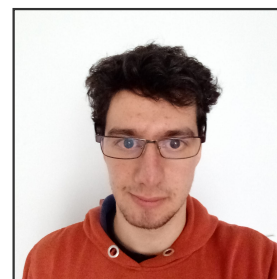# Giorgio **Mangioni**

3RD YEAR PHD STUDENT AT HERIOT-WATT UNIVERSITY, EDINBURGH (UK)

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"A true gentleman leaves no puzzle unsolved."

Research interests

I'm mainly interested in Geometric Group Theory, and consider myself an expert in *hierarchically hyperbolic groups* (HHG), a common framework for the "hyperbolic" features of cubulated groups and mapping class groups of surfaces. Under the supervision of Professor Alessandro Sisto (Heriot-Watt University, Edinburgh), my PhD project investigates which algebraic, geometric, and algorithmic properties of a HHG can be detected by looking at its quotients, and conversely which quotients of a HHG remain HHG. On a broader level, any topic in Geometric topology, which requires mixing geometric, combinatorial, and algebraic approaches, could grab my attention.

Publications

2. (with Alessandro Sisto) *Rigidity of Mapping Class Groups mod Powers of Twists*, Proc. R. Soc. Edinb., Sect. A, Math, 2025

1. (with Alessandro Sisto) *Short hierarchically hyperbolic groups II: quotients and the Hopf property for Artin groups*, 2024, accepted in *Adv. Math.*

Preprints

8. (With Carolyn Abbott, Daniel Berlyne, Thomas Ng, and Alex Rasmussen) *Random quotients preserve acylindrical and hierarchical hyperbolicity*, 2025

7. (With Oli Jones and Giovanni Sartori) *A combination theorem for the twist conjecture for Artin groups*, 2025

6. (With Oli Jones and Giovanni Sartori) *JSJ decompositions for all Artin groups*, 2025

5. (with Francesco Fournier-Facio and Alessandro Sisto) *Bounded cohomology, quotient extensions, and hierarchical hyperbolicity*, 2025

4. *Short hierarchically hyperbolic groups I: uncountably many coarse median structures*, 2024

3. *A combination theorem for hierarchically quasiconvex subgroups, and application to geometric subgroups of mapping class groups*, 2024

2. *Random quotients of mapping class groups are quasi-isometrically rigid*, 2023

1. (with Mark Hagen and Alessandro Sisto) *A Combinatorial Structure for Many Hierarchically Hyperbolic Spaces*, 2023

Recent workshops and seminars

International young seminar on Bounded Cohomology and Simplicial Volume, on boundedness of quotient central extensions (04/11/2025)	*Online*
World of GroupCraft, on which quotient techniques preserve hierarchical hyperbolicity (01/09/2025, **VIDEO**)	*Online*
Geometry and Topology seminar, Two lectures on hierarchical hyperbolicity and random quotients of MCG (16/04/2025, **FIRST** and **SECOND** videos)	*Harbin (China)*
Geometry and Topology seminar, on random quotients of a MCG (15/10/2024)	*Bristol (UK)*
Advancements in Hierarchical Hyperbolicity, on quasi-isometries in hierarchically hyperbolic groups (28/05/2024, **VIDEO**)	*Banff (Canada)*
Manifolds and groups in Bologna, on random quotients of mapping class groups (19/04/2024)	*Bologna (Italy)*

Teaching experiences

In 2025 I became an Associate Fellow of the *Advance Higher Education*, an internationally respected recognition of professionalism in teaching and supporting learning within higher education.

2025-26	**Teaching assistant**, for PhD level course (Differential Topology)	*Maxwell institute*
2024-25	**Teaching assistant and marker**, for undergraduate courses (Calculus A, Discrete Maths) (Topology, Geometry), and PhD level courses (Algebraic Topology)	*Heriot-Watt*
2023-24	**Teaching assistant**, for undergraduate courses (Discrete Maths, Mathematics for Engineers and Scientists 2)	*Heriot-Watt*

Honors & Awards

2025	**Edinburgh Teaching Award**, Mentorship program to become an Associate Fellow of Advance Higher Education	*Edinburgh (UK)*
2022	**Second Prize**, International Mathematics Competition for University Students	*Blagoevgrad (BGR)*
2019	**Granted Scholarship**, Scuola Normale Superiore	*Pisa (ITA)*
2018	**Bronze medal**, Italian Mathematical Olympiad Final	*Cesenatico (ITA)*
2016	**First Place**, Latin Certamen "Beccaria"	*Milan (ITA)*
2013	**Second Place**, Kangourou of Computer Science, Italian Team Finals	*Ravenna (ITA)*
2012	**Fourth Place**, Kangourou of Mathematics, Italian Individual Finals	*Ravenna (ITA)*

Education

Heriot-Watt University   *Edinburgh (UK)*

PhD in Mathematics   *September 2023 - present*

Research topic: Hierarchically Hyperbolic Spaces, supervisor prof. A. Sisto

Scuola Normale Superiore   *Pisa (ITA)*

Diploma in Mathematics, final grade: 100 cum laude/100   *October 2018 - October 2023*

Merit-based 5-years scholarship, covering university fees and all living expenses. It is awarded to 32 Science students every year from all over Italy, and awardees have to take two extra exams per year and keep an average grade of at least 27/30. Moreover they are asked to hold a Colloquium at the end of 5th year, in which I talked about *Rigidity Properties of Random Quotients of Mapping Class Groups*. The final diploma is equivalent to a 2nd level Master.

University of Pisa   *Pisa (ITA)*

Master degree in Mathematics, final grade: 110 cum laude/110   *June 2021 - June 2023*

My Thesis was about *Rigidity of Mapping Class Groups mod powers of Dehn Twists* (supervisor Prof A. Sisto)

Languages

2023	**English C1**, IELTS Academic, overall band score 8.0	
2022	**German A2**, One-year course at SNS	
2019	**French B2**, One-year course at SNS	
2017	**Latin B2**, Lombard Certification	
	Italian, mother-tongue	

Skills

Programming languages, Matlab, C++, LaTeX (intermediate), Python (amateur programmer)

Soft skills, Problem solving, critical thinking, teamwork, ability to take on new responsibilities

Interests and hobbies

I like spending time with my friends, hanging out or playing music together (I play the guitar, it helps me shake off the stress). Moreover I am always happy to help others: for example I gave many private lessons to my schoolmates regarding various school subjects, since I believe that knowledge must be shared among as many people as possible. But I also need to take some moments for my personal growth, watching good films, visiting art expositions (mostly on the works of early 20th century painters) and playing videogames.