committee for <i>Higher Gauge Theory, TQFT and Quantum Gravity</i> workshop at IST February 2011 • Organized a Seminar on Stacks, Groupoids and Algebras in 2009-2010 • Mentor to new Graduate Teaching Assistants in UC Riverside Math Department • President of the <i>Pure Math Club</i>: organized club activities, arranged faculty and invited talks, and organized a "conference" series of short student talks.
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SUMMARY OF TEACHING EDUCATION & EXPERIENCE

<p>Pedagogic Training</p> <p>Graduate/Upper Level Courses Given</p> <p>Independent Study & Course-by-Contract Courses Given</p> <p>Other Undergraduate Courses Given</p>	<ul style="list-style-type: none"> • Apprentice Teaching Course University of California, Riverside (UCR) 2002-2007 • Topics in Abstract Algebra SUNY Buffalo State, 2016 • Topics in Category Theory for Geometry Universität Hamburg, 2013 • Topology University of Western Ontario, 2007 • Complex Analysis Qualifying Exam Seminar UCR, 2005 • Category Theory Independent Study Course for Jared Renzi (Fall 2018) • Number Theory Independent Study Project for Radomir Pupovac (Spring 2019) • MAT 411 (Complex Variables) Course-by-Contract for Ann Buffington and Hayden Gooding (Fall 2019) • Precalculus • First Year Calculus Part C • Calculus II • Calculus III • Calculus III Labs • Multivariable Calculus • Complex Variables • Real Analysis • Introduction to Linear Algebra • Linear Algebra • Elementary Abstract Algebra • Introduction to Discrete Structures • Vectors, Matrices, and Geometry • Discrete Math • Techniques of Proof • Elementary Number Theory • Probability and Statistics 2 • Mathematical Modelling and Problem Solving • Study Skills for Mathematical Modelling and Problem Solving • Mathematics for Liberal Arts
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CONFERENCES & VISITS

Research Visits

- Roger Picken and John Huerta; **Instituto Superior Técnico**. Lisbon, Portugal, July 2017
- **Invited residence at Erwin Schrödinger Institute**. Vienna, Austria, February 2014
- Dany Majard; **Masaryk University**. Brno, Czech Republic (invited to University of Hamburg), November 2013
- Roger Picken; **Instituto Superior Técnico**. Lisbon, Portugal, November 2012, September 2013
- John Huerta; **Instituto Superior Técnico**. Portugal (invited to University of Hamburg), June 2013
- Jiri Rosicky, Dany Majard; **Masaryk University**. Brno, Czech Republic, December 2012
- Chenchang Zhu; **Göttingen University**. Göttingen, Germany, 2011 and February 2012
- Tim Porter et. al.; **Cardiff University**. Wales, May 2011
- Jamie Vicary; **Oxford University**. Oxford, England, May 2011
- Roger Picken; *TQFT Club Seminar*, **Instituto Superior Técnico**. Lisbon, Portugal, July 2010
- Derek Wise; **University of California, Davis**. April 2010
- Dorette Pronk; *Atlantic Category Theory Seminar*, **Dalhousie University**. Halifax, Canada, August/September 2009
- Derek Wise, for *String Theory and Quantum Gravity Seminar*, **University of California, Davis**. March 2008
- **Short-Term Visitor at Perimeter Institute**. Waterloo, Canada, June-July 2006

Presented at...

