

CURRICULUM VITÆ

Marek Biskup

(version November 19, 2007)

Education:

- *Master of Physics*: Charles University of Prague, 1994.
- *Master Class diploma*: Mathematical Research Institute, Utrecht 1995.
- *Doctor of Mathematics*: Catholic University of Nijmegen, 1999. Doctoral thesis: *On Three Techniques for Rigorous Proofs of First-Order Phase Transitions*. Advisors: Frank den Hollander and Roman Kotecký.

Language skills:

- Czech, English, Russian, Dutch.

Academic Positions:

- *Post-doc Researcher*, Microsoft Research; 1999-2001.
- *Hedrick Assistant Professor*, UCLA, 2001-2004.
- *Assistant Professor*, UCLA, 2004-2005.
- *Associate Professor*, UCLA, 2005-present.
- *Visiting Researcher*, Microsoft Research, 2007-2008.

Awards and grants:

- Summer internship at Microsoft Research, June-September 1999.
- 2003-2005 National Science Foundation research grant NSF DMS-0306167.
- 2003 UCLA Mathematics Department Distinguished Teaching Award.
- 2005-2007 National Science Foundation research grant NSF DMS-0505356.
- 2007-2011 US-Israel Binational Science Foundation research grant, BSF-2006477.

Graduate students:

- Nick Crawford (defended in 2007, currently postdoc at Berkeley Statistics)
- Alex Smith (advanced to candidacy in 2006, to finish in 2008)
- Tim Prescott (advanced to candidacy in 2006, to finish in 2008)

Synergistic activities:

- Associate editor of the *Electronic Journal of Probability*
- Catalina school *Stochastic Loewner Equation & Applications*, August 2005 (organizer).
- *Special session on Probability and Statistical Mechanics*, AMS regional meeting, San Francisco, March 2006 (organizer).

- Prague School *Mathematical Statistical Mechanics*, September 2007 (lecturer).
- Oberwolfach Workshop: *Spatial Random Processes and Statistical Mechanics*, September 2006 (organizer).
- Undergraduate Program of the Park City summer school, July 2007 (lecturer).
- XII Brazilian School of Probability, August 2008 (lecturer).
- Oberwolfach Miniworkshop: *Mathematical approaches to collective phenomena in large quantum systems*, September 2008 (organizer).
- Oberwolfach Workshop: *Spatial Random Processes and Statistical Mechanics*, August 2009 (organizer).

Teaching experience:

- Undergraduate: Calculus & upper division Probability Theory
- Graduate Probability (UCLA MATH 275ABC sequence)
- Topics courses (Path properties of Brownian motion, Domino Tilings, Statistical Mechanics of Ising model, Mean-field models of spin glasses, Algorithms)
- Summer school teaching (Prague in 2006, Park City Mathematics Institute in 2007)
- Coordination of “Professor apprenticeship program,” whereby UCLA grad student teach calculus to 120-180 size classrooms under full supervision of the faculty.

Research visits:

- The Fields Institute, Toronto, Canada, October-December 1998.
- Center for Theoretical Study, Prague, The Czech Republic, August 2002.
- Microsoft Research, Redmond, WA, June-July 2003; March 2005, June 2006.
- Kavli Institute for Theoretical Physics, August 2006.
- CPT-CNRS Luminy, Marseille, June 2007.

Other skills and interests:

- sports—hiking, swimming, skiing, ice-hockey.
- classical and jazz piano.
- computer programming (PostScript, C, Cocoa, HTML).

Invited talks:

- *Parabolic Anderson model with bounded potentials*, Oberwolfach meeting “Self-interacting Random Processes,” Oberwolfach, May 21–27, 2000.
- *Rigorous theory of partition function zeros in models with a convergent contour expansion*, Mark Kac seminarium voor Stochastiek en Fysica, Utrecht, June 9, 2000.
- *Statistical mechanics with complex weights: Rigorous theory of partition function zeros*, Randomized and Approximate Computation (RAND-APX) Workshop, Edinburgh, September 17-19, 2000.

