

David Keating

CONTACT INFORMATION

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EMPLOYMENT/ EDUCATION

University of Wisconsin-Madison, Madison, WI

Van Vleck Visiting Assistant Professor, August 2021- Present

University of California, Berkeley, Berkeley, CA

Ph.D., Mathematics, August 2015 - May 2021

- Advisor: Prof. Nicolai Reshetikhin
- Thesis: “Limit shapes in two-dimensional lattice models arising from physics and combinatorics.”

B.A., Mathematics, May 2015

B.A., Physics, May 2015

RESEARCH INTEREST

I am interested in statistical mechanics of two-dimensional lattice models, integrable probability, and combinatorics.

PUBLICATIONS AND PREPRINTS

1. **Keating, D.** and Xu, J. “Edge universality of β -ensembles through Dunkl operators.” *In preparation* (2023).
2. **Keating, D.** and Lyu, H. “Random perturbation of the box-ball system.” *In preparation* (2023).
3. Corteel, S. and **Keating, D.** “Multispecies q -TAZRP, modified Macdonald polynomials, and colored vertex models.” *In preparation* (2023).
4. Li, Z., **Keating, D.**, and Prause, I. “Asymptotics of Bounded Lecture-Hall Tableaux” *Preprint*, arXiv:2309.15235 [math.PR] (2023).
5. **Keating, D.** and Nicoletti, M. “Shuffling algorithm for coupled tilings of the Aztec diamond” *Preprint*, arXiv:2303.09089 [math.CO] (2023).
6. Corteel, S., Gitlin, A., and **Keating, D.** “Colored vertex models and k -tilings of the Aztec diamond” *Preprint*, arXiv:2202.06020 [math.CO] (2022).
7. Gitlin, A. and **Keating, D.** “A Vertex Model for Supersymmetric LLT Polynomials.” *Annales de l’Institut Henri Poincaré D*, accepted. arXiv:2110.10273 [math.CO] (2021).
8. **Keating, D.** “Equivalences of LLT polynomials via lattice paths.” *Preprint*, arXiv:2104.05862 [math.CO] (2021).
9. Corteel, S., Gitlin, A., **Keating, D.**, and Meza, J. “A Vertex Model for LLT Polynomials.” *International Mathematics Research Notices*, Volume 2022, Issue 20, October 2022, Pages 15869-15931, arXiv:2012.02376 [math.CO].
10. **Keating, D.** “Area Statistics for Large Oscillating Tableaux.” *Preprint*, arXiv:2010.10093 [math.CO] (2020).

11. **Keating, D.**, Reshetikhin, N., and Sridhar, A. “Integrability of Limit Shapes of the Inhomogeneous Six Vertex Model.” *Communications in Mathematical Physics* 391, 1181-1207 (2022), arXiv:2004.08971 [math-ph] (2020).
12. Corteel, S., **Keating, D.**, and Nicoletti, M. “Arctic curves phenomena for bounded lecture hall tableaux.” *Communications in Mathematical Physics* 382, 1449-1493 (2021), arXiv:1905.02881 [math.CO].
13. **Keating, D.**, Reshetikhin, N., and Sridhar, A. “Conformal Limit for Dimer Models on the Hexagonal Lattice.” *Journal of Mathematical Sciences* 242, 701-714 (2019).
14. **Keating, D.** and Sridhar, A. “Random Tilings with the GPU.” *Journal of Mathematical Physics* 59, 091420 (2018).
15. Carlsson, J., Khrabrov, A., Kaganovich, I., Sommerer, T., and **Keating, D.** “Validation and benchmarking of two particle-in-cell codes for a glow discharge.” *Plasma Sources Science and Technology*, 26(1) (2016).
16. Bhowmik, D., Nowakowski, M., You, L., Lee, O., **Keating, D.**, Wong, M., Boker, J., and Salahuddin, S. “Deterministic Domain Wall Motion Orthogonal To Current Flow Due To Spin Orbit Torque” *Scientific Reports* 5 (2015).

