

# Giorgio Cipolloni

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## General Information

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## Positions

Sep 2021- **Research Fellow**, *Princeton Center for Theoretical Sciences (PCTS)*.  
Current  
Feb 2021-Aug 2021 **Postdoc**, *IST Austria*, Erdős Group.

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## Education

2021 **PhD student**, *IST Austria*, Erdős Group, (PhD expected Spring 2021).  
**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

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## Publications

1. **Fluctuations for differences of linear eigenvalue statistics for sample covariance matrices** with László Erdős.  
Random Matrices: Theory and Applications 9 (03), 2050006 (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. 1, 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 (2020).  
**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 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.  
Communications on Pure and Applied Mathematics (2021).  
**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. 26, Paper No. 24, 61 (2021).  
**ArXiv version:** arXiv:2002.02438.
7. **Eigenstate Thermalization Hypothesis for Wigner Matrices**  
with László Erdős, and Dominik Schröder.  
Communications in Mathematical Physics, 1-44 (2021).  
**ArXiv version:** arXiv:2012.13215.
8. **Functional Central Limit Theorems for Wigner Matrices**  
with László Erdős, and Dominik Schröder (2020).  
Accepted to Annals of Applied Probability (AAP).  
**Preprint:** arXiv:2012.13218.
9. **Thermalisation for Wigner matrices**  
with László Erdős, and Dominik Schröder (2021).  
Journal of Functional Analysis (JFA).  
**arXiv version:** arXiv:2102.09975.
10. **Normal fluctuation in quantum ergodicity for Wigner matrices**  
with László Erdős, and Dominik Schröder (2021).  
Accepted to Annals of Probability (AoP).  
**arXiv version:** arXiv:2103.06730.
11. **On the condition number of the shifted real Ginibre ensemble**  
with László Erdős, and Dominik Schröder (2021).  
Accepted to SIAM Journal on Matrix Analysis and Applications (SIMAX).  
**Preprint:** arXiv:2105.13719.
12. **Density of small singular values of the shifted real Ginibre ensemble**  
with László Erdős, and Dominik Schröder (2021).  
Accepted to Annales Henri Poincaré (AHP).  
**Preprint:** arXiv:2105.13720.
13. **Quenched universality for deformed Wigner matrices**  
with László Erdős, and Dominik Schröder (2021).  
Accepted to Probability Theory and Related Fields (PTRF).  
**Preprint:** arXiv:2106.10200.
14. **On the Spectral Form Factor for Random Matrices**  
with László Erdős, and Dominik Schröder (2021).  
**Preprint:** arXiv:2109.06712.
15. **Optimal multi-resolvent local laws for Wigner matrices**

with László Erdős, and Dominik Schröder (2021).

**Preprint:** arXiv:2112.13693 .

16. **Rank-uniform local law for Wigner matrices**

with László Erdős, and Dominik Schröder (2022).

**Preprint:** arXiv:2203.01861.

17. **Directional Extremal Statistics for Ginibre Eigenvalues**

with László Erdős, Dominik Schröder, and Yuanyuan Xu (2022).

**Preprint:** arXiv:2206.04443.

18. **On the rightmost eigenvalue of non-Hermitian random matrices**

with László Erdős, Dominik Schröder, and Yuanyuan Xu (2022).

**Preprint:** 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 (2022).

**Preprint:** arXiv:2206.05545.

20. **Entanglement Entropy of Non-Hermitian Eigenstates and the Ginibre Ensemble**

with Jonah Kudler-Flam (2022).

**Preprint:** arXiv:2206.12438.

## 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 and awards

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.**

## Invited Talks

2022 **Probability Seminar, University of California San Diego.**

2022 **Probability Seminar, Tulane University, New Orleans.**

2022 **Spectral Theory Seminar, Rice University, Houston.**

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 **ICMP (International Congress on Mathematical Physics), Contributed Talk, Session Probability & Random Structures, Geneva.**

2021 **Probability Seminar, Università di Roma Tre, Rome.**

2021 **Queen Mary Postgraduate Seminar, Queen Mary, London (Online).**

2021 **Stanford Probability Seminar, Stanford University (Online).**

2021 **QLunch Seminar, University of Copenhagen (Online).**

2021 **Matrices et graphes aléatoires (MEGA), Institute Henri Poincaré, Paris (Online).**

- 2020 **Mathematical Physics Learning Seminar**, *University of Connecticut (Online)*.
- 2020 **Disordered Systems Group Seminar**, *King's College London (Online)*.
- 2020 **Oberseminar Stochastics**, *University of Bonn (Online)*.
- 2020 **Random Matrix Seminar**, *KTH (Online)*.
- 2020 **Probability Seminar**, *UCLA (Online)*.
- 2020 **UniMelb-Bielefeld RMT Seminar**, *University of Melbourne (Online)*.
- 2019 **Workshop on Random Matrices**, *MFO Oberwolfach*.
- 2019 **Randomness in Physics and Mathematics: From Stochastic Processes to Networks**, *ZiF Center, Bielefeld*.
- 2019 **From Many Body Problems to Random Matrices**, *BIRS Center, Banff*.
- 2017 **Dynamical Systems seminar**, *University of Vienna*.

## Teaching Experience

- 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*.

## Conferences, Workshops, and Schools

- 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*.

## Reviewing activities

Annals of Applied Probability (AAP), Annales Henri Poincaré (AHPO), Annals of Probability (AoP), Bernoulli Journal (BEJ), Communications in Mathematical Physics (CIMP), Electronic Communications in Probability (ECP), Journal of Functional Analysis (JFA), Journal of Statistical Physics (JSP), Mathematical Reviews, Probability Theory and Related Fields (PTRF).

## Language Skills

- Italian      Mother tongue
- English     Fluent