- *Mean-field driven first-order phase transitions*, 21st Annual Western States Mathematical Physics Meeting, Caltech, February 18-19, 2002.
- *Critical scale for droplet formation in the 2D Ising model*, 2002 Southern California Probability Symposium, UCLA, December 8, 2002.
- *Mesoscopic droplet formation in the 2D Ising model*, job talk at UT Austin, January 23, 2004.
- *Graph distance in long-range percolation*, job colloquia: University of Illinois, Urbana-Champaign (January 27, 2004); University of Wisconsin, Madison (January 29, 2004); University of Oregon, Eugene (February 2, 2004); UC Davis (February 5, 2004); University of Colorado, Boulder (February 11, 2004).
- *Acquaintance chains and long-range percolation*, Joint EMS mathematical weekend, Prague, Czech Republic, September 3-5, 2004.
- *Scaling limit of simple random walk on supercritical percolation clusters*, BIRS workshop on Critical Scaling for Polymers and Percolation, Banff, Alberta, May 28-June 3, 2005.
- *Limit theorems for random walks on supercritical percolation clusters*, Midwest Probability Colloquium, Northwestern University, Evanston, October 21-22, 2005.
- *A quenched invariance principle for random walk on percolation clusters*, EURANDOM conference "Self-Interacting Random Walk," Eindhoven, March 29-31, 2006.
- *Phase coexistence of gradient Gibbs measures*, 95th Statistical Mechanics Conference, Rutgers University, New Brunswick, May 7-9, 2006.
- *Phase transitions via mean-field theory*, session on Statistical Mechanics, Stochastic Processes and Applications, Paris, July 2006.
- *Reflection positivity, Gaussian domination and phase transitions in lattice spin models*, summer school on Mathematical Statistical Mechanics, Prague, September 11-22, 2006.
- *Random walk among random conductances: some questions and answers*, AMS regional meeting, Salt Lake City, October 7-8, 2006.
- *Harmonic Deformation and Random Walk on Infinite Percolation Clusters*, DIMACS Workshop on Properties of Large Graphs, October 16-20, 2006.
- *Random walk driven by arbitrary small random conductances*, Banff meeting "Random Media", November 4-9, 2006.
- *Martingales and limit theorems for random walks*, department colloquium, University of Wisconsin, Madison, January 26, 2007.
- *Phase transitions in quantum-spin systems at positive temperatures*, Miniworkshop on Multi-scale and Variational Methods in Material Science and Quantum Theory of Solids, Oberwolfach, Germany, February 11-17, 2007.
- *Scaling limit for random walk on supercritical percolation cluster*, 25th Annual Western States Mathematical Physics Meeting, Caltech, February 19-20, 2007.
- *Anomalous heat kernel decay for random walk among random conductances*, GaTech-DIMACS Workshop on Phase Transitions in Random Structures and Algorithm, Atlanta, March 19-23, 2007.
- *Harmonic Embedding and Random Walk on Infinite Random Graphs*, IPAM workshop "Random Curves, Surfaces, and Transport," Los Angeles, April 16-20, 2007.
- *Coherent states and phase transitions in quantum spin systems*, workshop "Analysis and Stochastics in Quantum Many-Body Systems," MPI Leipzig, May 17-19, 2007.

- *Strong path localization for random walk in random doubly-exponential potential*, workshop on “Random Polymers”, EURANDOM, Eindhoven, June 18-22, 2007; also at probability session of Colóquio Brasileiro de Matemática, IMPA, Rio de Janeiro, August 3, 2007.
- *Random walk in reversible random environment and connections to gradient fields*, a “conference” at the 11th Brazilian School of Probability, São Sebastião, August 5-11, 2007.
- *Random walk in reversible random environments*, Oberseminar Stochastik, Bonn University, August 27, 2007.
- *Gibbsian approach to some models of anharmonic crystals*, conference on “Stochastic Analysis of Large Scale Interacting Systems,” Fukuoka (Japan), October 22–26, 2007.

Contributed talks and seminars:

