

**Chung Yin Amy Pang 彭頌賢**

LaCIM, UQAM, CP 8888, Succ. Centre-ville, Montréal, Québec, H3C 3P8, Canada

[amypang@lacim.ca](mailto:amypang@lacim.ca)

[www.thales.math.uqam.ca/~amypang/](http://www.thales.math.uqam.ca/~amypang/), <http://amypang.github.io/>

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](http://arxiv.org/abs/1508.01570)

*Hopf Algebras and Markov Chains* [arxiv.org/abs/1412.8221](http://arxiv.org/abs/1412.8221)

### ***Invited Talks***

- October 2015  
(expected)      *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*,  
September 2014      York University Applied Algebra Seminar  
LaCIM Combinatorics Seminar
- 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*,  
LaCIM Combinatorics Seminar
- January 2014      University of Michigan Combinatorics Seminar
- August 2013      University of Melbourne Algebra/Geometry/Topology Seminar
- March 2013      Loyola University Chicago Algebra and Combinatorics Seminar
- 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*, University of Ottawa Probability Seminar
- 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??*, Stanford Student Probability and Related Fields Seminar
- May 2011      *Kolmogorov's Rock-Breaking and Related Walks on Species*, Stanford Student Probability and Related Fields Seminar

### ***Expository Presentations***

- March 2014      *What is a Combinatorial Hopf Algebra?* Stanford Graduate Student Colloquium
- May 2011      *Card Games and Crystals*, Stanford Graduate Student Colloquium

April 2010      *The Art Gallery Problem*, Stanford University Mathematics  
                         Organisation Speaker Series

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

### ***Teaching Experience***

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

Autumn 2015      Math 141, Integral Calculus

Teaching Assistant at Stanford University: leading recitation sessions (30 students),  
holding office hours, grading exams:

Autumn 2013      Math 41A, Accelerated Differential Calculus

Spring 2013,      Math 51, Linear Algebra and Multivariable Calculus

Winter 2012,

Autumn 2010

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***

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