

Gregory S. Warrington

CURRICULUM VITAE

June 22, 2019

Department of Mathematics & Statistics
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EMPLOYMENT

Associate Chair, Department of Mathematics & Statistics	Fall 2017 – Present
Associate Chair, Department of Mathematics & Statistics	Fall 2014 – Spring 2016
Associate Professor, University of Vermont	Fall 2014 – Present
Assistant Professor, University of Vermont	2009 – 2014
Assistant Professor, Wake Forest University	2004 – 2008
NSF Postdoctoral Fellow	
Wake Forest University	2006 – 2007
University of Pennsylvania	2003 – 2004
Visiting Assistant Professor, University of Massachusetts, Amherst	2001 – 2003

EDUCATION

Harvard University: Ph.D. in Mathematics	1996 – 2001
Advisor — S. Billey, MIT	
Thesis — <i>Kazhdan-Lusztig polynomials, pattern avoidance and singular loci of Schubert varieties</i>	
Princeton University: B.A. in Mathematics, magna cum laude	1991 – 1995

GRANTS & FELLOWSHIPS

Simons Foundation Collaboration Grant	2017 – 2021
Title — <i>Rational Catalan Combinatorics and Quasisymmetric Functions</i>	
Award # 429570	
National Science Foundation Standard Grant	2012 – 2016
Title — <i>Combinatorial polynomials arising from representations</i>	
Award # DMS-1201312	
Simons Foundation Collaboration Grant	2011 – 2012
Title — <i>Combinatorial polynomials arising from representations</i>	
Award # 197419 (years 2–5 declined)	
NSA Young Investigators Grant	2008 – 2010
Title — <i>Combinatorics of diagonal harmonics and Kazhdan-Lusztig polynomials</i>	
Award # H98230-09-1-0023	
Wake Forest Sterge Faculty Fellowship	2006 – 2008
NSF Postdoctoral Fellowship	2003 – 2007
AMS Project NExT Fellowship	2002 – 2003

RESEARCH INTERESTS

Algebraic combinatorics

Kazhdan-Lusztig polynomials, quasisymmetric functions, diagonal harmonics module, Schubert varieties, combinatorics of Weyl groups.

Complex systems, Modeling, Gerrymandering

REFEREED RESEARCH PUBLICATIONS

A comparison of partisan-gerrymandering measures

Election Law Journal, to appear.

Quasisymmetric and Schur expansions of cycle index polynomials

(with N. Loehr), *Discrete Mathematics*, **342** (1), (January 2019) 113–127.

What are Your Patients Using (and How Do You Know): Using Clinical Laboratory Results to Understand Drug Use Patterns In A State-Wide Model

(with Jill S. Warrington), poster presentation (2018) *PAINWeek Abstract Book 2018 Postgraduate Medicine*, 130:sup1, 1-91

Quantifying gerrymandering using the vote distribution

Election Law Journal, **17** (1), (March 2018) 39–57.

Orthogonal bases for transportation polytopes applied to Latin squares, magic squares and Sudoku boards

Linear Algebra Appl., **531**, (October 2017) 285–304.

Shape and pattern containment of separable permutations

(with A. Crites, G. Panova), *Ars Comb.*, **CXXVIII**, (July 2016) 103–116.

Rational parking functions and Catalan numbers

(with D. Armstrong and N. Loehr), *Annals of Combinatorics*, **20:1** (March 2016) 21–58.

Sweep maps: A continuous family of sorting algorithms

(with D. Armstrong and N. Loehr), *Advances in Mathematics*, **284** (2015), 159–85.

Evaluation of Choosing Wisely cervical cancer screening guidelines at a rural tertiary academic medical center: How are we doing?

(with S. Brownschidle, T. St. Johns, M. Fung, E. Everett, J. Warrington), *J. Amer. Soc. Cytopath.*, **3:5** (Sept.-Oct. 2014) S74–S75

Transition matrices for symmetric and quasisymmetric Hall-Littlewood polynomials

(with N. Loehr and L. Serrano), *J. Comb. Theory, Ser. A.*, **120** (2013), no. 8, 1996–2019.

On the existence of three-dimensional Room frames and Howell cubes

(with J. Dinitz and E. Lamken), *Disc. Math.*, **313** (2013), no. 12, 1368–1384.

What to expect in a game of memory

(with D. Velleman), *Amer. Math. Monthly*, **120:9** (2013), 787–805.

Martin Gardner’s minimum no-three-in-a-line problem

(with A. Cooper, O. Pikhurko, J. Schmitt), *Amer. Math. Monthly*, **121:3** (2014), 213–221.

Estimating landscape carrying capacity through maximum clique analysis

(with T.M. Donovan, W.S. Schwenk and J.H. Dinitz), *Ecological Applications*, **22** (2012), no. 8, pp. 2265–2276.

