

# Giorgio Cipolloni

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November 15, 2025

## General Information

Affiliation Dipartimento di Matematica, Universitá di Roma Tor Vergata  
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## Positions

2025–Current **Assistant Professor**, *Universitá di Roma Tor Vergata*  
2024–2025 **Assistant Professor**, *University of Arizona*  
2021–2024 **Research Fellow**, *Princeton Center for Theoretical Sciences (PCTS) and Department of Mathematics*, Princeton University  
2021 **Postdoc**, *IST Austria*, Erdős Group

## Education

2021 **PhD student**, *IST Austria*, Erdős Group  
**PhD Thesis Advisor:** Prof. László Erdős  
**Title:** Fluctuations in the spectrum of random matrices  
2017 **Master Degree**, *Univeristy of Rome Tor Vergata*, Dept. of Mathematics, Rome  
**Master Thesis Advisor:** Prof. Carlangelo Liverani  
**Title:** Deterministic walks  
**Grade:** 110/110 Summa cum laude  
2015 **Bachelor's Degree**, *Univeristy of Rome Tor Vergata*, Dept. of Mathematics, Rome  
**Thesis Advisor:** Prof. Carlo Sinestrari  
**Title:** Equazioni di Hamilton-Jacobi e problemi di controllo ottimale  
**Grade:** 110/110 Summa cum laude  
2012 **High School Diploma**, *Liceo Scientifico M. Vitruvio Pollione*, Avezzano, Italy  
**Grade:** 100/100

## Publications

1. **Fluctuations for differences of linear eigenvalue statistics for sample covariance matrices**  
with László Erdős.  
Random Matrices: Theory and Applications Vol. 9, No. 3 (2020).  
**arXiv version:** arXiv:1806.08751.
2. **Cusp universality for random matrices II: The real symmetric case**

- with László Erdős, Torben Krüger, and Dominik Schröder.  
 Pure Appl. Anal. Vol. 1, No. 4, 615–707 (2019).  
**arXiv version:** arXiv:1811.04055.
3. **Edge Universality for non-Hermitian Random Matrices**  
 with László Erdős, and Dominik Schröder.  
 Probab. Theory Relat. Fields, Vol. 179, 1–28 (2021).  
**arXiv version:** arXiv:1908.00969.
4. **Optimal Lower Bound on the Least Singular Value of the Shifted Ginibre Ensemble**  
 with László Erdős, and Dominik Schröder.  
 Prob. Math. Physics Vol. 1, No. 1, 101–146 (2020).  
**arXiv version:** arXiv:1908.01653.
5. **Central Limit Theorem for Linear Eigenvalue Statistics of non-Hermitian Random Matrices**  
 with László Erdős, and Dominik Schröder.  
 Comm. Pure Appl. Math., Vol. 76, Iss. 5, 946–1034 (2023).  
**arXiv version:** arXiv:1912.04100.
6. **Fluctuation Around the Circular Law for Random Matrices with Real Entries**  
 with László Erdős, and Dominik Schröder.  
 Electron. J. Probab., Vol. 26, 1–61 (2021).  
**arXiv version:** arXiv:2002.02438.
7. **Eigenstate Thermalization Hypothesis for Wigner Matrices**  
 with László Erdős, and Dominik Schröder.  
 Comm. Math. Phys., Vol. 388, 1005–1048 (2021).  
**arXiv version:** arXiv:2012.13215.
8. **Functional Central Limit Theorems for Wigner Matrices**  
 with László Erdős, and Dominik Schröder.  
 Ann. Appl. Probab., Vol. 33, No. 1, 447–489 (2023).  
**arXiv version:** arXiv:2012.13218.
9. **Thermalisation for Wigner matrices**  
 with László Erdős, and Dominik Schröder.  
 J. Funct. Anal., Vol. 282, Iss. 8 (2022).  
**arXiv version:** arXiv:2102.09975.
10. **Normal fluctuation in quantum ergodicity for Wigner matrices**  
 with László Erdős, and Dominik Schröder.  
 Ann. Probab. Vol. 50, No. 3, 984–1012 (2022).  
**arXiv version:** arXiv:2103.06730.
11. **On the condition number of the shifted real Ginibre ensemble**  
 with László Erdős, and Dominik Schröder.  
 SIAM Journal on Matrix Analysis and Applications Vol. 43, Iss. 3, 1469–1487 (2022).  
**arXiv version:** arXiv:2105.13719.
12. **Density of small singular values of the shifted real Ginibre ensemble**  
 with László Erdős, and Dominik Schröder.  
 Ann. Henri Poincaré. Vol. 23, No. 11, 3981–4002 (2022).  
**arXiv version:** arXiv:2105.13720.
13. **Quenched universality for deformed Wigner matrices**  
 with László Erdős, and Dominik Schröder.  
 Probab. Theory Relat. Fields, Vol. 185, 1183–1218 (2023).  
**arXiv version:** arXiv:2106.10200.
14. **On the Spectral Form Factor for Random Matrices**

