

Matan Harel

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Research Interests

Phase Transitions in Random Discrete Systems, Statistical Physics in Two Dimensions, Statistical Physics in Random Environments, Large Deviation Theory of Random Graphs

Academic Positions

Northeastern University , Boston, MA, USA	2020-Present
Assistant Professor of Mathematics	
Tel Aviv University , Tel Aviv, Israel	2017 - 2020
Zuckerman STEM Leadership Grant Postdoctoral Fellow, Supervised by Ron Peled	
Institute des Hautes Études Scientifiques , Bures-sur-Yvette, France	2016 - 2017
Postdoctoral Fellow, Supervised by Hugo Duminil-Copin	
University of Geneva , Geneva, Switzerland	2014 - 2016
Postdoctoral Assistant. Supervised by Hugo Duminil-Copin and Stanislav Smirnov	

Education

Courant Institute of Mathematical Sciences , New York, NY, USA	2009-2014
Ph.D. – Mathematics. May 2014. Advised by Sourav Chatterjee and Joel Spencer.	
M.A. – Mathematics. April 2011.	
University of California - Berkeley , Berkeley, CA, USA	2004-2008
B.A. – Applied Mathematics with an emphasis on statistical physics, and Molecular and Cellular Biology, with an emphasis in biochemistry; graduated <i>Summa Cum Laude</i>	

Publications

- N. Crawford, A. Glazman, **M. Harel**, R. Peled. *Macroscopic loops in the loop $O(n)$ model via XOR trick*. Preprint available at <https://arxiv.org/abs/2001.11977>.pdf.
- H. Duminil-Copin, **M. Harel**, B. Laslier, A. Raoufi, G. Ray. *Logarithmic variance for the height function of square-ice*. Preprint available at <https://arxiv.org/abs/1911.00092>.
- M. Harel**, F. Mousset, W. Samotij. *Upper tails via high moments and entropic stability*. Submitted – preprint available at <https://arxiv.org/abs/1904.08212>
- M. Aizenman, **M. Harel**, R. Peled. *Exponential decay of correlations in the 2D random field Ising model*. Journal of Statistical Physics 1(1): 1 -28

Publications (cont.)

- M. Harel**, Y. Spinka. *Finitary codings for the random-cluster model and other infinite-range monotone models*. Submitted – preprint available online at <https://arxiv.org/abs/1808.02333>
- H. Duminil-Copin, M. Gangebin, **M. Harel**, I. Manolescu, V. Tassion. *First Order Phase Transition for the Random-Cluster and Potts Models on Z^2 with $q > 4$* . To appear in *Annales Scientifiques de l'ENS* - preprint available at <https://arxiv.org/abs/1611.09877>
- H. Duminil-Copin, M. Gangebin, **M. Harel**, I. Manolescu, V. Tassion. *The Bethe Ansatz for the six-vertex and XXZ models: an exposition*. *Probability Surveys* 15: 102-130.
- M. Harel**, E. Mossel, P. Strack, O. Tamuz. *Rational Groupthink*. To appear in *Quarterly Journal of Economics* – preprint available at <https://arxiv.org/abs/1412.7172>
- S. Chatterjee, **M. Harel**. *Localization in Random Geometric Graphs With Too Many Edges*. *Annals of Probability* 48(2): 574-621.
- A. Kleinman, **M. Harel**, L. Pachter. *Affine and Projective Tree Metric Theorems*. *Annals of Combinatorics* 17(1): 205-228

Invited Talks

- “Logarithmic variance for the height function of square ice” at Recent advances in loop models and height functions, Fribourg, Switzerland September 2019
- “Upper tails via high moments and entropic stability” at the Bar-Ilan Probability seminar, Ramat Gan, Isarel November 2018
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the Courant Institute Probability Seminar, New York, NY September 2018
- “When More Information Reduces the Speed of Learning” at the Annual meeting of the Israeli Mathematical Union, Haifa, Israel May 2018
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the NYU Shanghai Joint Seminar (double lecture), Shanghai, China May 2018
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the Ben Gurion University Probability Seminar, Beer Sheva, Israel April 2018
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the Technion Probability Seminar, Haifa, Israel November 2017
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the Horowitz Probability and Ergodic Theory Seminar, Tel Aviv, October 2017
- “Discontinuity of the phase transition for the planar random-cluster and Potts models with $q > 4$ ” at the Statistical Laboratory Probability Seminar, Cambridge, UK October 2016

Invited Talks (cont.)

- “When More Information Reduces the Speed of Learning” at Random Roads: Joel Spencer's 70th Birthday Conference, New York, NY April 2016
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at Lyon-Geneva Probability Day, Lyon, France March 2015
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at Technion Probability Seminar, Haifa, Israel January 2015
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at Tel Aviv University Probability Seminar, Tel Aviv, Israel December 2014
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at University of Geneva Probability Seminar, Geneva, Switzerland February 2014
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at ETH Mittagseminar, Zurich, Switzerland September 2013
- “Localization and Phase Transition in Random Geometric Graphs with Too Many Edges” at Mini-Workshop on Phase Transition in Random Graphs, Graz, Austria September 2013
- “The Giant Clique in Random Geometric Graphs with Too Many Edges” at Courant Institute Probability/Mathematical Physics Seminar, New York, NY April 2013

Teaching Experience

Tel Aviv University, Tel Aviv, Israel

Co-lead instructor, Modern Topics in Probability Theory Spring 2019

University of Geneva, Geneva, Switzerland

Teaching Assistant, SWISSMAP Master Class in Planar Statistical Physics Fall 2015

Courant Institute of Mathematical Sciences, New York, NY, USA

Instructor, Calculus II Summer 2010 and Summer 2012

Teaching Assistant, Elementary Statistics Spring 2012

Teaching Assistant, Calculus I Fall 2011 and Fall 2012

Scholars for Educational Opportunity, New York, NY, USA

Math Teacher, 9th and 10th Grade Mathematics Spring 2009

University of California – Berkeley, Berkeley, CA, USA

Undergraduate Student Instructor, Linear Algebra Spring 2008

Undergraduate Student Instructor, Calculus I Spring 2007