JOSEPH PAUL MacMANUS

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RESEARCH INTERESTS

I am broadly interested in combinatorial and geometric group theory. More specifically, I think about questions relating to hyperbolicity, coarse geometry, splittings, and computability.

EDUCATION

Exp. 2025	St Anne's College, University of Oxford
	DPhil in Mathematics
	Supervisor: Prof Panagiotis Papazoglou.
2021	Balliol College, University of Oxford
	MSc in Mathematics and Foundations of Computer Science, with Distinction
	Diss.: *Splitting Theory of Groups*, with Prof Panagiotis Papazoglou.
2020	University of Bristol
	BSc in Mathematics and Computer Science, with First Class Honours
	Thesis: *Decision Problems within Combinatorial Group Theory*, with Dr Philipp Schlicht.
2017	Ysgol Aberconwy Sixth Form
2017	Coleg Llandrillo

SCHOLARSHIPS, GRANTS, AND PRIZES

2023 – 2025	Graduate Development Scholar in Pure Mathematics — St Anne's College, University of Oxford
2021 – 2025	HDP Scholarship — Heilbronn Institute for Mathematical Research
2020	Postgraduate Grant — The James Pantyfedwen Foundation
2020	Graphcore Prize — University of Bristol
2019	Top Student in 2nd Year Maths and Comp Sci. — University of Bristol
2019	Undergraduate Summer Research Bursary — University of Bristol

TEACHING EXPERIENCE

2023 – 2025	Graduate Development Scholar — St Anne's College, Oxford
	Subjects taught:
	- Analysis I, II,
	- Linear Algebra I, II.
	- Groups and Group Actions,
	- A5 Topology.

2022 – 2023	Class Tutor — University of Oxford

Subjects taught:
- C2.4 Infinite Groups;
- ASO Group Theory,
- A3 Rings and Modules (Revisions),
- M4 Geometry (Revisions).

The Queen's & Merton Colleges, and Intercollegiate.

2021 – 2023	Teaching Assistant — University of Oxford

Subjects taught:
- B3.5 Topology & Groups,
- C3.2 Geometric Group Theory,
- B1.2 Set Theory;
- M4 Geometry,
- A3 Rings and Modules,
- A5 Topology.

The Queen's College, and Intercollegiate.

2019 – 2020	Teaching Assistant — University of Bristol

Subjects taught:
- Algorithms,
- Data Structures & Algorithms,
- Combinatorics.

2018 – 2023	Private Tutor — Metatutor; Tutorful; Blue Education

OUTREACH WORK

2023 – 2024	Class Tutor – Fibonacci Programme, Balliol College, Oxford

Topics:
- Eigenvalues and Linear Algebra,
- Hamming Codes.

2021	Class Tutor – UNIQ Summer School, University of Oxford

PUBLICATIONS AND PREPRINTS

[1] Baligács, J., MacManus, J. (2024). The metric Menger problem. *Preprint.*

[2] MacManus, J., Mineh, L. (2024). Tiling in some nonpositively curved groups. *Submitted..*

[3] **MacManus, J. (2023). Accessibility, planar graphs, and quasi-isometries.** *Preprint.*

[4] MacManus, J. (2022). Deciding if a hyperbolic group splits over a given quasiconvex subgroup. *Submitted.*

[5] Alexandru, C. -M., Bridgett-Tomkinson, E., Linden, N., MacManus, J., Montanaro, A., & Morris, H. (2020). Quantum speedups of some general-purpose numerical optimisation algorithms. *Quantum Science and Technology, 5*(4), 045014.

CONTRIBUTED TALKS

1. *Tilings in groups* — ITMAIA, University of Exeter (February 2024).

2. *Characterising surface groups* — ECSTASy, University of Southampton (August 2023).

3. *Understanding limit sets via finite automata* — PGTC, Heriot-Watt University (July 2023).

SEMINAR TALKS

1. *Groups quasi-isometric to planar graphs* — Geometry and Topology Seminar, University of Warwick (February 2024).

2. *Reasons to be accessible* — Junior Topology and Group Theory Seminar, University of Oxford (October 2023).

3. *Planar Cayley graphs and accessibility* — Junior Topology and Group Theory Seminar, University of Oxford (May 2023).

4. *Splitting detection, and limit set complements* — Junior Geometry Seminar, University of Cambridge (April 2023).

5. *Will it split? Recognising edge groups in hyperbolic groups* — BRIJGeS, University of Bristol (February 2023).

6. *Detecting topological features of the Gromov boundary* — Junior Topology and Group Theory Seminar, University of Oxford (March 2022).

OTHER ACTIVITIES

2022 – 2023	Seminar Organiser — University of Oxford Junior Topology and Group Theory
2022 – 2023	Admissions Interviewer — University of Oxford *Colleges*: - St Anne's College, - St Edmund Hall.
2021	Maths Admissions Test (MAT) Marker — University of Oxford
2019	Quantum Information Research Internship — University of Bristol With Dr Ashley Montanaro and Prof Noah Linden.

MISCELLANEOUS

2020 – 2024	Associate Membership, London Mathematical Society
2019 – 2024	Mathematics Blog, `jpmacmanus.me/blog`
2019	Bristol PLUS Award, University of Bristol