

## Curriculum Vitae Jeffrey Colin Morton

**Professional Address:**

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**Citizenship:** Canadian

**Languages:** English (Fluent); French (Conversational); Portuguese, German (Basic)

**Research Interests:** Topological Quantum Field Theory, Category Theory, Groupoids, Representation Theory, Low-Dimensional Topology, Combinatorics

**Current Position**

- Teaching Postdoc, Mount Allison University, (Aug.2014-Present)

**Previous Positions**

University of Hamburg (Germany)	• Postdoctoral Researcher, Research Training Group 1670 (Sep.2012-Aug2014)
Instituto Superior Técnico (Lisbon)	• Postdoctoral Researcher, (Sep.2010-Aug.2012)
University of Western Ontario	• Postdoctoral Fellow, (Jul.2007-Jun.2010)
University of California, Riverside	• Graduate Teaching Assistant (Sep.2002-Jun.2007) • Teaching Associate in Mathematics (2004-2006)
McGill University	• Lecturer (Fall 2001)
Dawson College (Montreal)	• Lecturer (Summer 2001-2002)

**Education**

University of California, Riverside	• Ph.D in Mathematics, (June 2007) • <i>Thesis Advisor:</i> John Baez • <i>Thesis Title:</i> Extended TQFTs and Quantum Gravity
McGill University	• M.Sc. in Mathematics, (Feb 2001) • <i>Thesis Advisor:</i> Niky Kamran • <i>Thesis Title:</i> Existence and Nonexistence Theorems for Solutions to the Einstein-Dirac-Maxwell Equations
University of Waterloo	• B.Math, (June 1998) • Double Major in Honours Pure Math, Honours Combinatorics & Optimization

**Publications**

Publications in Peer-Reviewed Journals	<ul style="list-style-type: none"> <li>• "Categorified Algebra and Quantum Mechanics"; (Theory and Applications of Categories, vol 16, pp 785-854, 2006)</li> <li>• "Double Bicategories and Double Cospans"; (Journal of Homotopy and Related Structures, vol 4, no. 1, pp. 389-428)</li> <li>• "2-Vector Spaces and Groupoids"; (Applied Categorical Structures, vol 19, no 4, pp 659-707)</li> <li>• "Cohomological Twisting of 2-Linearization and Extended TQFT"; (accepted by Journal of Homotopy and Related Structures; available as arxiv:1003.5603)</li> </ul>
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**Research**

Submitted To Peer-Reviewed Journals	<ul style="list-style-type: none"> <li>• “The Categorified Heisenberg Algebra I: A Combinatorial Representation”, with Jamie Vicary (available as arXiv:1207.2054) Submitted to <i>Journal of Pure and Applied Algebra</i>, (changes requested)</li> <li>• “Transformation Double Categories Associated to 2-Group Actions”, with Roger Picken (available as arxiv:1401.0149) Submitted to <i>Theory and Applications of Categories</i></li> </ul>
In Production	<ul style="list-style-type: none"> <li>• “The Categorified Heisenberg Algebra II: Free Symmetric Structures in a Bicategory”, with Jamie Vicary</li> <li>• “2-Group Actions on Moduli Spaces of Higher Gauge Theory”, with Roger Picken</li> <li>• “2-Hilbert Spaces for Measured Groupoids”, with Derek Wise</li> </ul>

**Classes Taught As Primary Instructor**

Mount Allison University	<ul style="list-style-type: none"> <li>• Linear Algebra (Fall, 2014)</li> <li>• Multivariable Calculus (Fall, 2014)</li> <li>• Probability and Statistics (Winter, 2015 - expected)</li> </ul>
University of Hamburg	<ul style="list-style-type: none"> <li>• Topics in Category Theory for Geometry (Spring 2013)</li> </ul>
University of Western Ontario	<ul style="list-style-type: none"> <li>• Introduction to Linear Algebra (Fall 2008, Fall 2009)</li> <li>• Complex Variables (Winter 2008, Winter 2009)</li> <li>• Topology (Fall 2007)</li> </ul>
UC Riverside	<ul style="list-style-type: none"> <li>• Introduction to Discrete Structures (Summer 2005/2006)</li> <li>• Complex Analysis Qualifying Exam Seminar (Spring 2005)</li> <li>• First Year Calculus Part C (Summer 2004)</li> </ul>
Dawson College	<ul style="list-style-type: none"> <li>• Precalculus (Summer 2002)</li> <li>• Calculus II (Summer 2001)</li> </ul>
McGill University	<ul style="list-style-type: none"> <li>• Vectors, Matrices and Geometry (Fall 2001)</li> </ul>