- with László Erdős, and Dominik Schröder.  
*Comm. Math. Phys.*, Vol. 401, 1665–1700 (2023).  
**arXiv version:** arXiv:2109.06712.
15. **Optimal multi-resolvent local laws for Wigner matrices**  
 with László Erdős, and Dominik Schröder.  
*Electron. J. Probab.*, Vol. 27, 1–38 (2022).  
**arXiv version:** arXiv:2112.13693.
16. **Rank-uniform local law for Wigner matrices**  
 with László Erdős, and Dominik Schröder.  
*Forum of Mathematics, Sigma*. Vol. 10 (2022).  
**arXiv version:** arXiv:2203.01861.
17. **Directional Extremal Statistics for Ginibre Eigenvalues**  
 with László Erdős, Dominik Schröder, and Yuanyuan Xu.  
*J. Math. Phys.*, Vol. 63, Iss. 10 (2022). Editor's Pick.  
**arXiv version:** arXiv:2206.04443.
18. **On the rightmost eigenvalue of non-Hermitian random matrices**  
 with László Erdős, Dominik Schröder, and Yuanyuan Xu.  
*Ann. Probab.*, Vol. 51, No. 6, 2192–2242 (2023).  
**arXiv version:** arXiv:2206.04448.
19. **Dynamical Localization for Random Band Matrices up to  $W \ll N^{1/4}$**   
 with Ron Peled, Jeffrey Schenker, and Jacob Shapiro.  
*Comm. Math. Phys.*, Vol. 405, No. 82 (2024).  
**arXiv version:** arXiv:2206.05545.
20. **Entanglement Entropy of Non-Hermitian Eigenstates and the Ginibre Ensemble**  
 with Jonah Kudler-Flam.  
*Phys. Rev. Lett.*, Vol. 130, Iss. 1 (2023).  
**arXiv version:** arXiv:2206.12438.
21. **Ruminations on Matrix Convexity and the Strong Subadditivity of Quantum Entropy**  
 with Michael Aizenman.  
*Lett. Math. Phys.*, Vol. 113, No. 103 (2023).  
 Erratum & Addendum in *Lett. Math. Phys.*, Vol. 114, No. 18 (2024).  
**arXiv version:** arXiv:2210.10729.
22. **Mesoscopic Central Limit Theorem for non-Hermitian Random Matrices**  
 with László Erdős, and Dominik Schröder.  
*Probab. Theory Relat. Fields*, Vol. 188, 1131–1182 (2024).  
**arXiv version:** arXiv:2210.12060.
23. **Precise asymptotics for the spectral radius of a large random matrix**  
 with László Erdős, and Yuanyuan Xu.  
*J. Math. Phys.*, Vol. 65, Iss. 6 (2024).  
**arXiv version:** arXiv:2210.15643.
24. **Fluctuations of eigenvector overlaps and the Berry conjecture for Wigner matrices**  
 with Lucas Benigni.  
*Electron. J. Probab.*, Vol. 29, 1–19 (2024).  
**arXiv version:** arXiv:2212.10694.
25. **Optimal Lower Bound on Eigenvector Overlaps for non-Hermitian Random Matrices**  
 with László Erdős, Joscha Henheik, and Dominik Schröder.  
*J. Func. Anal.*, Vol. 287, Iss. 4 (2024).  
**arXiv version:** arXiv:2301.03549.

