

Kilian Raschel

March 17, 1983

CNRS Researcher since October 2011 (First class CNRS researcher since October 2015)

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Academic education and positions

CNRS researcher, Tours University (France) 10/2011–08/2015 and 03/2016–present

Habilitation thesis “Elliptic combinatorics and walks in cones” (defense on Sept. 16, 2016)

Committee: Philippe Biane (CNRS & Paris-Est University), Philippe Bougerol (Paris 6 University), Mireille Bousquet-Mélou (CNRS & Bordeaux University), Christian Krattenthaler (Vienna University), Irina Kurkova (Paris 6 University), Emmanuel Lesigne (Tours University), Wolfgang Woess (Graz University of technology)

CNRS researcher, Pacific Institute for Mathematical Sciences (Vancouver, Canada) 09/2015–02/2016

Post-doctorate at Bielefeld University (Germany) 2010–2011

Group of Barbara Gentz, Professor at Bielefeld University

PhD dissertation “Walks confined in a quadrant” 2007–2010 (defense on November 24, 2010)

Under the supervision of Irina Kurkova, Professor at Paris VI University (Probabilities and Random Models Laboratory)

Prize Jacques Neveu 2010 for the best French PhD thesis in probability and statistics

Committee: Philippe Biane (CNRS & Paris-Est University), Philippe Bougerol (Paris 6 University), Nathanaël Enriquez (Paris Nanterre University), Guy Fayolle (Inria Rocquencourt), Philippe Flajolet (Inria Rocquencourt), Wolfgang König (WIAS Berlin), Irina Kurkova (Paris 6 University), Marc Peigné (Tours University)

École Normale Supérieure de Cachan 2005–2007

Publications

Theses

- [Elliptic combinatorics and walks in cones](#). *Habilitation thesis* (2016) 1–103
- Walks confined to a quadrant. *PhD thesis of Pierre et Marie Curie University (Paris 6)* (2010) 1–200. Thesis prize Jacques Neveu 2010

Preprints and accepted papers

- Explicit expression for the stationary distribution of reflected Brownian motion in a wedge, with Sandro Franceschi. *arXiv:1703.09433* (2017) 1–24
- The Z -invariant Ising model via dimers, with Cédric Boutillier and Béatrice de Tilière. *arXiv:1612.09082* (2016) 1–70
- Weighted lattice walks and universality classes, with Julien Courtiel, Steve Melczer and Marni Mishna. *Journal of Combinatorial Theory, Series A* (to appear). *arXiv:1609.05839* (2016) 1–43
- Tutte’s invariant approach for Brownian motion reflected in the quadrant, with Sandro Franceschi. *ESAIM: Probability and Statistics* (to appear). *arXiv:1602.03054* (2016) 1–14

Papers

- The Z -invariant massive Laplacian on isoradial graphs, with Cédric Boutillier and Béatrice de Tilière. *Inventiones mathematicae* **208** (2017) 109–189
- A human proof of Gessel’s lattice path conjecture, with Alin Bostan and Irina Kurkova. *Transactions of the American Mathematical Society* **369** (2017) 1365–1393
- t -Martin boundary of killed random walks in the quadrant, with Cédric Lecouvey. *Séminaire de Probabilités XLVIII* (2016) 305–323
- Counting quadrant walks via Tutte’s invariant method, with Olivier Bernardi and Mireille Bousquet-Mélou. *Discrete Mathematics & Theoretical Computer Science Proceedings*. In: 28th International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2016) 203–214
- On the exit time from a cone for random walks with drift, with Rodolphe Garbit. *Revista Matemática Iberoamericana* **32** (2016) 511–532
- New steps in walks with small steps in the quarter plane, with Irina Kurkova. *Annals of Combinatorics* **19** (2015) 461–511

