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British citizen, Hong Kong permanent resident

Research Interests:

Symmetric functions and other combinatorial Hopf algebras, and their interaction with Markov chains.

Employment

2014-present CRM-ISM postdoctoral fellow, Laboratoire de Combinatoire et d'Informatique Mathématique (LaCIM), Université du Québec à Montréal (UQAM), Canada

Education

2014 PhD in Mathematics, Stanford University, USA (*Advisor: Persi Diaconis; dissertation title: Hopf Algebras and Markov Chains*)

2009 Certificate of Advanced Study in Mathematics ('Part III') with distinction, Trinity Hall, University of Cambridge, UK

2008 BA in Mathematics, Trinity Hall, University of Cambridge, UK

Publications

- 4 *Card-Shuffling via Convolutions of Projections on Combinatorial Hopf Algebras*, 27th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2015), 49-60, Discrete Math. Theor. Comput. Sci. Proc., Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2015
- 3 (with P. Diaconis, A. Ram) *Hopf Algebras and Markov Chains: Two Examples and a Theory*, J. Algebraic Combin., 39(3):527–585, 2014.
- 2 *A Hopf-power Markov chain on Compositions*, 25th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2013), 499-510, Discrete Math. Theor. Comput. Sci. Proc., AS, Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2013
- 1 (with 27 others) *Supercharacters, Symmetric Functions in Noncommuting variables, and related Hopf Algebras*, Adv. Math. 229 (2012), no. 4, 2310–2337

Preprints

A Hopf-Algebraic Lift of the Down-up Markov Chain on Partitions to Permutations
arxiv.org/abs/1508.01570

Hopf Algebras and Markov Chains (thesis) arxiv.org/abs/1412.8221

Invited Talks

- January 2016 *A Uniform Analysis of Combinatorial Markov Chains using Hopf Algebras*,
Colloquium, Hong Kong Baptist University
- January 2016 Numerical Methods and Applied Analysis Seminar, University of Hong Kong
- October 2015 *A Hopf-Algebraic Lift of the Down-Up Markov Chain on Partitions to Permutations*, Special Session on Hopf Algebraic Combinatorics, AMS Sectional Meeting, Chicago, USA.
- January 2015 *Card Shuffling and Convolutions of Projections on graded Hopf Algebras*,
Applied Algebra Seminar, York University
- September 2014 Combinatorics Seminar, LaCIM
- December 2014 *Card Shuffling, Tree-Pruning and Convolutions of Projections on graded Hopf Algebras*, CRM-ISM Probability Seminar
- June 2014 *Card Shuffling and other Hopf-Power Markov Chains*,
Combinatorics Seminar, LaCIM
- January 2014 Combinatorics Seminar, University of Michigan
- August 2013 Algebra/Geometry/Topology Seminar, University of Melbourne
- March 2013 Algebra and Combinatorics Seminar, Loyola University Chicago
- February 2014 *Markov Chains from Combinatorial Hopf Algebras*, Cornell University Probability Seminar

Other Research Presentations

- July 2015 *Card-Shuffling via Convolutions of Projections on Combinatorial Hopf Algebras*, 27th International Conference on Formal Power Series and Algebraic Combinatorics, Daejeon, South Korea.
- March 2015 *Card Shuffling and Markov Chains on Combinatorial Hopf Algebras*, Probability Seminar, University of Ottawa
- January 2015 *Card Shuffling and Convolutions of Projections on graded Hopf Algebras*, Combinatorial Algebra meets Algebraic Combinatorics, Kingston, Canada.
- July 2013 *A Hopf-power Markov chain on Compositions (poster)*, 25th International Conference on Formal Power Series and Algebraic Combinatorics, Paris, France.
- April 2012 *Ribbon Characters, Garsia-Reutenauer idempotents and a Biased Amazing Matrix??*, Student Probability and Related Fields Seminar, Stanford University
- May 2011 *Kolmogorov's Rock-Breaking and Related Walks on Species*, Student Probability and Related Fields Seminar, Stanford University

Expository Presentations

- March 2014 *What is a Combinatorial Hopf Algebra?* Graduate Student Colloquium, Stanford University
- May 2011 *Card Games and Crystals*, Graduate Student Colloquium, Stanford University
- April 2010 *The Art Gallery Problem*, Stanford University Mathematics Organisation Speaker Series
- October 2009, *Hopf Algebras and Representation Theory*
March 2009 Graduate Student Colloquium, Stanford University
Part III seminar, University of Cambridge

Teaching Experience

Course Lecturer at McGill University: giving lectures (350 students), holding office hours, writing exams, coordinating 5 teaching assistants:

Autumn 2015 Math 141, Integral Calculus

Guest Lecturer at Université du Québec à Montréal: giving 3 lectures (12 students):

Autumn 2015 Mat 995B, Research Seminar on Combinatorics: Descent Algebras

Teaching Assistant at Stanford University: leading recitations (13-37 students), holding office hours, grading exams:

Autumn 2013 Math 41A, Accelerated Differential Calculus

Spring 2013, Math 51, Linear Algebra and Multivariable Calculus

Winter 2012

Course Assistant at Stanford University: holding office hours, grading exams:

Autumn 2012 Math 19, Differential Calculus

Spring 2012 Math 110, Applied Number Theory and Field Theory

Winter 2011 Math 210B, Graduate Algebra

Spring 2010 Math 113, Linear Algebra and Matrix Theory

Autumn 2009 Math 120, Introduction to Abstract Algebra

Administrative Teaching Assistant at Stanford University: managing course registration, coordinating exam arrangements, liaising with homework graders, grading exams:

Spring 2014 Math 51, Linear Algebra and Multivariable Calculus (200 students)

Teaching Assistant at Stanford University Mathematics Camp: holding one-on-one feedback sessions

2010, 2009 Program I, Abstract Algebra and Number Theory

Teaching Assistant at Enrichment Program for Young Mathematical Talents, Chinese University of Hong Kong: holding recitation sessions with other TAs

2007 Non-Euclidean Geometry

Conference and Workshop Participation

December 2015	Canadian Mathematical Society Winter Meeting, Montreal, Canada
August 2015	BIRS workshop on Positivity in Algebraic Combinatorics, Banff, Canada
June 2015	SageDays65, Chicago, USA
April 2015	SageDays67, Montreal, Canada
January 2013	Algebraic Groups and Representation Theory - a Conference in Memory of Tonny A. Springer, Hong Kong
July 2012	24th International Conference on Formal Power Series and Algebraic Combinatorics, Nagoya, Japan
2011, 2012, 2013	Bay Area Discrete Mathematics Days

Awards

2009	Parks Prize (for Part III mathematics), Trinity Hall, University of Cambridge
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Activities

2011 - 2013	Stanford Women in Math, co-organiser
2010 - 2011	Stanford Graduate Student Colloquium, co-organiser