26. **Gaussian fluctuations in the Equipartition Principle for Wigner matrices**  
with László Erdős, Joscha Henheik, and Oleksii Kolupaiev.  
Forum of Mathematics, Sigma, Vol. 11 (2023).  
**arXiv version:** arXiv:2301.05181.
27. **Non-Hermitian Hamiltonians Violate the Eigenstate Thermalization Hypothesis**  
with Jonah Kudler-Flam.  
Phys. Rev. B, Vol. 109 (2024). Editor's pick.  
**arXiv version:** arXiv:2303.03448.
28. **The Dissipative Spectral Form Factor for I.I.D. Matrices**  
with Nicoló Grometto (2023).  
J. Stat. Phys., Vol. 191, No. 21 (2024).  
**arXiv version:** arXiv:2306.16262.
29. **Eigenstate thermalisation at the edge for Wigner matrices**  
with László Erdős, and Joscha Henheik.  
Accepted to Ann. inst. Henri Poincaré (B) Probab. Stat. (2025).  
**Preprint:** arXiv:2309.05488.
30. **Universality of extremal eigenvalues of large random matrices**  
with László Erdős, and Yuanyuan Xu (2023).  
**Preprint:** arXiv:2312.08325.
31. **Out-of-time-ordered correlators for Wigner matrices**  
with László Erdős, and Joscha Henheik.  
Adv. Theor. Math. Phys., Vol. 28, 2025-2083 (2024).  
**arXiv version:** arXiv:2402.17609.
32. **On the spectral edge of non-Hermitian random matrices**  
with Andrew Campbell, László Erdős, and Hong Chang Ji.  
Ann. Probab., Vol. 53, No. 6, 2256-2083 (2025).  
**arXiv version:** arXiv:2404.17512.
33. **Maximum of the Characteristic Polynomial of I.I.D. Matrices**  
with Benjamin Landon.  
Comm. Pure Appl. Math. (2025).  
**arXiv version:** arXiv:2405.05045.
34. **Matrix Concentration Inequalities and Free Probability II. Two-sided Bounds and Applications**  
with Afonso S. Bandeira, Dominik Schröder, and Ramon Van Handel (2024).  
**Preprint:** arXiv:2406.11453.
35. **Fluctuations for non-Hermitian dynamics**  
with Paul Bourgade, Jiaoyang Huang (2024).  
**Preprint:** arXiv:2409.02902.
36. **Non-Hermitian spectral universality at critical points**  
with László Erdős, and Hong Chang Ji.  
Probab. Theory Relat. Fields (2025).  
**arXiv version:** arXiv:2409.17030.
37. **Eigenvector decorrelation for random matrices**  
with László Erdős, Joscha Henheik, and Oleksii Kolupaiev (2024).  
**Preprint:** arXiv:2410.10718.
38. **Optimal decay of eigenvector overlap for non-Hermitian random matrices**  
with László Erdős, and Yuanyuan Xu.  
J. Func. Anal., Vol. 290, Iss. 1 (2026).  
**arXiv version:** arXiv:2411.16572.

39. **Decorrelation transition in the Wigner minor process**  
 with Zhigang Bao, László Erdős, Joscha Henheik, and Oleksii Kolupaiev.  
*Probab. Theory Relat. Fields* (2025).  
**arXiv version:** arXiv:2503.06549.
40. **Law of fractional logarithm for random matrices**  
 with Zhigang Bao, László Erdős, Joscha Henheik, and Oleksii Kolupaiev (2025).  
**Preprint:** arXiv:2503.18922.
41. **Optimal Delocalization for Non-Hermitian Eigenvectors**  
 with Benjamin Landon (2025).  
**Preprint:** arXiv:2509.15189.
42. **Numerical Radius of Non-Hermitian Random Matrices**  
 with Zhigang Bao (2025).  
**Preprint:** arXiv:2510.02667.

## Proceedings

1. **Edge Universality for non-Hermitian Random Matrices**  
*Oberwolfach Rep.* 16 (2019), no. 4, pp. 3480–3481.
2. **Fluctuations in the Spectrum of non-Hermitian i.i.d. Matrices**  
*J. Math. Phys.* 63, 053503 (2022).