- *Symposium on Compositional Structures* (Chapman University) - May 2019 (invited talk)
- *Groupoidfest* (University of Illinois at Chicago) - November 2018 (submitted talk)
- *Higher Structures in Lisbon 2017*. Lisbon, Portugal, July 2017
- *Union College Mathematics Conference*. Schenectady NY, December 2016
- *Atlantic Canada Category Theory Seminar*. Dalhousie University, Halifax, Canada, October 2014-February 2015
- *Groupoidfest 2014*. University of Colorado Boulder, November 2014
- *Modern Methods in Topological Quantum Field Theory*. Vienna, Austria, February 2014
- *Workshop on Higher Gauge Theory and Higher Quantization*. Edinburgh, Scotland, June 2014
- *XXII International Fall Workshop on Geometry and Physics*. Evora, Portugal, September 2013
- **Invited minicourse Higher Structures in China 3**. Jilin University, Changchun, China, August 2012
- *Workshop on Representation Theoretical and Categorical Structures in Quantum Geometry and Conformal Field Theory*. Erlangen, Germany, October 2011
- *Quantum Theory and Gravitation*. Zurich, Switzerland, 2011
- *Higher Structures 2011*. Georg-August-Universität Göttingen, Germany, November 2011
- *Higher Gauge Theory, TQFT, and Categorification*. Cardiff University, Wales, May 2011
- *Higher Structures in Geometry and Topology V*. Hamburg, Germany, May 2011
- *Higher Gauge Theory, TQFT, and Quantum Gravity*. Instituto Superior Técnico, Lisbon, Portugal, February 2011
- *Oporto Meeting on Geometry, Topology and Physics*. Faro, Portugal, July 2010
- *Biannual Philosophy of Science Association Meeting*. Montreal, Canada, November 2010
- *Connections in Geometry and Physics*. Perimeter Institute, Waterloo, Canada, May 2009
- *Groupoidfest 08*. University of California, Riverside, November 2008
- *Quantum Gravity and Quantum Geometry 2008*. University of Nottingham, England, July 2008
- *Ottawa Mathematics Conference*. University of Ottawa, Canada, May 2008
- *Groupoidfest 07*. University of Iowa, November 2007
- *23rd Pacific Coast Gravity Meeting*. California Institute of Technology, March 2007
- *International Category Theory Conference*. White Point, Canada, June 2006
- *Union College Mathematics Conference*. Schenectady, NY, December 2005
- Poster at *LOOPS '05*. Max Planck Institute, Potsdam, Germany, October 2005

Other Conferences Attended

- *Category Theory 2015*. Aveiro, Portugal, June 2015
- *Categorical Methods at the Crossroads*. Schloss Dagstuhl – Leibniz Center for Informatics, Germany, April 27-May 2 2014
- *Modern Methods in Topological Quantum Field Theory*. Erwin Schrödinger Institute, Vienna, Austria, February 2014
- *New Directions in Topological Quantum Field Theory*. Universität Hamburg, Germany, August 2012
- *Categories, Quanta, Concepts*. Perimeter Institute, June 2009
- *Barrett Lectures*. University of Tennessee, Knoxville, May 2006
- *CBMS Conference on the Geometrical Study of Differential Equations*. Howard University, Washington DC, June 2000

PERSONAL SKILLS

Mother tongue

- English

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
French	B2	C1	C1	C1	B2
German	A2	B1	A2	A2	A2
Portuguese & Spanish	A1	A2	A1	A1	A2

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication

- Quick to pick up new languages: while in California, I acquired a basic understanding of Spanish; in Lisbon, I acquired working knowledge of Portuguese
- Relaxed and comfortable public speaker in English and French
- Enjoy collaborative work with colleagues

Organisation

- Good with handling multiple projects simultaneously and meeting deadlines
- Organizational skills developed through coordinating various seminars and conferences

Teaching

- Work well with students at undergraduate and higher level studies
- Experienced with classes of a wide range of sizes
- Comfortable working with a diverse student body, varied backgrounds and goals

Technical/Computer

- Experienced with web-based learning management platforms (Blackboard, Moodle) and using technology in the classroom (flipping, etc)
- Industry programming experience with C, assembler, Perl, SQL; quick learner of programming languages. Familiar with symbolic computation (Maple, Mathematica, octave)
- General : Unix, LaTeX typesetting, LibreOffice, etc.

Other

- Student space-science exchange in Russia, 1992. Learned—and still retain—rudimentary knowledge of Russian. Awarded one of the very last honorary diplomas from the Cosmonautics Federation of the USSR.

ANNEXES

Available upon request

- Copies of Degrees and Transcripts
- Diversity Statement
- Publications
- References
- Research Statement
- Research Visits, Conference/Seminar talks, Conferences Attended
- Teaching Dossier: includes Teaching Philosophy and History, each also available separately