

# Martha Yip

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## Research Interests

Algebraic combinatorics, symmetric functions, combinatorial representation theory.

## Education

- **University of Wisconsin-Madison** 2006 - 2010  
*Ph.D. in Mathematics*
  - Advisor: Arun Ram
  - Thesis: Combinatorics of Macdonald polynomials
- **University of Waterloo** 2004 - 2006  
*Master of Mathematics*
  - Advisor: David M. Jackson
  - Thesis: Genus one partitions
- Bachelor of Mathematics* 1999 - 2004
  - Double honours in Applied Mathematics and Pure Mathematics

## Employment

- **University of Kentucky** Aug 2014 - present  
*Assistant Professor*
- **University of Pennsylvania** Jul 2011 - Jul 2014  
*Hans Rademacher Instructor of Mathematics*
- **University of San Diego** Sep 2010 - Jun 2011  
*Lecturer*
- **University of Wisconsin-Madison** Sep 2009 - May 2010  
*Research Assistant*
  - Supervisor: Amos Ron
  - Project: Modulation splines
- **University of Waterloo** Jul 2004 - Aug 2004  
*Research Assistant*
  - Supervisor: David M. Jackson
  - Project: Algebraic enumeration
- **University of Waterloo** May 2003 - Aug 2003  
*Research Assistant*
  - Supervisor: David M. Jackson
  - Project: Algebraic enumeration
- **University of Waterloo** May 2002 - Aug 2002  
*Research Assistant*
  - Supervisor: L. Bruce Richmond
  - Project: Asymptotic enumeration and number theory

- **Symbolic Computation Group - University of Waterloo** Jan 2002 - Apr 2002  
*Programmer* May 2001 - Aug 2001
  - Supervisor: Keith O. Geddes
  - Project: Conversion of special functions to hypergeometric functions
- **Isopia Learning Management System** Sep 2000 - Dec 2000  
*Programmer*

## Publications and Preprints

1. M. Yip, *Rook placements and Jordan forms of upper-triangular nilpotent matrices*, arXiv:1703.00057.
2. R. Sazdanovic and M. Yip, *A categorification of the chromatic symmetric function*, arXiv:1506.03133.
3. R. Sazdanovic and M. Yip, *A categorification of the chromatic symmetric function*, DMTCS Proceedings FPSAC 2015 **27** (2015) 631–642.
4. M. Yip, *q-Rook placements and Jordan forms of upper-triangular matrices*, DMTCS Proceedings FPSAC 2013 **25** (2013) 1017–1028.
5. M. Yip, *A Littlewood-Richardson rule for Macdonald polynomials*, Math. Z. **272** (2012) 1259–1290.
6. M. Yip, *Combinatorics of Macdonald polynomials*, Doctoral thesis (2010) 99 pages.
7. A. Ram and M. Yip, *A combinatorial formula for Macdonald polynomials*, Adv. Math. **226** (2011) 309–331.
8. M. Yip, *Genus one partitions*, Masters thesis (2006) 99 pages.
9. D. M. Jackson and M. Yip, *A symmetric function resolution of the number of permutations with respect to block-stable elements*, Ann. Comb. **10** (2006) 463–480.
10. D. Panario, L. B. Richmond and M. Yip, *A simple primality test and the rth smallest prime factor*, SIAM Proceedings Series ANALCO 2004 **115** (2004) 185–193.

## Invited Conference and Seminar Presentations (2010–present)

- *Generalized Koskta polynomials.*
  - Workshop in Asymptotic Representation Theory, Institut Henri Poincaré, Feb 2017.
  - AMS Special Session on Symmetric Functions and Its Applications, Athens GA, Mar 2016.
  - Combinatorics Seminar, University of Kansas, Dec 2015.
  - Discrete Mathematics Seminar, University of Kentucky, Sep 2015.
- *A categorification of the chromatic symmetric function.*
  - Congreso Latinoamericano de Matemáticos, Barranquilla Colombia, Jul 2016.
  - FPSAC poster presentation, Daejeon South Korea, Jul 2015.
  - Midwest Combinatorics Conference, Minneapolis Minnesota, May 2015.

