Giorgio **Mangioni**
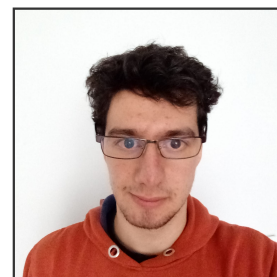
PHD STUDENT AT HERIOT-WATT UNIVERSITY, EDIMBURGH (UK)

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"A true gentleman leaves no puzzle unsolved."

Research interests

I'm mainly interested in Geometric Group Theory. Together with my supervisor, Professor Alessandro Sisto (Heriot-Watt University, Edinburgh), I am currently studying *hierarchically hyperbolic* groups (HHG), which enjoy the same "hyperbolic" features of the Mapping Class Group of a finite-type surface. My PhD project focuses on the investigation of which algebraic, geometric, and algorithmic properties of a HHG can be detected by looking at its quotients. On a broader level, any topic in Geometric topology, especially if it involves combinatorial and graph-theoretic approaches, or in Hyperbolic geometry, could grab my attention.

Publications

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

Preprints

- (with Alessandro Sisto) *Short hierarchically hyperbolic groups II: quotients and the Hopf property for Artin groups*, 2024

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

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

- *Rigidity results for large displacement quotients of mapping class groups*, 2023

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

Recent workshops and seminars

Geometry and Topology seminar, on random quotients of a MCG (15/10/2024)	*Bristol (UK)*
World of GroupCraft, on how to amalgamate certain geometric subgroups of a MCG (06/06/2024, **VIDEO**)	*Online*
Advancements in Hierarchical Hyperbolicity, on quasi-isometries in hierarchically hyperbolic groups (28/05/2024, **VIDEO**)	*Banff (Canada)*
Manifolds and groups in Bologna, on the rigidity properties of random quotients of MCG (19/04/2023)	*Bologna (ITA)*
MAXIMALS, on the rigidity properties of random quotients of MCG (24/01/2024)	*Edinburgh (UK)*

Teaching experiences

2024-25	**Teaching assistant and marker**, *Calculus A* (first year of undergraduate)		*Heriot-Watt*
2024-25	**Teaching assistant**, *Topology* (fourth year of undergraduate)		*Heriot-Watt*
2023-24	**Teaching assistant**, *Discrete Maths* (first year of undergraduate)		*Heriot-Watt*
2023-24	**Drop-in sessions**, *Mathematics for Engineers and Scientists 2* (first year of undergraduate)		*Heriot-Watt*

Honors & Awards

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)*

Science class (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)

University of Pisa *Pisa (ITA)*

Bachelor's degree in Mathematics, final grade: 110 cum laude/110 *October 2018 - June 2021*

My Thesis was about *Gromov's approach to Mostow rigidity* (supervisor Prof. R. Frigerio)

Liceo scientifico Leonardo da Vinci *Cologno Monzese (ITA)*

High school degree, final grade: 100 cum laude/100 *2013 - 2018*

Extracurricular Activities

Local church Summer Camp *Cologno Monzese (ITA)*

Children educator *July-August 2014-2017*

I contributed to the personal development of many children of age from 7 to 13, through games an community life.

English Summer Camp *Cologno Monzese (ITA)*

Assistant *July-August 2016-2018*

The organisers of this camp invite some English-speaking educators in order to make children familiar with this language through many activities and lections. I was in charge of the coordination of the activities and of the relations between the educators and the children.

Skills

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

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

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

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 about painters from the early Twentieth century) and playing videogames.