## Grants, awards, and habilitations

- 2025 **Italian National Habilitation for Full Professor (Professore I fascia) in Mathematical Physics (ASN, Settore concorsuale: 01/A4)**
- 2025 **Italian National Habilitation for Full Professor (Professore I fascia) in Analysis, Probability, and Mathematical Statistics (ASN, Settore concorsuale: 01/A3)**
- 2024 **Italian National Habilitation for Associate Professor (Professore II fascia) in Mathematical Physics (ASN, Settore concorsuale: 01/A4)**
- 2024 **Italian National Habilitation for Associate Professor (Professore II fascia) in Analysis, Probability, and Mathematical Statistics (ASN, Settore concorsuale: 01/A3)**
- 2017-2019 **Marie Skłodowska-Curie scholarship**
- 2018 **Prize for outstanding master thesis in Mathematics, University of Rome Tor Vergata**
- 2013-2015 **Prize for outstanding students, University of Rome Tor Vergata**

## Professional Memberships

- Since 2025 **Member of Unione Matematici Italiani (UMI)**
- Since 2025 **Member of the International Association of Mathematical Physics (IAMP)**

## Supervision

- 2025 **Member of the Ph.D. thesis committee of John Jeongsoo Park, University of Arizona**
- 2025 **Supervised 1 Undergraduate Student (Van Carlos Higgs), University of Arizona**
- 2022-2023 **Co-supervised 1 PhD student (Nicoló Grometto), Princeton University**

## Talks and Lectures

### [Invited Lectures](#)

- 2025 **Random Matrix Theory and Numerical Linear Algebra**, *University of Washington*  
2024 **The mystery of universality in random matrices**, *GSSI, L'Aquila*

### [Invited talks at conferences and workshops](#)

- 2025 **The Lush World of Random Matrices**, *ZiF Center, Bielefeld*  
2025 **American Mathematical Society Meeting**, Session "Integrability and Randomness", *Tulane University, New Orleans*  
2025 **Log-gases in Caeli Australia**, *Matrix Center, Creswick, Australia*  
2024 **XX Brunel-Bielefeld Workshop on Random Matrix Theory**, *Brunel University, London*  
2024 **Random Matrices and Scaling Limits**, *Institute Mittag-Leffler, Djursholm, Sweden*  
2024 **Recent developments in disordered systems**, *Hausdorff Center for Mathematics, Bonn*  
2024 **Random Matrices and Related Topics in Jeju**, *Jeju Island, South Korea*  
2024 **American Mathematical Society Meeting**, Session "Spectral Theory and Quantum Systems", *Washington DC*  
2023 **Canadian Mathematical Society Meeting**, Session "The many facets of random matrix theory", *Montreal*  
2023 **High Dimensional Statistics and Random Matrices**, *Island of Porquerolles, France*  
2021 **Matrices et graphes aléatoires (MEGA)**, *Institute Henri Poincaré (Online)*  
2019 **Workshop on Random Matrices**, *MFO Oberwolfach*  
2019 **From Many Body Problems to Random Matrices**, *BIRS Center, Banff*

### [Invited seminars](#)

- 2025 **PRobability In Statistics, Mathematics and Applications Seminar**, *(Online)*  
2025 **Probability Seminar**, *University of Rome Tor Vergata*  
2025 **Probability Seminar**, *Politecnico di Milano*  
2025 **Mathematical Physics Seminar**, *Politecnico di Milano*  
2025 **Probability Seminar**, *Universitá la Sapienza*  
2025 **Probability Seminar**, *University of Colorado Boulder*  
2025 **Bielefeld–Melbourne–Seoul Random Matrix Seminar** *(Online)*  
2025 **Probability Seminar**, *University of Edinburgh (Online)*  
2024 **Probability Seminar**, *University of Warwick*  
2024 **Probability Seminar**, *Duke University*  
2024 **Probability and Statistical Mechanics Seminar**, *SPMES (Online)*  
2024 **Mathematics Seminar Series**, *Great Bay University (Online)*  
2024 **Probability and Mathematical Phsyics Seminar**, *University of Arizona*  
2024 **High Energy Theory Seminar**, *City College, City University of New York*  
2023 **Probability Seminar**, *HKUST, Hong Kong (Online)*  
2023 **Probability and Analysis Seminar**, *Bilkent University, Ankara (Online)*