Quasisymmetric expansions of Schur-function plethysms

(with N. Loehr), *Proc. Amer. Math. Soc.*, **140** (2012), 1159–1171.

Equivalence classes for the μ -coefficient of Kazhdan-Lusztig polynomials in S_n
Experimental Math., **20** (2011), no. 4, 457–466.

The spectra of certain classes of Room frames: the last cases
 (with J. Dinitz), *Elec. J. Combin.* **17** (2010), no. 1, Research Paper 74, 13 pp.

**From quasisymmetric expansions to Schur expansions via
 a modified inverse Kostka matrix**
 (with E. Egge, N. Loehr), *European J. Combin.* **31** (2010), no. 8, 2014–2027.

A combinatorial version of Sylvester’s four-point problem
Adv. in Appl. Math. **45** (2010), no. 3, 390–394.

A continuous family of partition statistics equidistributed with length
 (with N. Loehr), *J. Comb. Theory, Ser. A.* **116** (2009), no. 2, 379–403.

Nested quantum Dyck paths and $\nabla(s_\lambda)$
 (with N. Loehr), *Int. Math. Res. Not. IMRN* (2008), no. 5, Art. ID: rnm157, 29pp.

Bitableau bases for Garsia-Haiman modules of hollow type
 (with E. Allen, M. Marion), *J. Comb. Theory, Ser. A.* **115** (2008), no. 7, 1127–1155.

**A human proof for a generalization of Shalosh B. Ekhad’s
 10^n Lattice Paths Theorem**
 (with N. Loehr, B. Sagan), *Ars Comb.* **89** (2008), 421–429.

Square q, t -lattice paths and $\nabla(p_n)$
 (with N. Loehr), *Trans. of the AMS* **359** (2007), no. 2, 649–669.

Juggling probabilities
Amer. Math. Monthly **112** (2005), no. 2, 105–118.

The combinatorics of a three-line circulant determinant
 (With N. Loehr, H. Wilf), *Israel J. Math.* **143** (2004), 141–156.

Counterexamples to the 0-1 Conjecture
 (With T. McLarnan), *Rep. Theory* **7** (2003), 181–195.

A formula for inverse Kazhdan-Lusztig polynomials in S_n
J. Comb. Theory, Ser. A **104** (2003), no. 2, 301–316.

Maximal singular loci of Schubert varieties in $SL(n)/B$
 (With S. Billey), *Trans. of the AMS* **355** (2003), no. 10, 3915–3945.

Kazhdan-Lusztig polynomials for 321-hexagon-avoiding permutations
 (With S. Billey), *J. of Alg. Comb.* **13** (2001), 111–136.

ADDITIONAL CONTRIBUTIONS

The combinatorics of Hall-Littlewood creation operators
 (with N. Loehr), *in preparation*.

How to communicate the results of instant-runoff voting
 (with B. Tenner), *in revision*.

Rectangular (q, t) -Schröder numbers
 (with A. Morse), *in preparation*.

**Gerrymandering and the net number of US House seats won
 due to vote-distribution asymmetries**
 (with J. Buzas), *in revision*.

Optimized random chemistry
 (with J. Buzas), *in revision*.

Cyballs: Cyborg juggling balls

<http://www.cems.uvm.edu/~gswarrin/cyballs/index.html>

KLC: Computer code and database for Kazhdan-Lusztig polynomials

<http://www.cems.uvm.edu/~gswarrin/research/klc/klc.html>

A photographic assignment for abstract algebra

PRIMUS 19 (2009), no. 6, 561–564.

Peer reviewed paper on pedagogy.

Juggling performers + Math = ?

Math Horizons, Feb. 2008.

Invited, non-research contribution; not peer reviewed.

GERRYMANDERING IMPACT**The declination metric for gerrymandering**

One of four metrics used by expert witness Chris Warshaw in federal district court case

Householder v. Ohio A. Philip Randolph Institute

SERVICE**Department**

Associate Chair	Fall 2017 – Present
Assessment Coordinator	Fall 2017 – Present
Tenure-track Search (chair)	Fall 2018 – Spring 2019
Undergraduate Curriculum Comm. (chair)	Fall 2017 – Spring 2018
GIV Advisory Board	Spring 2015 – pres.
Undergraduate Curriculum Comm. (chair)	Fall 2015 – Spring 2016
Tenure-track Search	Fall 2015 – Spring 2016
Associate Chair	Fall 2014 – Spring 2016
Tenure-track Search (chair)	Fall 2014 – Spring 2015
Graduate Comm.	Fall 2012 – Spring 2014
Math Club Comm.	Fall 2011 – Spring 2014
Vision Comm. (chair)	Fall 2013
Peers & Aspirants Comm.	Fall 2013
Lecturer Reappointments	2012
Colloquium Comm.	Fall 2010 – Spring 2012
Undergraduate Curriculum Comm.	Fall 2010 – Spring 2012
Faculty Evaluation Guidelines Comm.	Fall 2009 – Spring 2010
Masters Oral Exam (Simonici, Buddemeyer, Star)	Spring 2010 & 2012