**Classes Taught as Teaching Assistant**

UC Riverside	<ul style="list-style-type: none"> <li>• Precalculus (regular and for Life Sciences)</li> <li>• First Year Calculus parts A,B, C (regular and for Business)</li> <li>• Multidimensional Calculus parts A, B</li> <li>• Linear Algebra (Advanced, and for Business)</li> <li>• Introduction to Differential Equations</li> <li>• Set Theory</li> </ul>
McGill University	<ul style="list-style-type: none"> <li>• 1st year calculus</li> </ul>

**Research Visits**

- Invited residence at Erwin Schrodinger Institute, Vienna, Austria, Feb 2014
- Dany Majard, Masaryk University, Brno, Czech Republic (invited to University of Hamburg), Nov 2013
- John Huerta, Instituto Superior Tecnico, Portugal (invited to University of Hamburg), June 2013
- Roger Picken, Instituto Superior Tecnico, Portugal, Nov 2012 and Sept 2013
- Jiri Rosicky, Dany Majard; Masaryk University, Brno, Czech Republic, Dec 2012
- Chenchang Zhu, Gottingen University, Gottingen, Germany, 2011 and Feb 2012
- Tim Porter et. al., Cardiff University, May 2011
- Jamie Vicary, Oxford University, May 2011
- Roger Picken, TQFT Club Seminar, Instituto Superior Tecnico, Portugal, July 2010
- Derek Wise, University of California, Davis, April 2010
- Dorette Pronk, Atlantic Category Theory Seminar, Dalhousie University, Halifax, Nova Scotia, Canada, Aug/Sept 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

## Conference/Seminar Talks

- “Baez-Dolan Groupoidification and Measure Groupoids”, presented at Groupoidfest 2014, University of Colorado Boulder, Nov 2014
- “Representations of the Categorified Heisenberg Algebra by Groupoidification Part 1&2”, given at Atlantic Category Theory Seminar, Dalhousie University, Oct 2014
- “2-Group Action on Moduli Spaces of Higher Gauge Theory”, presented at Workshop on Higher Gauge Theory and Higher Quantization, Edinburgh, Scotland, June 2014
- “Towards Extended TQFT from Higher Gauge Theory”, presented at Modern Methods in Topological Quantum Field Theory, Erwin Schrodinger Institute, Vienna, Austria, Feb 2014
- “2-Group Action on Moduli Spaces of Higher Gauge Theory”, presented at XXII International Fall Workshop on Geometry and Physics, Evora, Portugal, Sept 2013
- “Higher Gauge Theory and 2-Group Actions”, invited Seminar talk, Masaryk University, Dec 2012
- “Categorification and Groupoidification of the Heisenberg Algebra”, invited minicourse given at Higher Structures in China 3, Changchun, China, Aug 2012
- “Span Categories and 2-Linearization”, invited Seminar series, Gottingen University, Feb 2012
- “Extended TQFT from (Higher) Gauge Theories”, presented at Higher Gauge Theory, TQFT, and Quantum Gravity, Feb 2011; Higher Gauge Theory, TQFT, and Categorification, Cardiff University, May 2011; Higher Structures in Geometry and Topology V, May 2011
- “2-Linearization in Topology and Physics”, presented at Oporto Meeting on Geometry, Topology and Physics in Faro, Portugal, July 2010
- “Groupoidification in Physics”, invited talk in special session on Category Theory at biannual Philosophy of Science Association meeting, Montreal, Nov 2010
- “2-Vector Spaces and Groupoids”, presented at Groupoidfest 07, University of Iowa, November 2007; Ottawa Mathematics Conference, University of Ottawa, Canada, May 2008; Octoberfest 2008, Concordia University, Montreal, Canada, October 2008
- “Extended Topological Quantum Field Theories and 3D Quantum Gravity”, presented at 23rd Pacific Coast Gravity Meeting, Pasadena, California, March 2007; Quantum Gravity and Quantum Geometry 2008, Nottingham, England, July 2008
- “Higher Algebra, Extended TQFT's and Quantum Gravity” talk presented at at Perimeter Institute, Waterloo, Ontario, Canada, July 2006
- “Categorifying the Quantum Harmonic Oscillator”, talk presented at: International Category Theory Conference, White Point, Nova Scotia, Canada, June 2006; Union College Mathematics Conference, Schenectady, NY, December 2005; UC Riverside (Qualifying Exam Talk)
- “2D and 3D TQFT's and Higher Dimensional Algebra” (poster): presented at LOOPS '05 at Albert Einstein Institut fur Gravitationphysik, Potsdam, Germany, October 2005

