

Education

- 2025 - now **Visiting Fellow**, London School of Economics, UK.
- 2020 - 2025 **PhD in Discrete Mathematics**, London School of Economics, UK.
My PhD focused on extremal combinatorics and algorithmic game theory. Among other results, I established new exact Ramsey numbers for squares of paths, extended and strengthened the Transference Principle (as presented by Conlon and Gowers), and analysed convergence and collusion phenomena of learning dynamics in random games.
Thesis: Colours, Giants and Games.
- 2018 - 2020 **MSc in Pure Mathematics**, ETH Zürich, Switzerland. GPA: 5.77/6 'with distinction'
Thesis: A discussion about the Pentagon problem.
- 2015 - 2018 **BSc in Pure Mathematics**, University of Pisa, Italy. GPA: 110/110
Thesis: On the Hausdorff Dimension of Brownian Motion.

Papers

Areas: Pure Mathematics, Reinforcement Learning, Game Theory, Optimisation, Methodology.

Work in progress

The Bounds to Algorithmic Collusion, Q-learning, Gradient learning, and the Folk Theorem, with G. Ashkenazi-Golan, E. Plumb, C. Possnig.

Simultaneous Best-Response Dynamics in Random Games, with G. Ashkenazi-Golan, E. Plumb, J. Skokan.

Recurrence of Strictly Dominated Strategies, with G. Ashkenazi-Golan, P. Mertikopoulos, E. Plumb, B. Tarbush.

A Transference Principle and a Counting Lemma for Sparse Hypergraphs, with P. Allen, J. Böttcher, J. Lada, (44 pages).

Submitted

2025 **Simultaneous Best-Response Dynamics in Random Potential Games**, with G. Ashkenazi-Golan, E. Plumb, (18 pages).

2024 **Reinforcement Learning, Collusion, and the Folk Theorem**, with G. Ashkenazi-Golan, E. Plumb, (57 pages).

Published and to appear

2025+ **Dirac's theorem for graphs of bounded bandwidth**, with A.E. Díaz, P. Gupta, O. Parczyk, A. Sgueglia, (7 pages).
To appear. Electron. J. Comb.

2025+ **Graphs with large minimum degree and no short odd cycles are 3-colourable**, with J. Böttcher, N. Frankl, O. Parczyk, J. Skokan, (21 pages).
To appear. Combinatorial Theory.

2025 **On Product Schur Triples in the Integers**, with L. Mattos, O. Parczyk, (16 pages).
In *SIAM J. Discrete Math.* Volume 39, Issue 2 (2025).

2024 **Ramsey numbers of squares of paths and cycles**, with P. Allen, B. Roberts, J. Skokan, (43 pages).
In *Electron. J. Comb.* Volume 31, Issue 2 (2024).

Other and notes

2024 **Re-ILS: a metaheuristic approach for cardinality-constrained optimization**, with Amazon ATS team, (12 pages).
Internal publication at Amazon.

- 2022 **Density of small diameter subgraphs in K_r -free graphs**, with E.K. Hng, (3 pages).
Note not intended for journal publication.

Relevant Talks and Conferences

Organiser

- 2024 **PCC**, Main Organiser, University of London (LSE, UCL, KCL).
2022/23 **PhD CGO Seminar**, *Organiser*, LSE.

Summer Schools

- 2023 **EEML**, *Invited participant*, Summer School organised icw DeepMind.
2023 **Charles University Spring School**, *Invited Participant*.

Speaker (selected)

- 11/2025 **Invited Speaker**, *Sobre las tríplas producto-Schur en $[n]$* , Coloqio de Matematica, Universidad de los Andes.
09/2023 **Invited Speaker**, *Ramsey number of P_n^2* , Deutsche Mathematiker-Vereinigung (DMV) meeting in Ilmenau.
08/2023 **Contributed Talk**, *Hypergraph partition universality*, European Conference on Combinatorics, Graph Theory and Applications in Prague.
07/2022 **Contributed talk**, *Chromatic profile of \mathcal{C}_{2k-1}* , Random Structures & Algorithms in Poznan.
06/2022 **Invited seminar**, *Ramsey number of P_n^2* , Technische Universität Hamburg seminar.

Teaching Experience (for the London School of Economics)

- **Mathematics:**
 - MA103: Introduction to Abstract Mathematics (2020/21; 2021/22).
 - MA210: Discrete Mathematics (2021/22).
 - MA423: Fundamentals of Operations Research (2021/22).
 - ME306: Real Analysis (2021).
 - ME200: Computational Methods in Financial Mathematics (2023).
- **Statistics:**
 - ST310: Machine Learning (2022/23).
 - ST455: Reinforcement Learning (2022/23).
- **Finance and Management:**
 - FM250: Finance (2023).
 - Master's in Management pre-sessions (2022; 2023).

Awards and Grants

- 2020-2024 **PhD Travel Fund**, Department of Mathematics, LSE. Multiple fundings.
2022 **LMS Computer Science Small Grant**, London Mathematical Society. (£660)
2021 **LSE Contribution Award**, Department of Mathematics, LSE. (£300)

Other relevant experience

- 2021-now **Senior Subwarden**, Work for LSE ResLife to oversee students' wellbeing in an LSE residence (600 students, managing a team of 4).
2024 **Applied Scientist Intern at Amazon**, Work for Amazon ATS team in developing Re-ILS metaheuristics. Code submitted to production and internal publication of results.
Jun-Dec 2023 **Research Assistant**, Work for LSE Management department. Study to help the didactics of Supply Chains, in particular regarding the Beer Decision Game.
2022 **MHFA Certificate**, Certified Mental Health First Aider.
Languages (ordered by proficiency)
Italian, Native; English, Proficient; Spanish, Advanced; Portuguese, Beginner.