Michał Kotowski

Personal Data

date of birth:	18 December 1987
citizenship:	Polish
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Research interests

- **discrete probability, phase transitions in random structures, statistical physics**
  random permutations, interchange process and its generalizations

- **geometric group theory, random walks, spectral graph theory**
  random groups, random walks on infinite groups

Employment

2022 –	assistant professor at the Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw
2019 – 2022	assistant professor at the Institute of Mathematics, Polish Academy of Sciences (IMPAN)
2018 – 2019	research assistant at the Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw
2017 – 2018	postdoctoral position in the Concentration of Measure project (PI: Radosław Adamczak) at the Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw
2016 – 2017	WCMCS postdoctoral position at the Faculty of Mathematics, Informatics, and Mechanics, University of Warsaw

Education

2013 – 2016	PhD in mathematics, Department of Mathematics, University of Toronto
advisor: Bálint Virág
2006 – 2011	M. Sc. in Mathematics at the University of Warsaw
Faculty of Mathematics, Informatics and Mechanics
studied mathematics, physics and computer science in an interdisciplinary program at College Of Inter-Faculty Individual Studies In Mathematics and Natural Sciences
advisor: Piotr Przytycki

Research grants

2019 – 2022	*Structure of random permutations and the interchange process*, funded by the National Science Centre (NCN), grant number 2019/32/C/ST1/00525 (SONATINA 3), total funding: 597 419 PLN

Publications

2022　*Large deviations for the interchange process on the interval and incompressible flows*, Michał Kotowski, Bálint Virág, Geom. Funct. Anal. 32, 1357–1427

2021　*Phase transition for the interchange and quantum Heisenberg models on the Hamming graph*, Radosław Adamczak, Michał Kotowski, Piotr Miłoś, Ann. Inst. H. Poincaré Probab. Statist. 57 (1) 273 - 325

2019　*The interchange process with reversals on the complete graph*, Jakob E. Björnberg, Michał Kotowski, Benjamin Lees, Piotr Miłoś, Electron. J. Probab. 24, no. 108, 43 pp.

2019　*A note on concentration for polynomials in the Ising model*, Radosław Adamczak, Michał Kotowski, Bartłomiej Polaczyk, Michał Strzelecki, Electron. J. Probab. 24, no. 42, 22 pp.

2015　*Non-Liouville groups with return probability exponent at most 1/2*, Michał Kotowski, Bálint Virág, Electron. Commun. Probab. 20, no. 12, 12 pp.

2013　*Random groups and Property (T): Żuk's theorem revisited*, Marcin Kotowski, Michał Kotowski, J. London Math. Soc. 88 (2): 396-416

2012　*Tight Bell inequalities with no quantum violation from qubit unextendible product bases*, Remigiusz Augusiak, Tobias Fritz, Marcin Kotowski, Michał Kotowski, Marcin Pawłowski, Maciej Lewenstein, Antonio Acín, Phys. Rev. A 85, 042113

2010　*Universal nonlinear entanglement witnesses*, Marcin Kotowski, Michał Kotowski, Marek Kuś, Phys. Rev. A 81, 062318

Longer research visits

January-June 2022	research stay at Alfréd Rényi Institute of Mathematics, Budapest
January-July 2015	research stay at Alfréd Rényi Institute of Mathematics, Budapest
March-August 2014	research stay at Alfréd Rényi Institute of Mathematics, Budapest
February 2014	one month at IHP trimester on random walks and asymptotic geometry of groups at IHP, Paris

