

Raphael Ducatez

Maitre de Conférence à l'Université Claude Bernard Lyon 1

Contact

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Topics of research

Probability, Mathematical Physics, Random Operators and Spectral Theory.

Education/Employment

- 2022-... **Maitre de Conférence**, *Université Claude Bernard Lyon 1*.
- 2021-2022 **Post-doct**, *Ecole Normale Supérieure de Lyon*.
- 2018-2021 **Post-doct**, *University of Geneva, Switzerland*.
- 2015-2018 **PhD**, *University Paris Dauphine*, advisor : Mathieu Lewin.
- 2011-2015 **Ecole Normale Supérieure de Paris** :
 - **Master 2** in Probability, Master PMA, University Paris 6.
 - **Master 2** in Mathematical logic, Master LMFI, University Paris 7.
 - **Bachelor** in Mathematics, ENS Paris.
 - **Bachelor** in Physics, ENS Paris.

Publications

Pre-print

R Rivier and RD, *Spectral gap and embedded trees for the Laplacian of the Erdos-Renyi graph* arXiv:2309.17292, 2023.

RD, *For the use of exterior form in daily physics, an introduction without coordinate frame* arXiv:2307.06597, 2023.

J Alt, RD and A Knowles, *Localized phase for the Erdos-Rényi graph* arXiv:2305.16294, 2023.

N Cook, RD and A Guionnet *Full large deviation principles for the largest eigenvalue of sub-Gaussian Wigner matrices* arXiv:2302.14823, 2023.

RD, *Analysis of the one dimensional inhomogeneous Jellium model with the Birkhoff-Hopf Theorem* (revision requested in Journal of Functional Analysis) arXiv:1806.07681, 2018.

Published

J Alt, RD and A Knowles, *Poisson statistics and localization at the spectral edge of sparse Erdős–Rényi graphs*, arXiv:2106.12519, 2021.

J Alt, RD and A Knowles, *The completely delocalized region of the Erdős–Rényi graph*, accepted in *Electronic Communications in Probability*, arXiv:2005.14180, 2021.

J Alt, RD and A Knowles, *Delocalization transition for critical Erdős–Rényi graphs*, accepted in *Communications in Mathematical Physics*, arXiv:2005.14180, 2020.

J Alt, RD and A Knowles, *Extremal eigenvalues of critical Erdős–Rényi graphs*, *Annals of Probability*. arXiv:1905.03243, 2019.

RD, *Forward Backward process for one dimension Anderson model*, *Electronic Communication of Probability*, arXiv:1711.11302, 2017.

RD and F Huveneers, *Periodically driven Anderson model*, *Annales Henri Poincaré*, arXiv:1607.07353, 2017.

RD, *Anderson localization for infinitely many interacting particles under Hartree Fock theory*, *Journal of Spectral Theory*, arXiv:1602.02896, 2016.

PhD Thesis

RD, *Analyse mathématique de divers systèmes de particules en milieu désordonné*. tel-01886142

Popular Science Article

RD, *Une version simplifiée du Théorème de Gauss-Bonnet*. Image des Maths

Research Experiences before the PhD

- 2014 **5 month internship**, *University Paris Diderot*, advisor : T. Tsankov.
- 2013 **5 month internship**, *University of Warwick*, United Kindom, advisor : D. Ueltschi.
- 2012 **2 month internship, experimental physics**, *Laboratoire LKB, ENS Paris*, advisor : F. Chevy.

Oral presentations

International Conferences

- 2021 — **Aug**, International Congress of Mathematical Physics (Geneva).
- 2020 — **Aug**, One World probability Symposium (Web Conference).
- 2019 — **Aug**, QMath14 (Aarhus, Danemark).
- **May**, Spectral Theory and Probability in mathematical physics (Strasbourg).
- 2018 — **Nov**, Theorie spectral des operateurs quasi-periodiques et aleatoires (Montreal).
- **Jul**, International Congress of Mathematical Physics (Montreal).
- 2017 — **Jun**, Mathematical aspects of disordered quantum systems (Zurich).
- 2016 — **Oct**, QMath13 (Atlanta, USA).

