

Davide Macera

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Research interests

Mathematics: Probability, Mathematical Physics, in particular:

random matrices, random graphs, random operators, random surfaces, dimer model, multiplicative stochastic processes, interacting particle systems, spectral geometry.
Applications to statistical mechanics and quantum computing.

Employment

University of Bonn

September 2024 to present

Postdoc

Sponsor: Prof. Dr. Johannes Alt

Durham University

October 2022 to September 2024

Postdoc

Funded by EPSRC EP/T004290/1

Sponsor: Professor Sunil Chhita

Education

Università degli Studi Roma Tre

July 2022

PhD in Mathematics

Thesis: *Probabilistic analysis of quasi 1d disordered quantum systems*

Advisor: Prof. Sasha Sodin, Queen Mary University of London

(Internal advisor: Prof. Pietro Caputo)

PhD studies

November 2018 to July 2022

July 2018

Laurea Magistrale (M.A) in Mathematics

final mark: 110/110 *cum laude*

M.A. dissertation: *Random spatial permutations and the Quantum Heisenberg Ferromagnet*

Advisor: Prof. Pietro Caputo

Master level studies in Mathematics

October 2015 to July 2018

October 2015

September 2011 to October 2015

Laurea (B.A.) in Mathematics

Undergraduate studies in Mathematics

Queen Mary University of London

October 2019 to March 2020

Associate research student

Publications and preprints

1. Davide Macera *Non-Lyapunov annealed decay for 1d Anderson eigenfunctions*, Journal of Mathematical Physics 65(1), 2024
2. Davide Macera, Sasha Sodin, *Anderson localisation for quasi-one-dimensional random operators*, Annales Henri Poincaré 23(12), 4227-4247, 2022
3. Will Hide, Davide Macera, Joe Thomas, *Spectral gap with Polynomail rate for random covering surfaces*. arXiv preprint <https://arxiv.org/abs/2505.08479>

Works in preparation

1. Sunil Chhita, Davide Macera, *A phase transition in a dimer model with random weights*
2. Davide Macera, Meredith Shea, *Pearcey Process near the Rough-Smooth Boundary Cusp Points*

Teaching

Department of Mathematical Sciences, Durham University

Epiphany 2024	Tutor and grader of Single Math A for Chemistry, Physics and Computer Science students (3 groups)
Michaelmas 2023	Tutor and grader of Single Math A for Chemistry, Physics and Computer Science students (3 groups)

Department of Mathematics and Physics, Roma Tre

Fall 2017	Tutor of Analysis I for Physics students
Spring 2017	Tutor of Probability I for Mathematics students

Talks

Talk (in person)	IWOTA 2024, Canterbury, August 12-16 2024 Talk title: "On a dimer model with random weights"
Talk (in person)	Conference "Bridging the physics and mathematics of quantum many-body chaos", Helsinki, June 24-28 2024 Talk title: "On a dimer model with random weights"
Talk (in person)	Durham Probability Seminar, November 10th 2023. Talk title: "Non Lyapunov annealed decay for 1-d Anderson eigenfunction"
Talk (in person)	Conference <i>New Directions in Disordered Systems: In Honor of Abel Klein</i> , Institut D'études Avancées, Cergy, June 27th-July 1st 2022. Talk title: "Anderson Localisation for the quasi-one-dimensional random operator".
Talk (in person)	2nd RAW graduate school on Disordered Systems, Institut D'études Avancées, Cergy, June 22th-24th 2022. Talk title: "Dynamical decay for one-dimensional Anderson eigenfunctions: quenched regime vs annealed regime".
Talk (online)	Graduate Interuniversity Math Seminar (GIMS), Jan 29 2021. Talk title: "Full spectrum Anderson Localization for a general model of a disordered quantum wire"
Minitalk (in person)	Workshop <i>Random Polymers and Networks</i> , IGESA, Pourquerolles, Sept 7-11 2020. Talk title: "Full spectrum Anderson Localization for a general model of a disordered quantum wire"

Grants Winner of a grant of €550 to participate, as an undergraduate student, to the EMS-IAMP Summer School in Mathematical Physics “Universality in Probability Theory and Statistical Mechanics” held in Ischia, from June 11th to June 15th 2018

Winner of financial support to participate in the International Congress of Mathematical Physics, held in Geneva from August 1st to August 7th 2021.

Winner of two-year funding from the Argelander Grant “Stepping Stone” from the University of Bonn (2024-2026).

Languages Italian (native), English (C1)
and Skills C, L^AT_EX, Mathematica

Other skills I passed the exams “Teoria e Solfeggio” (basic music theory, solfeggio in all , the seven clefs, aural and singing skills) and “Compimento inferiore di pianoforte”, (an intermediate level piano performance exam) at the Conservatorio Statale S.Cecilia (Rome) in 2010 with marks, respectively, of 7.7/10 and 8/10

References

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Queen Mary University of London
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