Ahmed Bou-Rabee

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RESEARCH INTERESTS Probability and PDEs: the Abelian sandpile, stochastic homogenization, Liouville quantum gravity, percolation, random planar maps, unique continuation

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EMPLOYMENT University of Pennsylvania, Philadelphia, Pennsylvania

Assistant Professor of Mathematics

New York University, New York City, New York

NSF Postdoctoral Fellow / Courant Instructor, 2023-2025

Cornell University, Ithaca, NY

NSF Postdoctoral Fellow, 2022-2023

EDUCATION

University of Chicago, Chicago, Illinois

Ph.D., Statistics, 2022

Advised by Charles K. Smart.

Stanford University, Stanford, California

B.S., Mathematics, minor in Computer Science; M.S., Statistics, 2016

Papers

Preprints

- 11. Random walk on sphere packings and Delaunay triangulations in arbitrary dimension, with Ewain Gwynne.
- 10. Superdiffusive central limit theorem for a Brownian particle in a critically-correlated incompressible random drift, with Scott Armstrong and Tuomo Kuusi.
- 9. Unique continuation on planar graphs, with Bill Cooperman and Shirshendu Ganguly.

Publications

- 8. Harmonic balls in Liouville quantum gravity, with Ewain Gwynne, **Proceedings of the London Mathematical Society**, to appear.
- 7. Rigidity of harmonic functions on the supercritical percolation cluster, with Bill Cooperman and Paul Dario, **Transactions of the American Mathematical Society**, to appear.
- 6. Internal DLA on mated-CRT maps, with Ewain Gwynne, Annals of Probability, to appear.
- 5. Integer superharmonic matrices on the F-lattice, **Advances in Mathematics**, 436, 109400 (2024).
- 4. Hamilton-Jacobi scaling limits of Pareto peeling in 2D, with Peter S. Morfe, **Probability Theory** and **Related Fields**, 188, 235-307 (2024).
- 3. A shape theorem for exploding sandpiles, **Annals of Applied Probability**, 34(1A): 714-742 (2024).
- 2. Dynamic dimensional reduction in the abelian sandpile, Communications in Mathematical Physics, 390, 933-958 (2022).

1. Convergence of the random abelian sandpile, Annals of Probability, 49(6): 3168-3196 (2021).

Awards

- 2. NSF Mathematical Sciences Postdoctoral Research Fellowship, 2022.
- 1. Stevanovich Fellow (PhD Thesis Prize), 2022.

INVITED TALKS

2025

ETH Zurich Analysis Seminar, March 18, 2025

University of Toronto Mathematics Colloquium, January 15, 2025

University of Southern California Mathematics Colloquium, January 13, 2025

UCLA Mathematics Colloquium, January 9, 2025

Vanderbilt Mathematics Colloquium, January 6, 2025

2024

University of South Carolina Mathematics Colloquium, December 10, 2024

Duke Probability Seminar, December 5, 2024

University of Pennsylvania Probability and Combinatorics Seminar, December 3, 2024

University of Chicago Mathematics Colloquium, November 18, 2024

University of Chicago Probability Seminar, October 4, 2024

Yale Analysis Seminar, September 26, 2024

IMSI, Two-Dimensional Random Geometry, July 8-12, 2024

Aalto University, Probabilistic Field Theories, June 17-19, 2024

MIT Analysis Seminar, April 16, 2024

NYU Probability Seminar, April 12, 2024

McGill University Probability Seminar, March 28, 2024

The Fields Institute, KPZ meets KPZ, March 4-8, 2024

Los Angeles Probability Forum, February 29, 2024

2023

University of Hagen, Analysis Seminar, November 29, 2023

NYU Analysis Seminar, November 2, 2023

AMS 2023 Fall Eastern Sectional Meeting, Special Session, September 9, 2023

CIRM, Percolation and interactions, August 3, 2023

43rd Conference on Stochastic Processes and their Applications, Invited Session, July 26, 2023

Percolation Today, April 4, 2023

University of British Columbia Probability Seminar, March 1, 2023

University of Victoria Dynamics and Probability Seminar, February 28, 2023

2022

Institute for Advanced Study Probability Seminar, November 2, 2022

Penn/Temple Probability Seminar, November 1, 2022

Cornell Probability Seminar, October 24, 2022

Oberwolfach, Universality: Random Matrices, Random Geometry and SPDEs, June 4, 2022

Yale Analysis Seminar, March 3, 2022

University of Utah Stochastics Seminar, February 25, 2022

2021

LU-NU-UMN Joint Probability Seminar, October 27, 2021

Bernoulli-IMS, Organized Session, July 22, 2021

Stanford Probability Seminar, May 10, 2021

UC Berkeley Probability Seminar, February 10, 2021

2020

Cornell Math 7710 Guest Lecture, October 27, 2020

2019

Cornell Probability Seminar, September 23, 2019

CCNY Mathematics Colloquium, September 19, 2019

Teaching

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MATH-UA 262 (ODE) Lecturer, Spring 2025.
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MATH-UA 325 (Analysis) Lecturer, Fall 2024.

MATH-UA 120 (Discrete Mathematics) Lecturer, Fall 2023, Spring 2024.

University of Chicago

STAT 33910 (Financial Statistics) Teaching Assistant, Winter 2020-2022.

STAT 234 (Statistical Models and Methods) Teaching Assistant, Spring 2020.

STAT 25150 (Introduction to Mathematical Probability) Teaching Assistant, Fall 2019.

STAT 383 (Measure-Theoretic Probability 2) Teaching Assistant, Spring 2019.

STAT 304 (Introduction to Probability Theory) Teaching Assistant, Spring 2018.

STAT 312 (Stochastic Processes) Teaching Assistant, Fall 2017-2021.

STAT 220 (Statistical Methods And Applications) Teaching Assistant, Winter-Spring 2016-2017.

Chinese University of Hong Kong Shenzhen

MAT 1030 (Matrix Methods and Applications) Lecturer, Summer 2016.

Stanford

EE 364A (Convex Optimization I) Teaching Assistant, Winter 2014-2015.

EE 103 (Matrix Methods and Applications) Teaching Assistant, Fall 2014-2016.