- About a possible analytic approach for walks in the quarter plane with arbitrary big jumps, with Guy FAYOLLE. *Comptes rendus Mathématique* **353** (2015) 89–94
- On the exit time from a cone for Brownian motion with drift, with Rodolphe GARBIT. *Electronic Journal of Probability* **19** (2014) 1–27 no. 63
- Random walks in the quarter plane, discrete harmonic functions and conformal mappings, with an appendix by Sandro FRANCESCHI. *Stochastic Processes and their Applications* **124** (2014) 3147–3178
- Non-D-finite excursions in the quarter plane, with Alin BOSTAN and Bruno SALVY. *Journal of Combinatorial Theory, Series A* **121** (2014) 45–63
- Some aspects of fluctuations of random walks on \mathbf{R} and applications to random walks on \mathbf{R}_+ with non-elastic reflection at 0, with Rim ESSIFI and Marc PEIGNÉ. *ALEA. Latin American Journal of Probability and Mathematical Statistics* **10** (2013) 591–607
- Random walks reaching against all odds the other side of the quarter plane, with Johan van LEEUWAARDEN. *Journal of Applied Probability* **50** (2013) 85–102
- Passage time of a random walk in the quarter plane for opinions in the voter model, with Irina KURKOVA. *Queueing Systems* **74** (2013) 219–234
- Extinction probabilities for a distylous plant population modeled by an inhomogeneous random walk on the positive quadrant, with Pauline LAFITTE-GODILLON and Viet Chi TRAN. *SIAM Journal on Applied Mathematics* **73** (2013) 700–722
- The compensation approach for walks with small steps in the quarter plane, with Ivo ADAN and Johan van LEEUWAARDEN. *Combinatorics, Probability and Computing* **22** (2013) 161–183
- On the functions counting walks with small steps in the quarter plane, with Irina KURKOVA. *Publications Mathématiques de l’IHÉS* **116** (2012) 69–114
- Some exact asymptotics in the counting of walks in the quarter plane, with Guy FAYOLLE. *Discrete Mathematics & Theoretical Computer Science Proceedings*. In: 23rd International Meeting on Probabilistic, Combinatorial, and Asymptotic Methods for the Analysis of Algorithms (AofA 2012) 109–124
- Counting walks in a quadrant: a unified approach via boundary value problems. *Journal of the European Mathematical Society* **14** (2012) 749–777
- Random walks in the quarter plane with zero drift: an explicit criterion for the finiteness of the associated group, with Guy FAYOLLE. *Markov Processes and Related Fields* **17** (2011) 619–636
- Random walks in \mathbf{Z}_+^2 with non-zero drift absorbed at the axes, with Irina KURKOVA. *Bulletin de la Société Mathématique de France* **139** (2011) 341–387
- Green functions for killed random walks in the Weyl chamber of $\mathrm{Sp}(4)$. *Annales de l’Institut Henri Poincaré* **47** (2011) 1001–1019
- Explicit expression for the generating function counting Gessel’s walks, with Irina KURKOVA. *Advances in Applied Mathematics* **47** (2011) 414–433
- Green functions and Martin compactification for killed random walks related to $\mathrm{SU}(3)$. *Electronic Communications in Probability* **15** (2010) 176–190
- On the holonomy or algebraicity of generating functions counting lattice walks in the quarter plane, with Guy Fayolle. *Markov Processes and Related Fields* **16** (2010) 485–496

Grants

Project MADACA (120 k€)

Project funded by the Région Centre-Val de Loire (France)

2014–2016

In collaboration with Jérémie GUILHOT (associate professor at Tours University), we have obtained a grant for the project MADACA, whose title is “Random walks and Dunkl processes: algebraic and combinatorial approaches”. This project covers the period September 2014–December 2016. The total amount funded is 120 k€. We have hired a (one year) postdoctoral researcher (Pierre TARRAGO) and funded several conferences. The website of the project can be found [here](#).

Project “Walks with big jumps in the quarter plane” (6 k€)

Projet PEPS JC

2016

This project is funded by the CNRS (6 k€) and is at the interface of combinatorics and probability theory. The consortium is composed of four young researchers: François CHAPON, Cécile MAILLER, Kilian RASCHEL and Pierre TARRAGO.

