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

B.A., Mathematics, May 2015

B.A., Physics, May 2015

PUBLICATIONS AND PREPRINTS

1. Corteel, S., Gitlin, A., and **Keating, D.** "Colored vertex models and k-tilings of the Aztec diamond" *Preprint,* arXiv:2202.06020 [math.CO] (2022).
2. Gitlin, A. and **Keating, D.** "A Vertex Model for Supersymmetric LLT Polynomials." *Preprint,* arXiv:2110.10273 [math.CO] (2021).
3. **Keating, D.** "Equivalences of LLT polynomials via lattice paths." *Preprint,* arXiv:2104.05862 [math.CO] (2021).
4. Corteel, S., Gitlin, A., **Keating, D.**, and Meza, J. "A Vertex Model for LLT Polynomials." *Preprint,* arXiv:2012.02376 [math.CO] (2020).
5. **Keating, D.** "Area Statistics for Large Oscillating Tableaux." *Preprint,* arXiv:2010.10093 [math.CO] (2020).
6. **Keating, D.**, Reshetikhin, N., and Sridhar, A. "Integrability of Limit Shapes of the Inhomogeneous Six Vertex Model." *Preprint,* arXiv:2004.08971 [math-ph] (2020).
7. Corteel, S., **Keating, D.**, and Nicoletti, M. "Arctic curves phenomena for bounded lecture hall tableaux." *Communications in Mathematical Physics,* accepted (2021), arXiv:1905.02881 [math.CO].
8. **Keating, D.**, Reshetikhin, N., and Sridhar, A. "Conformal Limit for Dimer Models on the Hexagonal Lattice." *Journal of Mathematical Sciences* 242, 701-714 (2019).
9. **Keating, D.** and Sridhar, A. "Random Tilings with the GPU." *Journal of Mathematical Physics* 59, 091420 (2018).
10. 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).
11. 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).

Invited Talks

1. *Lattice models and LLT polynomials*, Madison Combinatorics Seminar, UW Madison, May 2022.
2. *k-tilings of the Aztec Diamond*, Madison Probability Seminar, UW Madison, April 2022.
3. *k-tilings of the Aztec Diamond*, Solvable lattice model seminar, Stanford University, February 2022.
4. *A Vertex Model for LLT Polynomials*, Berkeley Combinatorics Seminar, UC Berkeley, December 2020.
5. *A Vertex Model for LLT Polynomials*, CMS Winter Meeting, December 2020.
6. *Arctic Curves, Lecture Hall Tableaux, and the Tangent Method*, LPSM Friday Seminar, Sorbonne University, November 2019.
7. *Arctic Curves, Lecture Hall Tableaux, and the Tangent Method*, Berkeley Combinatorics Seminar, UC Berkeley, September 2019.
8. *Arctic Curves in Lecture Hall Tableaux*, Asymptotic Algebraic Combinatorics Workshop, Banff International Research Station, March 2019.
9. *Random Tilings with the GPU*, Representation Theory, Mathematical Physics and Integrable Systems, Centre International de Rencontres Mathmatiques, 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 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

Outstanding GSI Award — 2018

Teaching Assistant — Fall 2018
Math 54 - Linear Algebra and Differential Equations
Instructor: Prof. Constantin Teleman

Teaching Assistant — Spring and Fall 2017
Math 53 - Multivariable Calculus
Instructor: Prof. Edward Frenkel

Teaching Assistant — Fall 2016
Math 54 - Linear Algebra and Differential Equations
Instructor: Prof. Ming Gu

Teaching Assistant — Spring 2016
Math 1B - Calculus
Instructor: Dr. Alexander Paulin

Teaching Assistant — Fall 2015
Math 1A - Calculus
Instructor: Dr. Alexander Coward

Undergraduate Mentoring

Matthew Nicoletti — 2019
Project: Simulations of large lecture hall tableaux,
now a graduate student at MIT

Murat Magomedov — 2019
Project: Kawasaki Dynamics and the Ising Model

Danny Wu — 2018
Project: Numerical computing fluctuations in the DWBC six vertex model

Pavel Dmitriev — 2017
Project: Numerically computing correlation functions in the DWBC six vertex model

Melissa Joseph — 2016
Project: Glueing formulas for discrete Laplacians,
now a graduate student at Boston University

Collaborators

Sylvie Corteel, Nicolai Reshetikhin, Ananth Sridhar, Matthew Nicoletti

Other Research Experience

National Undergraduate Fellowship in Plasma Physics June 2014 to Aug 2014
Princeton Plasma Physics Laboratory,
Princeton, NJ
Supervisor: Dr. Igor Kaganovich

- *Particle-in-cell simulations of abnormal Helium glow discharges using the Large Scale Plasma Code (LSP)*

Research Assistant March 2013 to May 2015
Department of Electrical Engineering and Computer Science,
University of California, Berkeley
Supervisor: Prof. Sayeef Salahuddin

- *Study of the domain wall processes responsible for magnetic switching and the effect of the Spin Hall Effect Spin Transfer Torque on switching behavior in micron-sized magnets*
- *Simulations of magnetic Skyrmions using the Object Oriented Micromagnetic Programming Framework (OOMMF)*