Bence Borda

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Profile

- **Mathematician** with research interest in:
  - Probabilistic number theory
  - Random walks on groups
  - Fourier analysis
- **Languages**: Hungarian (native), English (full professional proficiency)

Education

2011–2016 **Ph.D. in Mathematics**, Rutgers University, USA
Dissertation: *The number of lattice points in irrational polytopes*
Advisor: József Beck

2008–2011 **B.Sc. in Mathematics**, Eötvös Loránd University, Hungary
Thesis: *A Denjoy–Young–Saks tétel* (in Hungarian)
Advisor: Miklós Laczkovich

Positions

2019– **Postdoc**
Institute of Analysis and Number Theory,
Graz University of Technology, Austria

2017–2019 **Research Fellow**
Number Theory Department,
Alfréd Rényi Institute of Mathematics, Hungarian Academy of Sciences

Teaching

2021 **Instructor**, Graz University of Technology, Austria
Analytic Number Theory and Diophantine Approximation (graduate course)

2017–2019 **Instructor**, Budapest Semesters in Mathematics, Hungary
Topics in Analysis
Introduction to Mathematical Analysis

2017 **Instructor**, Eötvös Loránd University, Hungary
Real Analysis (graduate course)

2012–2016 **Teaching Assistant**, Rutgers University, USA
Calculus I
Calculus II for the Mathematical and Physical Sciences
Differential Equations for Engineering and Physics
Real and complex analysis problem solving session (graduate course)

2012–2015 **Instructor**, Rutgers University, USA
Calculus I
Calculus II for the Mathematical and Physical Sciences

Fellowships & Awards

2022– Lise Meitner Fellowship, Austrian Science Fund (FWF) Project M 3260-N
2012 Weill Fellowship, Rutgers University, USA
2011 Academic Excellence Award, Rutgers University, USA
2010 Fellowship Granted by the Republic, Eötvös Loránd University, Hungary
2009 First Prize, International Mathematics Competition (IMC)

Professional activities

2017–2019 National High School Academic Competition (OKTV) in Mathematics, Member of the Organizing Committee

Refereeing in: The Quarterly Journal of Mathematics, Stochastic Processes and their Applications, Canadian Journal of Mathematics, European Journal of Combinatorics, Discrete Mathematics, Discrete and Computational Geometry, Acta Arithmetica, Ramanujan Journal, Journal of Complexity, Acta Mathematica Hungarica, Periodica Mathematica Hungarica, Graphs and Combinatorics

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Papers

[27] *Eigenvalues of random matrices from compact classical groups in Wasserstein metric.* Submitted.

[26] *Limit laws for cotangent and Diophantine sums.* (with L. Frühwirth and M. Hauke) Submitted.

[25] *Equidistribution of continued fraction convergents in* $\mathrm{SL}(2,\mathbb{Z}_m)$ *with an application to local discrepancy.* Submitted.

[24] *Optimal and typical* L^2 *discrepancy of 2-dimensional lattices.* Submitted.

[23] *A conjecture of Zagier and the value distribution of quantum modular forms.* (with C. Aistleitner) Submitted.

[22] *Pointwise and correlation bounds on Dedekind sums over small subgroups.* (with M. Munsch and I. Shparlinski) To appear in Res. Number Theory.

[21] *Riesz energy,* L^2 *discrepancy, and optimal transport of determinantal point processes on the sphere and the flat torus.* (with P. Grabner and R. Matzke) To appear in Mathematika.

[20] *Remarks on sums of reciprocals of fractional parts.* To appear in Acta Arith.

[19] *On the distribution of Sudler products and Birkhoff sums for the irrational rotation.* To appear in Ann. Inst. Fourier (Grenoble).

[18] *On the distribution of partial quotients of reduced fractions with fixed denominator.* (with C. Aistleitner and M. Hauke) Trans. Amer. Math. Soc. 377 (2024), 1371–1408.

[17] *Limit laws of maximal Birkhoff sums for circle rotations via quantum modular forms.* Int. Math. Res. Not. IMRN 2023 (2023), 19340–19389.