- *Rigorous theory of partition function zeros at first order phase transitions*, University of British Columbia, Vancouver, April 19, 2000.
- *Rigorous theory of partition function zeros at first order phase transitions*, International Congress of Mathematical Physics, London, July 17-22, 2000.
- *Long-time tails in the parabolic Anderson model with a bounded potential*, STATMECH 2000, Satellite Meeting to ICMP, Cambridge UK, August 9-12, 2000.
- *Rigorous proofs of first-order phase transitions by mean-field bounds*, Caltech, Pasadena, May 8, 2002.
- *Critical scale for droplet formation in the 2D Ising model*, UC Davis, November 12, 2002.
- *Phase transition and critical behavior in a model of organized criticality*, University of Southern California, Los Angeles, February 7, 2003.
- *Rigorous proofs of first-order phase transitions by comparison to mean-field theory*, UC Santa Barbara, October 28, 2003.
- *A perturbative proof of the Lee-Yang Circle Theorem*, UCLA Analysis Seminar, April 30, 2004.
- *Droplet formation in an Ising-based model of nonvolatile solutions*, UC Irvine, February 22, 2005.
- *Scaling limit of simple random walk on supercritical percolation clusters*, UC Berkeley (March 30, 2005), Stanford (April 25, 2005), UC Davis (April 26, 2005).
- *Phase coexistence of gradient Gibbs measures*, UCSD (December 1, 2005), USC (February 2, 2006), UCI (February 21, 2006).
- *A quenched invariance principle for random walk on percolation clusters*, Courant Institute, NYU (May 3, 2006).
- *The corrector approach to random walk in random environment*, The Fields Institute “Workshop on Random Walks in Random Environments”, Toronto (May 17, 2006).
- *Proofs of phase transitions by comparison to mean-field theory*, UCI (June 6, 2006).
- *Random walk driven by arbitrary small random conductances*, UC Davis and UC Berkeley (December 2006).
- *Anomalous heat kernel decay for random walk among random conductances*, UC Irvine (April 2007).
- *Harmonic deformation and random walk on infinite percolation cluster*, University of Minnesota, Minneapolis (April 2007).
- *Mean-field dynamics of bosons in a trap: Exchangeability approach*, UC Irvine (May 2007).

PUBLICATIONS

Published & accepted papers:

- [1] M. Biskup, *Reflection positivity of the random-cluster measure invalidated for non-integer q* , J. Statist. Phys. **92** (1998), no. 3/4, 369-375.
- [2] M. Biskup and F. den Hollander, *A heteropolymer near a linear interface*, Ann. Appl. Probab. **9** (1999), no. 3, 668-687.
- [3] M. Biskup, C. Borgs, J.T. Chayes and R. Kotecký, *Gibbs states of graphical representations of the Potts model with external fields*, J. Math. Phys. **41** (2000), no. 3, 1170-1210.
- [4] M. Biskup, L. Chayes and R. Kotecký, *Coexistence of partially disordered/ordered phases in an extended Potts model*, J. Statist. Phys. **99** (2000), no. 5/6, 1169-1206.
- [5] M. Biskup, C. Borgs, J.T. Chayes, L.J. Kleinwaks and R. Kotecký, *General theory of Lee-Yang zeros in models with first-order phase transitions*, Phys. Rev. Lett. **84** (2000), no. 21, 4794-4797.
- [6] M. Biskup and W. König, *Long-time tails in the parabolic Anderson model with bounded potential*, Ann. Probab. **29** (2001), no. 2, 636-682.
- [7] M. Biskup and W. König, *Screening effect due to heavy lower tails in one-dimensional parabolic Anderson model*, J. Statist. Phys. **102** (2001), no. 5/6, 1253-1270.
- [8] M. Biskup, L. Chayes and R. Kotecký, *On the formation/dissolution of equilibrium droplets*, Europhys. Lett. **60** (2002), no. 1, 21-27.
- [9] M. Biskup, Ph. Blanchard, L. Chayes, D. Gandolfo and T. Krüger, *Phase transition and critical behavior in a model of organized criticality*, Probab. Theory Rel. Fields. **128** (2004), no. 1, 1-41.
- [10] M. Biskup and L. Chayes, *Rigorous analysis of discontinuous phase transitions via mean-field bounds*, Commun. Math. Phys. **238** (2003), no. 1-2, 53-93.
- [11] M. Biskup, L. Chayes and R. Kotecký, *Critical region for droplet formation in the two-dimensional Ising model*, Commun. Math. Phys. **242** (2003), no. 1-2, 137-183.
- [12] M. Biskup, L. Chayes and R. Kotecký, *A proof of the Gibbs-Thomson formula in the droplet formation regime*, J. Statist. Phys. **116** (2004), no. 1-4, 175-203.
- [13] M. Biskup, L. Chayes and R. Kotecký, *Comment on: "Theory of the evaporation/condensation transition of equilibrium droplets in finite volumes"*, Physica A **327** (2003) 589-592.
- [14] M. Biskup, C. Borgs, J.T. Chayes, L.J. Kleinwaks and R. Kotecký, *Partition function zeros at first-order phase transitions: A general analysis*, Commun. Math. Phys. **251** (2004), no. 1, 79-131
- [15] M. Biskup, *On the scaling of the chemical distance in long-range percolation models*, Ann. Probab. **32** (2004), no. 4, 2938-2977.
- [16] M. Biskup, C. Borgs, J.T. Chayes, and R. Kotecký, *Partition function zeros at first-order phase transitions: Pirogov-Sinai theory*, J. Statist. Phys. **116** (2004), no. 1-4, 97-155.
- [17] M. Biskup, L. Chayes and Z. Nussinov, *Orbital ordering in transition-metal compounds: I. The 120-degree model*, Commun. Math. Phys. **255** (2005), no. 2, 253-292
- [18] M. Biskup, L. Chayes, Z. Nussinov and J. van den Brink, *Orbital order in classical models of transition-metal compounds*, Europhys. Lett. **67** (2004), no. 6, 990-996.
- [19] M. Biskup, L. Chayes and S.A. Kivelson, *Order by disorder, without order, in a two-dimensional spin system with $O(2)$ symmetry*, Ann. Henri Poincaré **5** (2004), no. 6, 1181-1205.
- [20] K.S. Alexander, M. Biskup and L. Chayes, *Colligative properties of solutions: I. Fixed concentrations*, J. Statist. Phys. **119** (2005), no. 3-4, 479-507.

