

Curriculum Vitae of William J. Keith, August 2018

Contact Information

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Education

Fall 2010 - Summer 2012 Postdoctorate	University of Lisbon Supervisor: Carlos André
Fall 1999 - Summer 2007 Graduate study	Pennsylvania State University Advisor: Prof. George Andrews Obtained Ph.D. Summer 2007
Fall 1995 - Summer 1999 Undergraduate study	University of Texas at Austin B.Sc., Mathematics / B.Sc., Physics

Research Interests

- Number Theory
 - Partition theory
- Combinatorics
 - Tableaux, symmetric functions, q -series

Employment and Teaching Experience

Fall 2013 - Present	Michigan Tech University, Asst. Prof.
Fall 2012 - Spring 2013	Western Illinois University, Visiting Asst. Prof.
Fall 2010 - Summer 2012	Postdoc, University of Lisbon
Fall 2009 - Summer 2010	Drexel University, Teaching Assistant Professor
Fall 2007 - Summer 2009	Drexel University, Senior Lecturer
Fall 1999 - Spring 2007	Pennsylvania State University, Graduate assistant

Publications

- 1.) Ranks of Partitions and Durfee Symbols. Ph.D. Thesis, PSU, June 2007.
URL: <http://etda.libraries.psu.edu/theses/approved/WorldWideIndex/ETD-2026/index.html>
- 2.) Translation: Dieter Stockhofe, *Bijektive Abbildungen auf der Menge der Partitionen einer Natürlichen Zahl*. Appendix to thesis; see above.
- 3.) Distribution of the full rank in residue classes for odd modulus. *Discrete Mathematics* 309 (16), 28 August 2009, pp. 4960-4968. Extract of thesis. URL: <http://dx.doi.org/10.1016/j.disc.2009.02.032> .
- 4.) A bijective toolkit for signed partitions. *Annals of Combinatorics*, (2011) Volume 15, Number 1, 95-117. doi: 10.1007/s00026-011-0085-6
- 5.) Sequences of density $\zeta(k) - 1$. *INTEGERS* 10 (2010), Article A19, 233-241. URL: <http://www.emis.de/journals/INTEGERS/papers/k19/k19.pdf>
- 6.) Proof of a conjectured q, t -Schröder identity. *Discrete Mathematics*, Volume 310, Issue 19, 6 October 2010, Pages 2489-2494
- 7.) Recursively self-conjugate partitions. *Proceedings, INTEGERS Conference 2009*. URL: <http://www.integers-ejcnt.org/vol11a.html>, Article 12.
- 8.) A bijection for partitions with initial repetitions. *Ramanujan Journal*, Vol. 27 (2), 2011. doi:10.1007/s11139-011-9298-x
- 9.) (Joint w/ Rishi Nath, CUNY-York) Partitions with prescribed hooksets. *J. Comb. and Num. Thy*, Volume 3 (1) 2011. Preprint: <http://arXiv.org/abs/1011.1945>
- 10.) The 2-adic valuation of plane partitions and totally symmetric partitions. *Elec. Journ. of Comb.*, Volume 19 (2012), paper 48.
- 11.) (Joint w/ Robert Boyer, Drexel University) Stabilization of coefficients for partition polynomials. *INTEGERS* 13 (2013), article 56.
- 12.) A Ramanujan congruence analogue for Han's hook-length formula mod 5, and other symmetries. *Acta Arith.* 160 (2013), 303-315
- 13.) (Joint with Ángela Mestre, Univ. of Lisbon, and Christian Brouder, IPMPC) Closed forms for a multigraph enumeration. *Journal of Combinatorics and Number Theory*, 2015 Vol. 6 Number 2, pp. 37-51
- 14.) Congruences for 9-regular partitions modulo 3. *Ramanujan J.*, October 2014, Volume 35, Issue 1, pp 157-164
- 15.) (Joint w/ Giampiero Chiaselotti and Paolo Oliverio, Univ. della Calabria) Two Self-Dual Lattices of Signed Integer Partitions. *Appl. Math. and Inf. Sci.*, Volume 8, No. 6 (Nov. 2014), 3191-3199. Volume 8, No. 6 (Nov. 2014), PP:3191-3199. doi:10.12785/amis/080661
- 16.) Congruences for m -regular partitions modulo 4. *INTEGERS* 15A (2015), <http://www.integers-ejcnt.org/vol15a.html>, paper #A11
17. Restricted k -colored partitions. *Ramanujan J.*, May 2016, Volume 40, Issue 1, pp 7192. doi:10.1007/s11139-015-9704-x
- 18.) Partitions with a small number of part sizes. *Int. J. Number Theory*, 13, 229 (2017). doi:10.1142/S1793042117500130
- 19.) The part-frequency matrices of a partition. *Proceedings of the Kliakhandler Conference 2015*. doi:10.13069/jacodesmath.41075
- 20.) (Joint w/ undergraduate Sean Grindatti) Fair choice sequences. *Involve* 12 (2019) 1, 13-30. doi:10.2140/involve.2019.12.13