[16] *Random walks on the circle and Diophantine approximation.* (with I. Berkes) J. Lond. Math. Soc. 108 (2023), 409–440.

[15] *Empirical measures and random walks on compact spaces in the quadratic Wasserstein metric.* Ann. Inst. Henri Poincaré Probab. Stat. 59 (2023), 2017–2035.

[14] *Maximizing Sudler products via Ostrowski expansions and cotangent sums.* (with C. Aistleitner) Algebra Number Theory 17 (2023), 667–717.

[13] *On the metric theory of approximations by reduced fractions: a quantitative Koukoulopoulos–Maynard theorem.* (with C. Aistleitner and M. Hauke) Compos. Math. 159 (2023), 207–231.

[12] *Quantum invariants of hyperbolic knots and extreme values of trigonometric products.* (with C. Aistleitner) Math. Z. 302 (2022), 759–782.

[11] *On the discrepancy of random subsequences of $\{n\alpha\}$, II.* (with I. Berkes) Acta Arith. 199 (2021), 303–330.

[10] *Berry–Esseen smoothing inequality for the Wasserstein metric on compact Lie groups.* J. Fourier Anal. Appl. 27 (2021), 13.

[9] *Equidistribution of random walks on compact groups II. The Wasserstein metric.* Bernoulli 27 (2021), 2598–2623.

[8] *Equidistribution of random walks on compact groups.* Ann. Inst. Henri Poincaré Probab. Stat. 57 (2021), 54–72.

[7] *On the discrepancy of random subsequences of $\{n\alpha\}$.* (with I. Berkes) Acta Arith. 191 (2019), 383–415.

[6] *Bounded error uniformity of the linear flow on the torus.* Monatsh. Math. 189 (2019), 221–237.

[5] *On the law of the iterated logarithm for random exponential sums.* (with I. Berkes) Trans. Amer. Math. Soc. 371 (2019), 3259–3280.

[4] *Berry–Esseen bounds and Diophantine approximation.* (with I. Berkes) Analysis Math. 44 (2018), 149–161.

[3] *Lattice points in algebraic cross-polytopes and simplices.* Discrete Comput. Geom. 60 (2018), 145–169.

[2] *On the distribution of the van der Corput sequence in arbitrary base.* Monatsh. Math. 183 (2017), 563–586.

[1] *On the theorem of Davenport and generalized Dedekind sums.* J. Number Theory 172 (2017), 1–20.

Selected talks

2023 *Extreme values of Birkhoff sums and quantum modular forms*
Journées Arithmétiques, Nancy, France

2022 *The L^2 discrepancy of lattices revisited*
15th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing, Linz, Austria

2022 *Randomness of Sudler products*
Genova–Graz Number Theory Workshop, Genova, Italy

2022 *A smoothing inequality for the Wasserstein metric on compact manifolds*
Analysis and Geometry of Point Processes Workshop, Bielefeld University, Germany

2021 *Equidistribution on compact groups*
Discrepancy Theory and Applications Workshop, CIRM, France

2021 *Trigonometric products and Diophantine approximation*
MSRC Research Seminar, Queen's University Belfast, UK

2020 *Quantum modular forms, trigonometric products and quadratic irrationals*
Séminaire Ernest, Institut de Mathématiques de Marseille, France

2018 *The discrepancy of the linear flow on the torus*
Discrepancy Workshop, RICAM, Linz, Austria

2017 *Véletlen bolyongások az egységkörön*
Young Researchers' Mini-Symposium, Rényi Institute, Hungary

2017 *The discrepancy of random walks*
Workshop on Discrepancy Theory and Quasi-Monte Carlo Methods, Erwin Schrödinger Institute, Austria

2017 *The L^2 discrepancy of the irrational rotation*
SFB Colloquium, JKU Linz, Austria

2016 *The number of lattice points in irrational polytopes*
Uniform Distribution Theory Conference, Sopron, Hungary

2016 *Lattice point counting in polytopes*
New York Number Theory Seminar, CUNY Graduate Center, USA