Seminars

- 2022 — **Jan**, Séminaire de probabilité et statistique (Angers).
- **Jan**, Séminaire de probabilité (Université Gustave Eiffel, Paris).

- 2021 — **Oct**, GDR Matrices et graphes aléatoires (Toulouse).
- **Jun**, Probability Seminar (LPSM Paris).
- **May**, Groupe de Travail Large Deviation for Random Matrices (ENS Lyon).
- **Mar**, Journées Jeunes EDPistes (Besançon).
- **Mar**, Mathematical Physics and Harmonic Analysis Seminar (Texas A and M University).
- **Feb**, Quantum and Classical dynamics seminar (Toulon).
- **Feb**, Probability seminar (Marseille).
- **Jan**, Working group Point process and applications (Lille).
- **Jan**, Winter School of Mathematical Physics (Switzerland).
- 2020 — **Dec**, Seminar of the group Image, Optimisation and Probability (Bordeau).
- **Nov**, Seminar of Analysis (Strasbourg).
- **June**, Probability Seminar of UMPA-ICJ (Lyon).
- **Jan**, Probability Seminar in University of Paris Orsay (Orsay).
- 2019 — **Nov**, Informal pizza seminar on probability (Geneva).
- **Oct**, PhD Seminar in University of Zurich (Zurich).
- **May**, PhD Seminar in University of Geneva (Geneva).
- 2018 — **Oct**, Seminar of mathematical physics at University of Geneva (Geneva).
- **June**, Seminar of random matrices and graphs (MEGA), (Paris).
- **May**, Les probabilités de demains (Paris).
- 2017 — **Oct**, PhD summer school of Paris Dauphine.
- **Apr**, PhD seminar at University Pierre et Marie Curie (Paris).
- 2016 — **Mars**, PhD seminar at University Paris Dauphine (Paris).

Teaching Experiences

In academia

- 2018-2019 **Teaching assistant**, *University of Lyon*, Analysis, Algebra and Probability, From 1st year Bachelor to 1st year Master.
- 2018-2021 **Lecturer**, *University of Geneva*, Martingale and Brownian motion, 1st year Master.
- 2018-2019 **Teaching assistant**, *University of Geneva*, Brownian motion and Finance, 1st year Master.
- 2015-2018 **Teaching assistant**, *University Paris Dauphine*, Analysis and Algebra , 1st and 2nd year Bachelor.

In the Préparation Olympique Française de Mathématiques (POFM), Animath association

- 2018-... **Member of the board of the POFM.**
- 2019-... **Director of the POFM workshop for high school students.**
 - 2019, 2020, 2021, Valbonne (10 days, 80 students)
 - 2019, 2020, 2021, Cachan (5 days, 40 students).
 - Feb 2021, Online.
- 2020-... **Organisator of the POFM Online courses and Author of the POFM YouTube Channel**, www.youtube.com/c/POFM-yt.
- 2019 **Deputy Team Leader of the French team**, *Junior Balkanic Mathematics Olympiads*, Cyprus.
- 2017 **Teacher**, *POFM workshop and Parimath association.*

Distinctions

2013 **First Price in International Mathematic Competition for university students (IMC)**, *Bulgaria*, (ranked 9th out of 320 participants).

Miscellaneous

2016-2019 **Participant in the Semaine Math Entreprise (SEME)**.

2017 **Organizer of the PhD summer school**, *Paris Dauphine*.

2016 **Organizer of the Chinese Cultural week**, *Ecole Normale Supérieure Paris*.

Jul-Aug 2014 **Teacher**, *High school and in a child prison*, Natitingou, Benin.

2016-... **Involved on the website Mathoverflow**, *pseudo RaphaelB4*, ≈ 4000 pts.