Selected invited talks

February 2022	*Large deviations for the interchange process on the interval and incompressible flows*, Alfréd Rényi Institute of Mathematics, Budapest
January 2021	*Macroscopic structures in random permutations and random loop models*, IMPAN, Probability Seminar
December 2019	*Macroscopic cycles in the interchange process and the quantum Heisenberg model on the Hamming graph*, University of Warwick, Statistical Mechanics Seminar
June 2019	*Phase transition for the interchange and quantum Heisenberg models on the Hamming graph*, Probability and Analysis 2019 conference, Będlewo
November 2018	*Macroscopic cycles in the interchange process and the quantum Heisenberg model on the Hamming graph*, Budapest University of Technology and Economics, Stochastics Seminar
November 2018	*Macroscopic cycles in the interchange process and the quantum Heisenberg model on the Hamming graph*, Tel Aviv University, Horowitz Seminar on Probability, Ergodic Theory and Dynamical Systems
December 2016	*Limits of random permuton processes and large deviations for the interchange process*, Alfréd Rényi Institute of Mathematics, Budapest
September 2016	*Limits of random permuton processes and large deviations for the interchange process*, MIT Mathematics Department, Probability Seminar
February 2015	*Non-Liouville groups with return probability exponent at most 1/2*, Budapest University of Technology and Economics, Stochastics Seminar
November 2014	*Non-Liouville groups with return probability exponent at most 1/2*, McGill University, Geometric Group Theory Seminar
September 2014	*Non-Liouville groups with return probability exponent at most 1/2*, University of Toronto, Probability Seminar
November 2012	*Random groups and property (T)*, University of Toronto, Probability Seminar
September 2012	*Random groups and property (T)*, Budapest University of Technology and Economics, Stochastics Seminar

Expository and popular articles

2014	*Kafelkowanie prostokątów i grafy planarne*, M. Kotowski, M. Kotowski, Delta 10/2014 ("Rectangle tilings and planar graphs", in Polish)
2013	*Hipoteza Kakeyi*, M. Kotowski, M. Kotowski, Delta 04/2013 ("Kakeya conjecture", in Polish)
2010	*Jak wyznaczyć liczbę pi za pomocą zderzeń*, M. Kotowski, M. Kotowski, Delta 10/2010 ("How to determine π using collisions", in Polish)

Former students

– Joanna Jasińska (MSc program in mathematics, University of Warsaw, graduated 2021)

Teaching experience

- University of Warsaw
  - Probability On Graphs, Faculty of Mathematics, Informatics, and Mechanics, 2019-2020 (graduate topics course)
  - Analytic Functions of One Complex Variable, Faculty of Mathematics, Informatics, and Mechanics, 2019-2020 (tutorials)
  - Mathematical Analysis II.1, Faculty of Mathematics, Informatics, and Mechanics, 2019-2020 (tutorials)
  - Probability Theory I, Faculty of Mathematics, Informatics, and Mechanics, 2018-2019 (tutorials)
  - Introduction to Mathematics I, cognitive science undergraduate program, 2018-2019 (tutorials)
  - Mathematical Analysis I.1, Faculty of Mathematics, Informatics, and Mechanics, 2018-2019 (tutorials)
  - Mathematical Analysis I.1, I.2, Faculty of Mathematics, Informatics, and Mechanics, 2016-2017 (tutorials)
- University of Toronto
  - Graduate Probability I and II, Deparment of Mathematics, 2015-2016 (tutorials)
  - various undergraduate courses (Calculus, Partial Differential Equations, Ordinary Differential Equations), 2013-2016 (tutorials)

Outreach

2013	Visitor at Canada/USA Mathcamp, an intensive summer program for mathematically talented high school students; taught course on Combinatorics of Partitions
2009 –	Volunteering for Polish Children's Fund as a tutor at scientific workshops for gifted high school students; taught courses in combinatorics and probability
2007 – 2015	Co-organizer of Summer Scientific School, aimed at exceptional high-school students interested in mathematics, computer science and physics; taught courses in combinatorics and probability

Other activities

May 2013	coorganized Geometric Group Theory Student Workshop in Będlewo
2012 – 2014	coorganizing a Probability, Geometry and Groups seminar at the University of Toronto
April 2012	taught a short course on spectral graph theory and expanders at the University of Warsaw
2010 – 2011	coorganizing a student seminar of Mathematics Students Association in analysis, geometry and probability (University of Warsaw)
2010 – 2011	Member of Polish Mathematical Olympiad's Warsaw regional comitee,
2006 – 2011	member of the Physics Students Club of the University of Warsaw (SKFiz UW)
2006 – 2011	member of the Mathematics Students Association of the University of Warsaw (KPM UW), vice-president since 2009

Awards and scholarships

2013 – 2016	Connaught International Scholarship for Doctoral Students (University of Toronto)
2011	2nd prize in the Polish Mathematical Society competition for the best student paper
2010	Scholarship of the Minister of Science and Higher Education for exceptional achievements in science
2007 – 2011	Scholarship for academic achievements (University of Warsaw)