

**Chung Yin Amy Pang 彭頌賢**

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<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**

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|----------------|---|
| 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**

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|------|--|
| 2014 | PhD in Mathematics, Stanford University, USA ( <i>Advisor: Persi Diaconis; dissertation title: Hopf Algebras and Markov Chains</i> ) |
| 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***

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

## ***Other Research Presentations***

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|--------------|---|
| July 2015    | <i>Card-Shuffling via Convolutions of Projections on Combinatorial Hopf Algebras,</i> 27th International Conference on Formal Power Series and Algebraic Combinatorics, Daejeon, South Korea. |
| March 2015   | <i>Card Shuffling and Markov Chains on Combinatorial Hopf Algebras,</i> Probability Seminar, University of Ottawa   |
| January 2015 | <i>Card Shuffling and Convolutions of Projections on graded Hopf Algebras,</i> Combinatorial Algebra meets Algebraic Combinatorics, Kingston, Canada.   |
| July 2013    | <i>A Hopf-power Markov chain on Compositions (poster),</i> 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***

*Course Lecturer at Hong Kong Baptist University:*

1<sup>st</sup> Sem. 2016      Math 2207, Linear Algebra

*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:*

2010, 2009      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***

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

### ***Awards***

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

### ***Service***

2014 - 2016        Journal referee: J. Alg. Combi.; J. Combin. Theory Ser. A

2011 - 2013        Co-organiser, Stanford Women in Math

2010 - 2011        Co-organiser, Stanford Graduate Student Colloquium