Organisation of conferences, seminars and workshops

Final conference of MADACA project Sologne (domaine de Chalès), joint organization with Jérémie GUILHOT	20–24.06.16
Séminaire tournant de probabilités et statistiques Tours	01.06.15
Winter school of MADACA project Tours, joint organization with Jérémie GUILHOT	05–09.01.15
Start meeting of MADACA project Orléans, joint organization with Jérémie GUILHOT	11.09.14
Conference Scaling limits of random walks in the quarter plane Eurandom (Eindhoven), joint organization with Johan van LEEUWAARDEN	13–16.02.12
Probability and ergodic theory seminar Weekly seminar of Tours University	2012–present

Popularization

Interventions in (written and audiovisual) press	
Interview radio CBC/Radio-Canada Program Boulevard du Pacifique	<i>February 2016</i>
La Nouvelle République Article on the Mathematics department of Tours University	<i>October 2012</i>
Recent popularization articles	
Compter les excursions sur un échiquier <i>Pour la Science</i> 449 40–46, March 2015, with Alin BOSTAN	2015
Walks confined to a quadrant <i>Matapli</i> , November 2012	2012
Promenades sur le quart de plan <i>La Recherche</i> 462 18–18, March 2012, by Philippe PAJOT	2012

Supervision of PhD students and Master students

PhD thesis of Amélie TROTIGNON (co-supervision with Marni MISHNA) Walks with big jumps in the quarter plane	2016–2019
PhD thesis of Sandro FRANCESCHI (co-supervision with Irina KURKOVA) Analytic approach for reflected Brownian motion in the quarter plane	2014–2017
Master theses Combinatorics and probability theory (mainly)	2011–present

Teaching

Paris 6 University, Bielefeld University and Tours University (mainly in probability and statistics) Tutorials and lectures	2007–present
Lycée Descartes, Tours Tutorials	2011–present

Invitations

Long stays	
Pacific Institute for the Mathematical Sciences, Vancouver, Canada	01.09.15–29.02.16
Münster University, Germany	15.03.15–15.05.15
Short stays (less than two weeks), selection	
Workshop on restricted lattice walks, RISC, Linz	27–29.05.15
Workshop Approximation and Combinatorics, CIRM	20–24.04.15
Conference Functional equations and special functions, Grenoble	16–19.02.15
Workshop on Persistence probabilities and related fields, Darmstadt	15–18.07.14

Workshop Enumerative Combinatorics , Oberwolfach	02–08.03.14
Conference Lévy Processes and Autosimilarity , Hammamet	04–09.11.13
München University	22–26.10.12
Journées MAS 2012	29–31.08.12
Münster University	09–14.07.12
Journées de Probabilités 2012	18–22.06.12
Inria Paris-Rocquencourt	04–08.06.12
Workshop MODEMAVE	31.05.12–01.06.12
LaBRI	30.04.12–03.05.12
ALEA 2012	05–09.03.12
Workshop Scaling limits of random walks in the quarter plane , Eurandom	13–16.02.12
Journées de combinatoire de Bordeaux 2012	01–03.02.12

Services for the mathematical community and the administration of Tours University

Academic services

Reviewer for international journals 2011–present

I was reviewer for articles submitted to *Annals of Applied Probability*, *AofA 2012* (International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms), *AofA 2014*, *Applied Mathematics Research eXpress*, *Combinatorics, Probability & Computing*, *Comptes Rendus de l'Académie des sciences*, *Discrete Mathematics*, *Electronic Communications in Probability*, *FPSAC 2015* (International Conference on Formal Power Series and Algebraic Combinatorics), *Journal of Applied Probability*, *Markov processes and related fields*, *Queueing Systems*, *SIAM Journal on Applied Mathematics*, etc.

Reviewer for [Mathematical Reviews](#) 2011–present

Tours University and LMPT

Member of the Mathematics department council 2011–present

Member of the University council (“conseil d’administration”) 2016–present

Abstract

- 30 publications in international journals (in particular in *Inventiones mathematicae*, *Publications Mathématiques de l’IHÉS*, *Transactions of the American Mathematical Society*, *Journal of the European Mathematical Society*)
- Publication of several popularization articles (*La Recherche*, *Pour La Science*)
- Prize [Jacques Neveu 2010](#) for the best French PhD thesis in probability and statistics
- Many invitations in international and national conferences (in particular for the workshop [Enumerative Combinatorics](#) in Oberwolfach)
- Long stays in abroad universities (in 2015–2016: 2 months in Münster at WWU, 6 months in Vancouver at UBC)
 - Coordinator of the project [MADACA](#) on random walks (120k€, 2014–2016)
 - Supervisor of two PhD students
 - Holder of the “Prime d’Excellence Scientifique”, awarded by the CNRS
 - Involvement in the administration of Tours University: member of the Mathematics department council, member of the University council (“conseil d’administration”)
 - Teaching service at Tours University