- 2023 Mathematical Physics and Probability Seminar, *Gran Sasso Science Institute (GSSI)*, L'Aquila
- 2023 Probability Seminar, *University of Toronto*
- 2023 Probability Seminar, *Universitá di Roma Tre*
- 2023 Mathematical Physics Seminar, *SISSA, Trieste*
- 2023 Probability Seminar, *CMSA, Harvard University*
- 2023 Probability Seminar, *University of Minnesota/Leigh University (Online)*
- 2023 Probability Seminar, *Brown University*
- 2023 High Energy Theory Seminar, *Princeton University*
- 2023 Probability Seminar, *CUNY*
- 2022 Probability Seminar, *University of Erlangen*
- 2022 Analysis, PDE & Probability Seminar, *KIAS (Online)*
- 2022 Mathematics Colloquium, *Cornell University*
- 2022 Mathematics Colloquium, *University of Arizona*
- 2022 Mathematics Colloquium, *UT Austin (Online)*
- 2022 Mathematics Colloquium, *Rice University*
- 2022 Mathematical Physics Seminar, *UT Austin*
- 2022 Probability Seminar, *Courant Institute, New York University*
- 2022 Probability Seminar, *Cornell University*
- 2022 Probability Seminar, *University of California San Diego*
- 2022 Probability Seminar, *Tulane University*
- 2022 Spectral Theory Seminar, *Rice University*
- 2022 Probability and Statistical Physics Seminar, *University of Chicago*
- 2022 Penn/Temple Probability Seminar, *University of Pennsylvania*
- 2021 Probability Seminar, *Princeton University*
- 2021 Mathematical Physics Seminar, *Princeton University*
- 2021 Probability Seminar, *Universitá di Roma Tre*
- 2021 Queen Mary Postgraduate Seminar, *Queen Marry (Online)*
- 2021 Stanford Probability Seminar, *Stanford University (Online)*
- 2021 QLunch Seminar, *University of Copenhagen (Online)*
- 2020 Mathematical Physics Learning Seminar, *University of Connecticut (Online)*
- 2020 Disordered Systems Group Seminar, *King's College (Online)*
- 2020 Oberseminar Stochastics, *University of Bonn (Online)*
- 2020 Random Matrix Seminar, *KTH (Online)*
- 2020 Probability Seminar, *University of California Los Angeles (Online)*
- 2020 UniMelb-Bielefeld RMT Seminar (Online)
- 2017 Dynamical Systems seminar, *University of Vienna*  
[Contributed conference talks](#)
- 2024 ICMP (International Congress on Mathematical Physics), *Contributed Talk, Session Probability & Random Structures, Strasbourg*

- 2021 **ICMP (International Congress on Mathematical Physics)**, *Contributed Talk, Session Probability & Random Structures, Geneva*
- 2019 **Randomness in Physics and Mathematics: From Stochastic Processes to Networks, ZiF Center, Bielefeld**

## Teaching Experience

- 2026 **Co-instructor, Mathematical Physics 2, University of Roma Tor Vergata**
- 2026 **Co-instructor, Mathematical Physics 1, University of Roma Tor Vergata**
- 2025 **Instructor, Linear Algebra and its Applications (MATH 313, Section 6), University of Arizona**
- 2025 **Instructor, Linear Algebra and its Applications (MATH 313, Section 5), University of Arizona**
- 2023 **Instructor, Calculus (MAT103), Princeton University**
- 2023 **Instructor, Linear Algebra (MAT202), Princeton University**
- 2020-2021 **Teaching assistant, Selected Topics in Analysis and Applications, IST Austria**
- 2020 **Teaching assistant, Random Matrices, IST Austria**
- 2017 **Teaching assistant, Calculus 2 for chemistry, University of Rome Tor Vergata**