College of Engineering & Mathematics

Facilities Comm.	Fall 2010 – Spring 2016
Research talk to CEMS Board of Advisors	Spring 2012

University

CEMS Dean Search Committee	Fall 2017 – Spring 2018
IBB Cost Pool Methodology Subcommittee	Fall 2013 – Spring 2014
Faculty Senator	Fall 2013 – Spring 2014
Juggling Club, Faculty Advisor	Fall 2009 – Spring 2014

Profession

Reviewer for Math Reviews	2004 – pres.
FPSAC 2017 (London, UK) Program Committee	2016 – 2017
AMS-Simons Travel Grants Comm.	2014 – 2017
Book reviewer	2015 & 2019
NSF Panelist (combinatorics)	2014

NSA Discrete Mathematics Panelist
 Minisymposium organizer: SIAM Discrete Mathematics
 Referee for

Fall 2012 – Spring 2014
 2004

Adv. in App. Math.	J. of Alg. Comb.
Adv. in Math.	J. of App. Prob.
Alg. Comb.	J. of Comb.
Amer. Math. Monthly	J. of Comb. Theory, Ser. A
Annals of Comb.	J. of Int. Seq.
Austral. J. Comb.	Notices of AMS
Disc. App. Math.	SIAM J. Disc. Math
Disc. Math.	Trans. of the AMS
Elec. J. Comb.	NSA Grants
Exp. Math.	
FPSAC 2002 & 2017	

PH.D. DISSERTATION COMMITTEES

Louis-Francois Preville-Ratelle (Univ. Quebec, Montreal)	2012
Matt Welz	2009 – 2012
Paige Rinker (Dartmouth)	2011
Kirsten Stor	2010
Melanie Brown	2010

PH.D. ADVISING

Ada Morse (co-advisor)	2018
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MASTERS THESIS COMMITTEES

Ben Emery	2019
Wendy Cole (Rubenstein School)	2013

UNDERGRADUATE & MASTERS THESES ADVISED

Jonathan Godbout (Masters)	Fall 2012 – Spring 2013
Alli Morse (Undergraduate)	Fall 2011 – Spring 2012

INVITED TALKS

TBD	
Garsia Fest — Adriano Garsia 90th birthday conferenc (La Jolla, CA)	2019
Math and Gerrymandering	
Binghamton University Combinatorics Seminar (Binghamton, NY)	2019
Quasisymmetric functions in algebraic combinatorics	
30th Cumberland Conference (Huntington, WV)	2018
Mathematical Analyses of Gerrymandering	
Davidson College, Bernard Public Lecture	2017
What to expect in a game of memory	
Virginia Tech, Combinatorics Seminar	2017

Orthogonal bases for transportation polytopes University of Washington combinatorics seminar	2017
Quasisymmetric expansions of cycle indices AMS Special Session on the Combinatorics of Symmetric Functions (Brunswick, ME) AMS Special Session on Plethysm and Kronecker Products (Athens, GA)	2016 2016
Combinatorics of the Rational Catalan University of Notre Dame, Discrete Math Seminar	2016
Rational q, t-Schröder numbers York University, Applied Algebra Seminar	2015
Rational q-Catalan numbers and q-binomials AMS Special Session on Generalized Catalan Algebraic Comb. (Halifax, NS)	2014
Crosshatch permutations AMS Special Session on Geometric Applications of Alg. Comb. (Baltimore, MD)	2014
The sweep map CMS Special Session on Symmetric Functions and Generalizations (Ottawa, CA)	2013
Quasisymmetric expansions of Schur plethysms AMS Special Session on Symmetric Functions (Washington, DC)	2012
Quasisymmetric expansions Combinatorial algebra meets algebraic combinatorics (Montreal, QC)	2012
On the μ-coefficients of Kazhdan-Lusztig polynomials University of Massachusetts, Amherst; Representation Theory Seminar AMS Special Session on Combinatorics of Coxeter Groups (Worcester, MA)	2012 2011
Quasisymmetric expansions of symmetric functions AMS Special Session on Combinatorial Representation Theory (Worcester, MA) LaCIM, Montréal, Québec MIT, Combinatorics Seminar	2011 2011 2010
On the shape of separable permutations AMS Special Session on Algebraic and Topological Combinatorics (South Bend, IN)	2010
Infinitely many new partition statistics AMS Special Session on the Combinatorics of Symmetric Functions (Minneapolis, MN) AMS Special Session on Algebraic Combinatorics (State College, PA)	2010 2009
Statistics in combinatorics MAA MathFest Invited Speaker	2009
A combinatorial version of Sylvester's four-point problem Dartmouth College, Combinatorics Seminar MAA MathFest Session on "Gems in Combinatorics"	2009 2009
Bitableau bases for Garsia-Haiman modules of hollow type AMS Special Session on Rings, Algebras and Varieties Combinatorics (Raleigh, NC)	2009
Kazhdan-Lusztig polynomials of maximum possible degree AMS Special Session on Computational Methods in Lie Theory (Raleigh, NC)	2009
Combinatorial structures associated to the nabla operator BIRS, Banff, Canada (Jim Haglund, proxy speaker)	2007
Combinatorial aspects of $\nabla(s_\lambda)$ CRM, Montréal, Québec	2007

