Angela Hicks

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Education

- **University of California, San Diego** — La Jolla, CA
  Ph.D. in Mathematics (June, 2013) — *2007-2013*
  M.A. in Mathematics (June, 2009)
- **Furman University** — Greenville, SC
  B.S. in Mathematics and Latin — *2003 - 2007*

Current Research

My primary research interest lies in the areas of algebraic combinatorics and symmetric function theory, and in particular symmetric and quasisymmetric functions, Macdonald polynomials, k-schur functions, and rational Catalan combinatorics. My doctoral thesis, completed under Adriano Garsia, concentrated on parking functions and their conjectured relation to the diagonal harmonics.

Outside of algebraic combinatorics, as a National Science Foundation postdoc studying under Persi Diaconis, I'm part of a research group currently studying a classical random walk on the Heisenberg group using Fourier Analysis.

Publications

- (with D. Bump, P. Diaconis, A. Hicks, L. Miclo, and H. Widom) An Exercise (?) in Fourier Analysis on the Heisenberg Group. *(submitted).*
- (with D. Bump, P. Diaconis, A. Hicks, L. Miclo, and H. Widom) Useful bounds on the extreme eigenvalues and vectors of matrices for Harper's operators.*accepted to Operator Theory: Advances and Applications*
- (with E. Leven) A simpler formula for the number of diagonal inversions of an m, n-parking function and a returning fermionic formula. *Discrete Mathematics*, 338(3):48 – 65, 2015.
- (with Aval, D'Adderio, Dukes, and LeBorgne) Statistics on parallelogram polyominoes and a q, t-analogue of the Narayana numbers. *J. Combin. Theory Ser. A* Vol 123 (2014).
- (with E. Leven) A refinement of the Shuffle Conjecture with cars of two sizes and $t = 1/q$, *Journal of Combinatorics* Vol 5 No 1 (2014).
- A parking function bijection supporting the Haglund-Morse-Zabrocki conjectures, *Int. Math. Res. Notices*, Volume 2014, No 7.
- *Parking Function Polynomials and Their Relation to the Shuffle Conjecture.* Ph. D. Thesis, University of California, San Diego. 2013.

- (with Y. Kim) An explicit formula for ndinv, a new statistic for two-shuffle parking functions, *Journal of Combinatorial Theory, Series A*, Volume 120, Issue 1, January 2013.
- Two Parking Function Bijections: A sharpening of the q,t-Catalan and Shröder Theorems, *Int. Math. Res. Notices*, Volume 2012, No 16, July 2011.
- (with A. M. Garsia and A. Stout) The case $k = 2$ of the shuffle conjecture, *Journal of Combinatorics* Vol 2 (2011).
- Connections between a family of recursive polynomials and parking function theory, *Proceedings of the 24th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2012).*
- (with S. Assaf, C. Bessenrodt, C. Bowman, S. van Willigenburg, J. Remmel, V. Tewari) Multiplicity Free Kronecker Products, *results in preparation from a BIRS workshop*

Fellowships & Grants

- **NSF Mathematical Sciences Postdoctoral Fellowship** 2013-2016
- **Inimori Foundation Fellowship** 2012
- **MAA TENSOR Grant (co-applicant)** 2009-2012
- **GAANN Fellowship** 2007-2008

Teaching Experience

- **Postdoctoral Instructor- Stanford** Spring 2014, 2015-2016
  - Full responsibility for courses, including instruction, coordinating with TAs, selecting the text and syllabus (Combinatorics), and writing exams (shared among several calculus courses)
  - Courses: Undergraduate Combinatorics and Graph Theory; Linear Algebra and Multivariable Calculus, Applied Matrix Theory (upcoming)
- **Associate Instructor-UCSD** Summer, 2011
  - Full responsibility for course, including instruction, writing exams, and holding office hours
  - Course: Integral Calculus
- **Teaching Assistant-UCSD** 2007-2012
  - Responsibilities included conducting recitation, grade exams, holding office hours
  - Courses: Various calculus classes, Combinatorics, Introduction to Statistics, Computer Graphics.