- [21] K.S. Alexander, M. Biskup and L. Chayes, *Colligative properties of solutions: II. Vanishing concentrations*, J. Statist. Phys. **119** (2005), no. 3-4, 509–537.
- [22] M. Biskup, L. Chayes and N. Crawford, *Mean-field driven first-order phase transitions in systems with long-range interactions*, J. Statist. Phys. **122** (2006), no. 6, 1139–1193.
- [23] M. Biskup and R. Kotecký, *Forbidden gap argument for phase transitions proved by means of chessboard estimates*, Commun. Math. Phys. **264** (2006), no. 3, 631–656.
- [24] N. Berger and M. Biskup, *Quenched invariance principle for simple random walk on percolation clusters*, Probab. Theory Rel. Fields **137** (2007), no. 1–2, 83–120.
- [25] M. Biskup, L. Chayes and S.A. Smith, *Large-deviations/thermodynamic approach to percolation on the complete graph*, Random Structures & Algorithms **31** (2007), no. 3, 354–370.
- [26] M. Biskup, L. Chayes and S. Starr, *Quantum spin systems at positive temperature*, Commun. Math. Phys. **269** (2007), no. 3, 611–657.
- [27] M. Biskup and R. Kotecký, *Phase coexistence of gradient Gibbs measures*, Probab. Theory Rel. Fields **139** (2007), no. 1-2, 1–39.
- [28] M. Biskup, *Reflection positivity and phase transitions in lattice spin models*, lecture notes for the Prague Summer School on Mathematical Statistical Mechanics, September 2006; to appear in school proceedings (arXiv:math-ph/0610025).
- [29] M. Biskup, L. Chayes and S.A. Kivelson, *On the absence of ferromagnetism in typical 2D ferromagnets*, Commun. Math. Phys. **274** (2007), no. 1, 217–231.
- [30] N. Berger, M. Biskup, C. Hoffman and G. Kozma, *Anomalous heat-kernel decay for random walk among bounded random conductances*, Ann. Inst. Henri Poincaré (to appear)
- [31] M. Biskup and T. Prescott, *Functional CLT for random walk among bounded conductances*, Electron. J. Probab. **12** (2007), Paper no. 49, 1323–1348.

Submitted papers, preprints & work in progress:

- [32] M. Biskup, *Graph diameter in long-range percolation*, preprint (arXiv:math.PR/0406379).
- [33] M. Biskup and H. Spohn, *Scaling limit for a class of gradient fields with non-convex potentials*, submitted (arXiv:0704.3086).
- [34] M. Biskup and T. Prescott, *Invariance principle for random walk on shift-invariant random graphs*, in preparation.
- [35] M. Biskup and A. Smith, *Cycle-free percolation on complete and random d -regular graphs*, in preparation.
- [36] M. Biskup, *Lecture notes for the PCMI Undergraduate Summer School*, a PDF version available at <http://www.math.ucla.edu/~biskup/papers.html>
- [37] M. Biskup and N. Crawford, *Mean-field dynamics of interacting bosons: Exchangeability approach*, in preparation.
- [38] M. Biskup and W. König, *Eigenvalue order statistics and path localization for a random walk in a random potential*, in preparation.