Mail: d.mergoni@lse.ac.uk

Updated: May '25

Phone: +447383755005

Webpage: https://conj34.github.io

Domenico Mergoni Cecchelli

Curriculum

Education

2020 - now	**PhD in Discrete Mathematics**, London School of Economics, UK.

My PhD research spans extremal combinatorics and algorithmic game theory. Among other results, I establish new exact Ramsey numbers for square of paths; extend the Transference Principle (famously introduced by Green and Tao), and analyse convergence and collusion phenomena in learning dynamics.

Thesis title: **Colours, Giants and Games**   *Expected: May 2025*

2018 - 2020	**MSc in Pure Mathematics**, ETH Zürich, Switzerland.	GPA: 5.77/6 'cum laude'
2015 - 2018	**BSc in Pure Mathematics**, University of Pisa, Italy.	GPA: 110/110

Working Experiences

- **Applied Scientist** (at Amazon),

  6 months internship, Jun-Dec 2024. Focus on the ILS Optimization Metaheuristics. Pushed to production an algorithm with a 5% reduction on the cost for the Amazon EU network.

- **Teaching** (at London School of Economics):
  - Statistics and Machine Learning (2022-23):
    MA310: Machine Learning; MA455: Reinforcement Learning (MSc course).
  - Finance (2023):
    FM250: Finance; ME200: Comp. Methods in Financial Mathematics.
  - Management (2022-23) - Lecturer:
    Pre-sessional course for LSE Global Master's in Management.
  - Mathematics (2020-22):
    Discrete Mathematics, Fundamentals of Operations Research, etc.

- **Other:**
  - Research Assistant:

2023	**Supply chains** @LSE Management dept. Work on the *beer decision game*.

  - Managerial positions:

2021-now	**Senior Subwarden**@ LSE. *Lead of a 10-people team to oversee students' wellbeing.*
2023	**Main organiser** for PCC2024. *Lead of a 4-people team.*

  - Internships:

2020	**PigeonLine**. *Applications of graph theory to statistical analysis of correlations.*
2019	**Operations Team**, ETH Entrepreneur Club.

Coding

Python	Advanced, *(GTA of MSc RL course)*
Kotlin	Advanced, *Industry experience at Amazon*
R	Intermediate, *(GTA of Machine Learning with R)*

Coding competitions

Codeforces	Max. contest rating: 1333

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Awards and Grants

2022 **LMS Computer Science Small Grant**, London Mathem. Society.
2021 **LSE Contribution Award**, Dept. of Maths, LSE.

Papers (selected)

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

Work in progress

2025++ **Methodology for carbon credit assessment**, with A. Perrella, G. Marastoni.
2025+ **Transference principle and KŁR Conjecture**, with P. Allen, J. Böttcher, J. Lada.

Submitted

2025 **Simultaneous Best-Response Dynamics in Random Potential Games.**, with G. Ashkenazi-Golan, E. Plumb
Subm. NeurIPS 2025

2024 **Reinforcement Learning, Collusion, and the Folk Theorem**, with G. Ashkenazi-Golan, E. Plumb
Subm. Econometrica

Accepted

2023 **Graphs with large minimum degree and no short odd cycles are 3-colourable.**, with J. Böttcher, N. Frankl, O. Parczyk, J. Skokan.
Accept. Combinatorial Theory

Published

2025 **Product free sets in $[n]$**, with L. Mattos, O. Parczyk
In *SIAM J. Discrete Math*. Volume 39, Issue 2 (2025).

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

2024 `Re-ILS`**: a metaheuristic approach for cardinality-constrained optimization**
with Amazon ATS team, internal publication

Relevant Talks and Conferences

Organiser

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

Summer Schools

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

Speaker (selected)

09/2023 **Invited Speaker**, *Ramsey number of P_n^2*, @DMV Ilmenau,
08/2023 **Contributed Talk**, *Hypergraph partition universality*, @EuroComb Prague,
07/2022 **Contributed talk**, *Chromatic profile of $\{C_3, \ldots, C_{2k-1}\}$*, @RSA Poznan,

Languages (ordered by proficiency)

Italian Native
English C2 level; IELTS test score: 8.0 on July 2018
Spanish C1 level