## Service & Communication

- Assisting graduate students with research projects in Research Training Group 1670, University of Hamburg, (Fall 2012-Fall 2014)
- Co-organizer of half-semester seminar series on Infinity-n Categories, for Research Seminar of Christoph Schweigert, Ingo Runkel, Christoph Wockel, Hamburg, Fall 2012
- Co-organizer of conference “Higher Gauge Theory, TQFT, and Quantum Gravity”, Instituto Superior Tecnico, Portugal, Feb 2011
- Organizer of Seminar on Stacks and Groupoids, University of Western Ontario, 2009
- Maintain “Theoretical Atlas” mathematics research blog (Fall 2007-present)
- Mentor to new Graduate Teaching Assistants in UC Riverside Math Department, 2004 - 2007.

## Conferences Attended

- Workshop on Higher Gauge Theory and Higher Quantization , Edinburgh, Scotland, June 2014
- Categorical Methods at the Crossroads, April 27-May 2 2014, Dagstuhl, Germany
- Modern Methods in Topological Quantum Field Theory, Erwin Schrodinger Institute, Vienna, Austria, Feb 2014
- XXII International Fall Workshop on Geometry and Physics, Evora, Portugal, Sept 2013
- New Directions in Topological Quantum Field Theory, Universitat Hamburg, Aug 2012
- Higher Structures in China III, Jilin University, Changchun, China, Aug 2012
- Higher Structures in Topology and Geometry V, Universitat Hamburg, May 2011
- Workshop on Higher Gauge Theory, TQFT and Categorification, Cardiff University, May 2011
- Higher Gauge Theory, TQFT, and Quantum Gravity, IST, Lisbon, Feb 2011
- Philosophy of Science Association biannual Meeting, Nov 2010
- Oporto Meeting on Geometry, Topology and Physics, Faro, Portugal, July 2010
- Categories, Quanta, Concepts, Perimeter Institute, June 2009
- Groupoidfest 08, University of California, Riverside, Nov 2008
- Quantum Gravity and Quantum Geometry 2008, University of Nottingham, July 2008
- Ottawa Mathematics Conference, University of Ottawa, 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, Nova Scotia, Canada, June 2006
- Barrett Lectures, University of Tennessee, Knoxville, May 2006
- Union College Mathematics Conference, Schenectady, NY, December 2005
- LOOPS '05, Max Planck Institute, Potsdam, Germany, October 2005
- CBMS Conference on the Geometrical Study of Differential Equations, Howard University, Washington DC, June 2000

## References

- Dr. John C. Baez, University of California, Riverside  
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- Dr. Roger Picken, Instituto Superior Tecnico, Lisbon  
email: [rpicken@math.ist.utl.pt](mailto:rpicken@math.ist.utl.pt)
- Dr. Christoph Schweigert, University of Hamburg  
email: [christoph.schweigert@uni-hamburg.de](mailto:christoph.schweigert@uni-hamburg.de)
- Dr. Dorette Pronk, Dalhousie University  
email: [pronk@mathstat.dal.ca](mailto:pronk@mathstat.dal.ca)
- Dr. Andrew Irwin, Mount Allison University (regarding teaching)  
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