## Participation in Conferences, Workshops, and Schools

- 2025 **Mathematical Perspectives in Scientific Modeling, University of Rome Tor Vergata**
- 2024 **Universality and Integrability in KPZ, Columbia University, New York**
- 2022 **Random media & large deviations, Courant Institute, New York University**
- 2022 **Random Matrices and Random Landscapes, Ascona**
- 2020 **Random Matrices and Their Applications, New York (Online)**
- 2019 **Dynamical Systems: From Geometry to Mechanics, Rome**
- 2018 **XIX International Congress of Mathematical Physics, Montreal**
- 2018 **EMS-IAMP Summer School in Mathematical Physics, Ischia**
- 2018 **Budwiser Seminars, Budapest**
- 2017 **Summer School in Mathematical Physics, Ravello**
- 2016 **Summer School in Mathematical Physics, Ravello**

## Service work

### Editorial Activities

2025- Associate Editor for Journal of Mathematical Physics (JMP).

### Reviewing activities:

Acta Mathematica, Annales de l'Institut Henri Poincaré (B) Probabilités et Statistiques (AIHP), Annals of Applied Probability (AAP), Annales Henri Poincaré (AHPO), Annals of Probability (AoP), Annals of Statistics (AoS), Astérisque, Bernoulli Journal (BEJ), Communications in Mathematical Physics (CIMP), Electronic Communications in Probability (ECP), Electronic Journal of Probability (EJP), Foundations of Computational Mathematics, International Journal of Mathematics for Industry (IJMI), Journal of Functional Analysis (JFA), Journal of Mathematical Physics (JMP), Journal of

Physics A: Mathematical and Theoretical, Journal of Statistical Physics (JSP), Mathematical Reviews, Nature Physics, Nature Communications, Letters in Mathematical Physics (LMP), Probability Theory and Related Fields (PTRF), Random Matrices: Theory and Applications (RMTA), Reports on Progress in Physics.

#### Referee for the institutions:

Swiss National Science Foundation.

#### Conference organizing:

- 1) "Mathematical Challenges in Quantum Mechanics", co-organized with Michael Aizenman, Bruno Nachtergaele, Simone Warzel, and Jacob Shapiro (Princeton University, 2023).
- 2) "Physics for Neural Networks", co-organized with William Bialek, Boris Hanin, and Francesca Mignacco (Princeton University, 2023).
- 3) "Random Physics", co-organized with Jonah Kudler-Flam, Samuel A. Leutheusser, Gautam Satishchandran, and Edward Witten (Princeton University, 2024).
- 4) "Facets of entanglement", co-organized with Michael Aizenman, Dmitry Abanin, Bruno Nachtergaele, Simone Warzel, and Jacob Shapiro (Princeton University, 2025).
- 5) "Random matrices and operators", co-organized with Paul Bourgade and Nathanaël Berestycki (ESI Vienna, 2026).
- 6) "Log-correlated fields and SPDEs", co-organized with Tommaso Rosati (tentatively at Villa Mondragone, Rome 2026).

#### Seminar organizing:

- 1) Princeton Center for Theoretical Science (PCTS) seminars (2022–2023).
- 2) Probability seminars, Princeton University (2023–2024).
- 3) Mathematical Physics seminars, Princeton University (2023–2024).
- 4) Probability and Mathematical Physics seminars, University of Arizona (2024–2025).
- 5) Seminário de Probabilidade e Mecânica Estatística (Online) (2024–2025).
- 6) Probability seminars, Università di Roma Tor Vergata (2025–).
- 7) Mathematical Physics seminars, Università di Roma Tor Vergata (2025–).

## Outreach

- 2024 **Center of Recruitment and Retention of Mathematics Teachers Community Game Night, University of Arizona**
- 2024 **Research presentation (The mystery of Universality in Random Matrices) to senior undergraduates, Princeton University**
- 2023 **Mentorship Pair with undergraduate Sophia Huellstrunk, Princeton University**
- 2022 **Interview for students' newspaper on working abroad, Liceo Scientifico M. Vitruvio Pollione, Avezzano (AQ)**

## Language Skills

- Italian Mother tongue
- English Fluent