András Mészáros
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Education

2016-2021 **PhD** in mathematics, Central European University, Budapest.
Thesis advisor: Miklós Abért

2013-2015 **MSc** in mathematics, Eötvös Loránd University, Budapest.
Thesis advisor: András Frank

2010-2013 **BSc** in mathematics, Eötvös Loránd University, Budapest.
Thesis advisor: G.O.H. Katona

Employment

2021- **Postdoctoral Fellow**, University of Toronto.
Mentored by Bálint Virág

2019-2021 **Junior Researcher**, Alfréd Rényi Institute of Mathematics, Budapest.

2015-2016 **Research Assistant**, Alfréd Rényi Institute of Mathematics, Budapest.

Publications and preprints

[1] *The 2-torsion of determinantal hypertrees is not Cohen-Lenstra,*
preprint, arXiv: 2404.02308, 2024

[2] *Bounds on the mod 2 homology of random 2-dimensional simplicial complexes,*
preprint, arXiv: 2401.13646, 2024

[3] *Coboundary expansion for the union of determinantal hypertrees,*
preprint, arXiv: 2311.17897, 2023

[4] *Last passage percolation in a product-type random environment,*
with Yuri Bakhtin, Konstantin Khanin, Jeremy Voltz, preprint, arXiv: 2310.08379, 2023

[5] *Cohen-Lenstra distribution for sparse matrices with determinantal biasing,*
preprint, arXiv: 2307.04741, 2023

[6] *Eigenvectors of the square grid plus GUE,*
with Bálint Virág, **Communications in Mathematical Physics** 405 (1), 1-49, 2024

[7] *The local weak limit of k-dimensional hypertrees,*
Transactions of the American Mathematical Society 375 (2022), 6127-6154

[8] *On the free energy density of factor models on biregular graphs,*
preprint, arXiv: 2011.06564, 2020

[9] *Matchings on trees and the adjacency matrix: A determinantal viewpoint,*
Random Structures & Algorithms 63(3), 753-778, 2023

[10] *A BK inequality for random matchings,*
Combinatorics, Probability and Computing 32 (1), 151-157, 2023

[11] *Atoms of the matching measure,*
with Ferenc Bencs, **Electronic Journal of Probability** 27 1 - 38, 2022.

[12] *Limiting entropy of determinantal processes,*
Annals of Probability 48(5):2615-2643, 2020.

[13] *The distribution of sandpile groups of random regular graphs,*
Transactions of the American Mathematical Society 373:6529-6594, 2020.

[14] *A note on disjoint dijoins,*
Combinatorica, 38(6):1485-1488, 2018.

[15] *New bounds for 3-part Sperner families,*
Moscow J. Combin. Number Theory, 5:255-273, 2015.

Talks

On cokernels of random matrices and determinantal hypertrees

- Durham University, February 27, 2024, Durham, UK (Virtual)

On the eigenvectors of the square grid plus GUE:

- CMS Winter Meeting, December 2, 2023, Montreal
- Kansai Probability Seminar, September 1, 2023, Kyoto, Japan
- Measured Group Theory, Stochastic Processes on Groups and Borel Combinatorics, May 22-26, 2023. CIRM, Luminy, France
- Alfréd Rényi Institute of Mathematics, May 19, 2023, Budapest
- Poster at The 24th Midrasha Mathematicae: Random Schrödinger Operators and Random Matrices, May 14-18, 2023, Jerusalem, Israel
- Toronto Probability Seminar, April 24, 2023.
- DoSS Postdoc Day, December 1, 2022. Toronto

On distribution of sandpile groups of random regular graphs:

- Random Matrix EurAsia, April 18-May 13, 2022. Singapore (Virtual)
- Toronto Probability Seminar, November 15, 2021
- Algebraic questions in random integral matrices, November 14-15, 2020. Columbus, Ohio (Virtual)
- UW-Madison Probability Seminar, August 10, 2018. Madison, Wisconsin
- Zamecek workshop on Analytic combinatorics, 2017,
- Alfréd Rényi Institute of Mathematics, Januar 30, 2017, Budapest

A tutorial on the cokernels of random integral matrices:

- Random Matrix EurAsia, April 18-May 13, 2022. Singapore (Virtual)

On the local week limit of k-dimensional hypertrees:

- TDA week, February 14-18, 2022. Japan (Virtual)

On the limiting entropy of determinantal processes:

- Alfréd Rényi Institute of Mathematics, November 11, 2019. Budapest

On 3-part Sperner families:

- Summit 240, July 7-11, 2014. Budapest

Teaching experience

As an instructor:

At University of Toronto Scarborough:

- Linear algebra II (2023, Class size: around 75 students),
- Techniques of the Calculus of Several Variables I (2022, Section size: around 110),
- Introduction to number theory (2022,2024),
- Coding theory and Cryptography (2021, 2023).

At Eötvös Loránd University:

- Discrete Mathematics for first year BSc students (2013, 2014, 2015),
- Complexity Theory for third year BSc students (2014, 2015, 2016),
- Complexity Theory for MSc students (2015).

As a teaching assistant:

At Central European University:

- Topics in Combinatorics (2018).

Participation in conferences, workshops

Measurability, Ergodic Theory and Combinatorics, Warwick, 8-12 July 2019

Building Bridges II., Conference to celebrate 70th birthday of László Lovász, Budapest, July 2 - 6, 2018

Introduction to graph limits, ELTE Summer School in Mathematics, Budapest, June 25-29, 2018

Thematic program "L^2-invariants and their analogues in positive characteristic", Workshop, Madrid, June 4-8, 2018

Thematic program "L^2-invariants and their analogues in positive characteristic", Introductory School, Madrid, March 5-16, 2018

Graph limits, groups and stochastic processes, Summer school, Budapest, August 28 - September 2, 2017

Measured Group Theory, Oberwolfach, August 28 - September 3, 2016

Measured group theory, Winter School, Vienna, February 1- 12, 2016

Other achievements

Miklós Schweitzer Competition, *First place* in 2012, *Second place* in 2013, 2014, 2015

University students' national research paper contest (OTDK), *First Prize*, 2015

International Mathematics Competition for University Students, *First Prize*, Blagoevgrad, Bulgaria, 2013

International Olympiad in Informatics, *Silver Medal*, Waterloo, Canada, 2010

International Mathematical Olympiad, *Honorable Mention*, Astana, 2010

Kürschák Mathematical Competition, *First place*, 2009