- CAGE Seminar, University of Pennsylvania, Mar 2015.
- Discrete Mathematics Seminar, University of Kentucky, Oct 2014.
- *Colouring: an algebraic approach.*
  - Mathematics Colloquium, Marshall University, Nov 2015.
- *Macdonald polynomials with shifted parameters.*
  - JMM AMS-AWM Special Session on Geometric Applications of Algebraic Combinatorics, Baltimore MD, Jan 2014.
- *q-Rook placements and Jordan forms for upper-triangular matrices.*
  - FPSAC poster presentation, Paris France, Jun 2013.
  - Lie Theory Seminar, University of Colorado-Boulder, Apr 2013.
  - AWM Research Symposium, Santa Clara University, Mar 2013.
  - Workshop on Whittaker functions, Schubert calculus and crystals, ICERM, Mar 2013.
  - AMS Special Session on Rook Theory and its Applications, New Orleans LA, Oct 2012.
  - Mathematics Colloquium, Villanova University, Mar 2012.
  - CAGE Seminar, University of Pennsylvania, Jan 2012.
- *Alcove walks and Macdonald polynomials.*
  - IAS Women and Mathematics Program, Institute of Advanced Studies, May 2013.
- $n^{n-2}$ .
  - Undergraduate Mathematics Society Seminar, University of Pennsylvania, Dec 2012.
- *A Littlewood-Richardson rule for Macdonald polynomials,*
  - Representation Theory Seminar, CUNY, Dec 2011.
  - AMS Special Session on Hecke Algebras and Deformations, Macalester College, Apr 2010.
  - Workshop on Combinatorial Representation Theory, Oberwolfach Germany, Mar 2010.
  - Algebra, Geometry and Combinatorics Seminar, University of Illinois, Urbana-Champaign, Feb 2010.
- *Macdonald polynomials, parking functions, trees, and zonotopal algebras.*
  - Combinatorics Seminar, UC San Diego, Oct 2010.

## Teaching Experience

- **University of Kentucky**
  - Fall 2016: MA 213 (Calculus III), MA 714 (Generalized Kostka Polynomials)
  - Spring 2016: MA 332 (Matrix Algebra), MA 361 (Modern Algebra I)
  - Fall 2015: MA 514 (Combinatorial Structures and Techniques)
  - Spring 2015: MA 114 (Calculus II), MA 340 (Applicable Algebra)
  - Fall 2014: MA 415G (Combinatorics and Graph Theory)
- **University of Pennsylvania**

- Winter 2014: Math 114 (Multivariable Calculus)
- Fall 2013: Math 114 (Multivariable Calculus), Math 580 (Topics in Combinatorics I)
- Winter 2013: Math 581 (Topics in Combinatorics II)
- Fall 2012: Math 104 (Calculus II), Math 580 (Topics in Combinatorics I)
- Winter 2012: Math 114 (Multivariable Calculus), Math 999 (Reading Course in Rep. Theory)
- Fall 2011: Math 312 (Linear Algebra), Math 340 (Discrete Mathematics)

- **University of California San Diego**

- Spring 2011: Math 20E (Vector Calculus), Math 184A (Combinatorics)
- Winter 2011: Math 10A (Calculus), Math 20C (Calculus for Science and Engineering)
- Fall 2010: Math 10C (Calculus), Math 20A (Calculus for Science and Engineering)

## Professional Activities

Advisor for UK undergraduate mathematics majors . . . . .	2017–present
Member of the AMS Library Committee . . . . .	2015–present
Member of the Discrete Mathematics preliminary examination committee	2014–present
Organizer, Discrete Mathematics Seminar . . . . .	2015–2016
Graduate program committee member, University of Kentucky . . . . .	2015–2016
Workshop leader, UK High School Mathematics Day . . . . .	2016
Co-organizer for UK High School Mathematics Day . . . . .	2015
Speaker and Panelist, Institute of Advanced Studies, Princeton . . . . .	May 2013
Fellow, University of Melbourne . . . . .	Mar – Aug 2009
Program Associate, Mathematical Sciences Research Institute . . . . .	Jan – May 2008
Mentor, UW-Madison Mentorship Program for Women in Math and Science	2006–2007
Organizer, Combinatorics Workshop, University of Waterloo . . . . .	2006
Reviewer for JCTA, JACO . . . . .	

## Awards and Scholarships

Collaboration Grant, Simons Foundation . . . . .	2016–2021
Good Teaching Award, University of Pennsylvania . . . . .	2013
Good Teaching Award, University of Pennsylvania . . . . .	2011
Elizabeth S. Hirschfelder Scholarship, University of Wisconsin-Madison . . . . .	2010
National Sciences and Engineering Research Council of Canada Postgraduate Scholarship D	2008–2010
Supplementary Research Grant, University of Wisconsin-Madison . . . . .	2008
National Sciences and Engineering Research Council of Canada Postgraduate Scholarship M	2004–2006
President’s Graduate Scholarship, University of Waterloo . . . . .	2004–2006
Provost Scholarship, University of Waterloo . . . . .	2005
Doreen Brisbin Award, University of Waterloo . . . . .	2003
NSERC Undergraduate Student Research Award . . . . .	2002–2003
R. A. Wentzell Memorial Award, University of Waterloo . . . . .	2001
René Descartes Scholarship, University of Waterloo . . . . .	1999