AWARDS	Nominated: Postdoctoral Excellence in Mentoring and Outreach Award	2023
	Herb Alexander Thesis Prize	2021
	Outstanding GSI Award	2018

INVITED TALKS

1. *Coupled Tilings of the Aztec Diamond*, JMM Special Session on Solvable Lattice Models and their Applications, 2024.
2. *TBA*, Mathematical Physics Seminar, Purdue University, November 2023.
3. *TBA*, Integrable Probability Seminar, MIT, October 2023.
4. *Double dimers, coupled tilings, and LLT polynomials*, DIMERS Closing Conference, Sorbonne Université, July 2023.
5. *k-tilings of the Aztec Diamond*, Berkeley Probability Seminar, UC Berkeley, April 2023.
6. *k-tilings of the Aztec Diamond*, Journées Cartes, Institute of Theoretical Physics, June 2022.
7. *k-tilings of the Aztec Diamond*, Enumerative and Analytic Combinatorics Seminar, Université Paris Cité, June 2022.
8. *Lattice models and LLT polynomials*, Madison Combinatorics Seminar, UW Madison, May 2022.
9. *k-tilings of the Aztec Diamond*, Madison Probability Seminar, UW Madison, April 2022.

10. *k-tilings of the Aztec Diamond*, Solvable lattice model seminar, Stanford University, February 2022.
11. *A Vertex Model for LLT Polynomials*, Berkeley Combinatorics Seminar, UC Berkeley, December 2020.
12. *A Vertex Model for LLT Polynomials*, CMS Winter Meeting, December 2020.
13. *Arctic Curves, Lecture Hall Tableaux, and the Tangent Method*, LPSM Friday Seminar, Sorbonne University, November 2019.
14. *Arctic Curves, Lecture Hall Tableaux, and the Tangent Method*, Berkeley Combinatorics Seminar, UC Berkeley, September 2019.
15. *Arctic Curves in Lecture Hall Tableaux*, Asymptotic Algebraic Combinatorics Workshop, Banff International Research Station, March 2019.
16. *Random Tilings with the GPU*, Representation Theory, Mathematical Physics and Integrable Systems, Centre International de Rencontres Mathématiques, June 2018.

CODE <https://github.com/GPUTilings>
 A library for generating random tilings with Markov chain Monte Carlo on the GPU.

TEACHING EXPERIENCE

At UW Madison:

Instructor Spring 2023
 Math 699 - Independent study
 A reading course on “Integer Partitions” by George Andrews.

Instructor Fall 2022, Spring 2023
 Math 390 - Undergraduate research
 Numerical study of coupled tilings.

Instructor Fall 2022, Spring and Fall 2023
 Math 632 - Introduction to Stochastic Processes

Instructor Spring 2022
 Math 475 - Introduction to Combinatorics

Instructor Fall 2021
 Math 431 - Introduction to Probability

At UC Berkeley:

Teaching Assistant Spring 2021
 Math 54 - Linear Algebra
 Instructor: Prof. Katrin Wehrheim

Teaching Assistant Spring 2020
 Math 128A - Numerical Analysis
 Instructor: Prof. Per-Olof Persson

Teaching Assistant Spring 2019

	Math 54 - Linear Algebra and Differential Equations Instructor: Prof. Ming Gu	
	Teaching Assistant Math 54 - Linear Algebra and Differential Equations Instructor: Prof. Constantin Teleman	Fall 2018
	Teaching Assistant Math 53 - Multivariable Calculus Instructor: Prof. Edward Frenkel	Spring and Fall 2017
	Teaching Assistant Math 54 - Linear Algebra and Differential Equations Instructor: Prof. Ming Gu	Fall 2016
	Teaching Assistant Math 1B - Calculus Instructor: Dr. Alexander Paulin	Spring 2016
	Teaching Assistant Math 1A - Calculus Instructor: Dr. Alexander Coward	Fall 2015
UNDERGRADUATE MENTORING	David Jiang, Jonah Guse Project: Generating functions for coupled plane partitions	2023
	Noah Bertz, Harsha Kenchareddy, Wei Zhiyuan, Ying Zheng, Lucas Allen Project: Numerical study of coupled tilings, through the Madison Experimental Mathematics lab	Fall 2022, Spring 2023
	Matthew Nicoletti Project: Simulations of large lecture hall tableaux, now a graduate student at MIT	2019
	Murat Magomedov Project: Kawasaki Dynamics and the Ising Model	2019
	Danny Wu Project: Numerical computing fluctuations in the DWBC six vertex model	2018
	Pavel Dmitriev Project: Numerically computing correlation functions in the DWBC six vertex model	2017
	Melissa Joseph Project: Glueing formulas for discrete Laplacians, now a postdoc at University of Utah	2016