Service

- **Bay Area Discrete Math Day** 2013-current
  - Current Committee Member
  - Host and Organizer of the Fall 2014 event
- **Reviewer** 2013-current
  - Reviewed papers and proposals as requested for:
    Journal of Algebraic Combinatorics, NSF grant request, Journal of Integer Sequences

- **Bay Area Mathematical Adventures Speaker** 2013
  - public lectures aimed at local high school audiences
- **Founding member of the UCSD Association for Women in Mathematics** 2007-2013
  - Chapter Treasurer 2009-2011, 2012-2013
  - Chapter Undergraduate Liaison 2008-2009
  - co-applicant and co-administrator of MAA Tensor grant
    - Supported panels and day long conferences for undergrads, travel funding for graduate students, mixers between the female faculty and graduate students, etc.
- **UCSD Graduate-Undergraduate Learning Program** 2012-2013
  - project organizer and mentor
  - organized undergraduate reading groups headed by a graduate student volunteer

Selected Talks

- *Combinatorial Challenges: Formidable symmetries from the q,t Catalan and Beyond*, Colloquim Speaker, Mills College, September, 2015
- *Combinatorial Challenges: Formidable symmetries from the q,t Catalan and Beyond* MAA Golden Section Invited Speaker, Foothill University, February 2015.
- *A simpler formula for the number of diagonal inversions of an ((m,n))-Parking Functions* AMS Special Session, Dalhousie University, October 2014.
- *Parallelogram Polyominoes and (Surprise!)– The Diagonal Harmonics* York University, March 2014.
- *The Diagonal Harmonics and n Capricious Wives* University of San Francisco Mathematics Colloquium March 2014.
- *Diagonal Harmonics, Parking Functions, and Parking Polynomials* Bay Area Discrete Math Day October 2013.
- *Parallelogram Polyominoes, the Diagonal Harmonics, and a Surprising (!) Connection* UC Berkeley Combinatorics Seminar October 2013.
- *Connections Between a Family of Recursive Polynomials and Parking Function Theory*, International Conference on Formal Power Series and Algebraic Combinatorics, Nagoya, Japan, August 2012.
- *New Approaches to the Study of Parking Functions and the Theory of the Diagonal Harmonics*, University of Washington Combinatorics Seminar, May 2012.
- *A Family of Polynomials Suggested by the Haglund- Morse-Zabrocki Conjecture*, Workshop de Algebra V Teoria de Numeros, Chile, December 2011.
- *A New Parking Function Statistic*, Special Session on Symmetric Functions, Symmetric Group Characters, and Their Generalizations, AMS Sectional Meeting, Wake Forest University, September 2011.
- *A Parking Function Bijection Suggested by the Haglund-Morse-Zabrocki Conjecture*, Banff International Research Institute for Mathematical Innovation and Discovery, November 2010.
- *Two Parking Function Bijections*, Universite de Bordeaux, France, December 2009.

- *Combinatorics of the Diagonal Harmonics*, MIT Women in Mathematics Lecture Series, March 2009.
- *The Metric Dimension of the Cayley Digraphs of Finite Abelian Groups*, AMS Session on Combinatorics, Joint Meetings, January 2007.
- *Applications of Lie Symmetry Groups to Minimal Surfaces*, Pi Mu Epsilon Session, MAA Mathfest, August 2005.

Workshops

- **BIRS Session on Schur Positivity** August 2015
- **BIRS Session on Kronecker Coefficients** April 2015
- **American Institute of Math (AIM) Session on Kronecker Coefficients** November 2014
- **AIM Session on Rational Catalan Combinatorics** December 2012
- **Career Mentoring Workshop (CaMeW)** June 2012
- **BIRS Session on Quasisymmetric Functions** November 2010