Counterexamples to the 0-1 Conjecture	
Yale University, Algebra Seminar	2004
MIT, Combined Lie Groups/Combinatorics Seminar	2002
CRM, Conference on Computational Lie Theory	2002
Towards pictures of Kazhdan-Lusztig polynomials	
SUNY Albany, Discrete Math Day	2002
Properties of Betti numbers of Schubert varieties	
AMS Special Session on Algebraic Combinatorics (Ann Arbor, MI)	2002

CONTRIBUTED TALKS

Merry Deranging: Gerrymandering	
UVM Colloquium	2018
A combinatorial version of Sylvester's four-point problem	
Amherst College, Colloquium	2013
UVM, Applied Combinatorics Seminar	2009
A photography assignment for abstract algebra	
AMS-MAA Joint Meetings, MAA Session	2012
Standardizations of symmetric functions	
UVM, Combinatorics Seminar	2012
Separable permutations and Greene's Theorem	
UVM, Combinatorics Seminar	2011
Quasisymmetric expansions of symmetric functions	
BIRS, Banff, Canada	2010
Quasisymmetric functions and the inverse Kostka matrix	
UVM, Combinatorics Seminar	2010
Catalan polynomials	
Middlebury College, Colloquium	2010
Infinitely many new partition statistics	
Discrete Mathematics of New England	2009
Points, planes and permutations	
Middlebury College, Colloquium	2009
Kazhdan-Lusztig polynomials of maximum possible degree	
UVM, Applied Combinatorics Seminar	2009
(0,1,q)-Permutations	
University of Pennsylvania, Combinatorics Seminar	2004
University of Washington, Combinatorics Seminar	2003
Ribbon tableaux and Kazhdan-Lusztig polynomials	
University of Pennsylvania, Combinatorics Seminar	2004
An overview of Kazhdan-Lusztig polynomials	
University of Pennsylvania, Combinatorics Seminar	2003
Counterexamples to the 0-1 Conjecture	
Yale University, Algebra Seminar	2004
MIT, Combined Lie Groups/Combinatorics Seminar	2002

CRM, Conference on Computational Lie Theory	2002
Maximal singular loci of Schubert varieties in $SL(n)/B$	
University of Massachusetts, Amherst, Representation Theory Seminar	2001
University of Michigan, Combinatorics Seminar	2000
Kazhdan-Lusztig polynomials and 321-hexagon-avoiding permutations	
AMS Special Session in Honor of G.-C. Rota (Washington, DC)	2000

“MATHEMATICS OF JUGGLING” TALKS

Juggling probabilities/Mathematical juggling in the 21st century

SUNY Plattsburgh, Pi Mu Epsilon Induction Ceremony	2019
Governor’s Institute of Vermont	2009 & 2013 & 2018
Davidson College, Bernard Lecturer	2017
University of Notre Dame, Math for Everyone Series	2016
Moravian College, Student Research Conference	2015
MAA/NES Spring Meeting	2014
National Museum of Mathematics MOVES Conference	2013
UVM Honors College Seminar: Mathematics and the Arts	2013
Missisquoi Middle School students	2012
MATHCOUNTS	2012
North Carolina Governor’s School	2005 – 2007
James Madison University, SUMS Conference	2005
EDGE Program, Greensboro, NC	2005
University of Georgia, VIGRE Seminar	2005
University of North Carolina, Charlotte, Super Competition	2005
Appalachian State University, Colloquium	2004
Davidson College, Math Coffee	2004
Yale University, Colloquium	2004
St. Michael’s College, Colloquium	2003

Mathematics of juggling (* – with A. Knutson)

University of Massachusetts, Amherst, Colloquium*	2002
MIT Museum, Family Day	2001
Haverford College, Colloquium*	1999
MIT, Applied Mathematics Colloquium*	1999
The Math Circle, Boston, MA	1998
IAS/PCMI Representation Theory Summer Session*	1998

Juggling and Markov chains

Dartmouth College, Discrete Math Day	2002
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