- 21.) (Joint with Fabrizio Zanello and graduate student Samuel Judge) On the density of odd values of the partition function. *Annals of Combinatorics*, <https://link.springer.com/article/10.1007/s00026-018-0397-x>
- 22.) (Joint with Xinhua Xiong) Euler's partition theorem for all moduli and new companions to Rogers-Ramanujan-Andrews-Gordon identities. To appear, Ramanujan J.
- 23.) (Joint with Don Kreher and Dalibor Fronček) A note on nearly platonic graphs. *Australasian Journal of Combinatorics* **70(1)** (2017), pp. 86-103
- 24.) Partitions into parts simultaneously regular, distinct and/or flat. *Combinatorial and Additive Number Theory II: CANT*, New York, NY, USA, 2015 and 2016. Springer Proceedings in Mathematics & Statistics, Volume 220. <http://www.springer.com/us/book/9783319680309>
- 25.) Major index over descent for pattern-avoiding permutations. *INTEGERS* 18 (2018), <http://math.colgate.edu/integers/vol18.html>, paper #A55
- 26.) Families of major index distributions: closed forms and unimodality. Submitted, *J. Combin. Theory, Ser. A*.
- 27.) Second differences of Gaussian coefficients. In preparation for submission, summer 2018
- 28.) (Joint w/ undergraduate Emily Anible) Extended results on the truncations of the Han/Nekrasov/Okounkov hooklength formula. Expected submission, summer/fall 2018

Presentations

1. October 2018, *INTEGERS Conference 2018* (planned): Second differences of the q -binomial coefficients.
2. July 2018, *Combinatory Analysis 2018*, Pennsylvania State University (Invited): Unimodality of q -Binomial Differences via Kirillov/Reshetikhin
3. Jan 2018, *Joint Math Meetings 2018 San Diego*, AMS Special Session on Special Functions and Combinatorics (contributed): Refinements by descents of the q -analog of the Frame-Robinson-Thrall formula
4. May 2017, *CANT 2017*, CUNY GC: Maj over descent for pattern avoidance classes.
5. January 2017, *Joint Math Meetings 2017 Atlanta*, Special Session on Partition Theory and Related Topics (Invited): Parity similarity formulas for partitions and multipartitions (work joint w/ F. Zanello and S. Judge)
6. November 2017 *Partitions Seminar*, Pennsylvania State University (Invited): Parity similarity formulas for partitions and multipartitions (work joint w/ F. Zanello and S. Judge)
7. October 2016, *INTEGERS Conference 2016*: Partitions into a small number of part sizes

8. September 2016, Combinatorics Seminar, Michigan Tech: Partitions into a small number of part sizes
9. May 2016 CANT 2016, CUNY GC: Partitions into parts simultaneously regular, distinct and/or flat
10. Jan 2016, Joint Meetings of the AMS and the MAA: *Partitions into parts simultaneously regular, distinct, and/or flat*
11. Aug 2015, Kliakhandler Conference, Michigan Tech: *The part-frequency matrices of a partition*
12. Aug 2015, Illinois Number Theory Conference: *The part-frequency matrices of a partition*
13. Jan-Mar 2014, Combinatorics Seminar, Michigan Tech: *An introduction to partition theory* (4-part series)
14. Oct 2014, Combinatorics Seminar, Michigan Tech: *Colored partitions with restrictions on the number of colors appearing*
15. Sep 2014, AMS Central Section Meeting: *Restricted k -colored partitions*
16. Apr 2014, Combinatorics Seminar, Michigan Tech: *m -Regular partitions and eta-function symmetries*
17. Apr 2014, UMN-Duluth Combinatorics Seminar: *m -Regular partitions and eta-function symmetries*
18. October 2013, Combinatorics Seminar, Michigan Tech: *The Robinson-Schensted-Knuth Algorithm: a gentle introduction*
19. May 2013 , Departmental Colloquium, Western Illinois University: *The Indeterminate Multipartition*
20. April 2013, Number Theory Seminar, Univ. of Illinois Urbana-Champaign (Invited): *The Indeterminate Multipartition*
21. Dec 2011, Seminário do CELC, Univ. Lisbon: *Ramanujan congruence analogues for the Han/Nekrasov-Okounkov formula*
22. Oct 2011, Integers Conference 2011, University of West Georgia: *Ramanujan congruence analogues for the Han/Nekrasov-Okounkov formula*
23. Sep 2011, 67th Séminaire Lotharingien de Combinatoire, Bertinoro, Italy: *Vexillary involutions and Motzkin paths* (joint w/Maria Torres and Fátima Rodrigues)
24. Mar 2011, Combinatorics Seminar, University of Coimbra: *Counting simultaneous s/t -core partitions* (50 min. version)

