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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

2016 - present	Assistant Professor, Hong Kong Baptist University, Hong Kong
2014 - 2016	CRM-ISM postdoctoral fellow, Laboratoire de Combinatoire et d'Informatique Mathématique (LaCIM), Université du Québec à Montréal (UQAM), Canada
2015	Course Lecturer (part time), McGill University, Montreal, 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

Research Grants

4   RGC-ECS: *Markov Chains driven by Permuted and Hyperoctahedral Descent Operators on Combinatorial Hopf Algebras*, 2018-2020.

Publications

(with M. Josuat-Vergès) *Subalgebras of Solomon's Descent Algebra based on Alternating Runs* J. Combin. Theory Ser. A, accepted.

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

Markov Chains from Descent Operators on Combinatorial Hopf Algebras
arxiv.org/abs/1609.04312

Lumpings of Algebraic Markov Chains arise from Subquotients
arxiv.org/abs/1508.01570

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

Invited Talks

	A Uniform Analysis of Combinatorial Markov Chains using Hopf Algebras,
October 2016	Department of Stat. Seminar, Chinese University of Hong Kong
January 2016	Department of Math. 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.

	Card Shuffling and Convolutions of Projections on graded Hopf Algebras,
January 2015	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

	Card Shuffling and other Hopf-Power Markov Chains,
June 2014	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,* Probability Seminar, Cornell University

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 March 2009	*Hopf Algebras and Representation Theory* Graduate Student Colloquium, Stanford University Part III seminar, University of Cambridge

Teaching

Course Lecturer at Hong Kong Baptist University:

2016 - present	Math 2207, Linear Algebra
2017 - present	Math 2205, Multivariate Calculus

Course Lecturer at McGill University:

Fall 2015	Math 141, Integral Calculus

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

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

Teaching Assistant at Stanford University (leading recitations):

Autumn 2013	Math 41A, Accelerated Differential Calculus
2010 - 2013	Math 51, Linear Algebra and Multivariable Calculus

Course Assistant at Stanford University (office hours, grading):

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:

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

Teaching Assistant at Stanford University Mathematics Camp:

2009 - 2010   Program I, Abstract Algebra and Number Theory

Teaching Assistant at Enrichment Program for Young Mathematical Talents, Chinese University of Hong Kong:

2007   Non-Euclidean Geometry

Student Supervision

2016 - present   Undergraduate final year projects, Hong Kong Baptist University

Conference and Workshop Participation

August 2017	3rd International Congress in Algebras and Combinatorics, Hong Kong
December 2016	Joint UM-HKBU Workshop on Mathematics and Statistics, Macau
June 2016	4th Institute of Mathematical Statistics Asia Pacific Rim Meeting, Hong Kong
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
2011 - 2014	Bay Area Discrete Mathematics Days, USA
February 2014	Lie Groups, Lie Algebras and Their Representations, Stanford, USA
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

Service, Academic

2018 (expected)	Progam committee member, 28th International Conference on Formal Power Series and Algebraic Combinatorics
2014 - 2017	Journal referee, J. Alg. Combi.; J. Combin. Theory Ser. A

Service, Departmental

2017	Interviewer, year 3 direct entry (to HKBU math department)
2011 - 2013	Co-organiser, Stanford Women in Math
2010 - 2011	Co-organiser, Stanford Graduate Student Colloquium