25. Mar 2011, q -Series Conference 2011, Georgia Southern University: *Counting simultaneous s/t -core partitions* (20 min. version)
26. Nov 2010, Seminário do CELC, Univ. Lisbon: *Partitions as a bridge between settings*
27. Jan 2010, Combinatorics and Probability Seminar, Univ. of Penn. *Proof of a conjectured q, t -Schröder identity*
28. Nov 2009, CUNY-York Number Theory Seminar: *Recursively Self-Conjugate Partitions* (50 min. version)
29. Oct 2009, INTEGERS 2009, AMS 2009 East. Sec. Mtg (Invited): *Recursively Self-Conjugate Partitions* (20 min. version)
30. Dec 2008, Combinatory Analysis 2008, Penn State: *Partitions in \mathbb{Z}_p*
31. Feb 2008, Departmental Colloquium, Drexel University: *Signed Partitions: New Theorems for Old*
32. April 2007, Graduate Student Combinatorics Conf., U. Washington: *Flat Partitions, Permutation Descents, and Classical Partition Identities*
33. Oct 2006, Midwest Number Theory Conf. for Graduate Students IV, U. Illinois: *Congruences for the Full Rank*
34. April 2006, Graduate Student Combinatorics Conf., U. Wisconsin-Madison: *Lecture Hall Partitions Generalized Toward Glaisher*
35. Feb 2004, Partitions Seminar, Penn State: *Fibonacci-Like Sequences Among Hyperbinary Partitions*

Advising and Thesis Committee

Jan 2016 - Spring 2017	Advisor, Master's thesis, J. T. Davies
Summer 2015 - present	Thesis committee, Samuel Judge
Spring 2013	Thesis committee (external examiner), Miehleketo Ndlovu Univ. Witwatersrand (Supv. Augustine Munagi)
2010	Thesis committee, Derek Heilman Drexel Univ. (Supv. Jennifer Morse)

Awards and Honors

Spring 2018	Outstanding Research Award, Assistant Professor Rank, MTU <i>Quality of research among Math Dept. Asst. Profs. at Michigan Tech</i>
Spring 2006	ZZRQ Award, Penn State <i>For service rendered to the Department by a graduate student</i>
Fall 2005	Departmental Award for Graduate Teaching <i>(Shared: http://www.math.psu.edu/about/giving/grad-teaching.php)</i>

Professional Service

Jan 2016, ongoing	Reviewer, Zentralblatt Math
Fall 2015, ongoing	Reviewer, Mathematical Reviews
Spr. 2013, ongoing	Organizer, MTU Combinatorics Seminar
Fall 2013, ongoing	Undergraduate Committee, MTU Math Dept
Ongoing	Referee work for journals
Spring 2010	Team advisor, Mathematical Contest in Modeling
2007 - 2010	Variety of Drexel Math Dept events as needed
Fall 2007	Volunteer, Fall 2007 EPaDel section MAA meeting
Fall 2003 - Spring 2007	Organizer, Penn State Slow Pitch Seminar
Fall 2004 - Spring 2005	Math Dept. Rep., Graduate Student Association

Grants and Funding

1. In progress, July 2018: NSF CAREER grant. Project: Algebraic and combinatorial approaches to parity in partitions.
2. January 2018: SURF funding, student Marshal Dunham. Project: Enumeration of tree-like tableaux. Approved.
3. Applied, September 2017: NSF Combinatorics program. Project: Distribution of statistics for standard Young tableaux. Rejected.
4. Granted: proposal for visiting speaker funding, Visiting Women and Minority Lecturer and Scholar Series, for visit of Bridget Tenner (DePaul) to Combinatorics Seminar, Fall 2015.