

# Curriculum Vitae - Harry Petyt

6<sup>th</sup> October 2022

## Contact Details

Mathematical Institute  
Woodstock Road  
Oxford  
OX2 6GG

petyt@maths.ox.ac.uk  
hpetyt.github.io

## Employment

2022–2026 Titchmarsh Research Fellow, University of Oxford.  
2023 CRM Postdoctoral Fellow, McGill University.

## Education

2018–2022 PhD in Mathematics, University of Bristol. Supervised by Mark Hagen.  
2014–2018 MMath, University of Warwick.

## Research Interests

Geometric group theory: mapping class groups, CAT(0) spaces, hierarchical hyperbolicity, injective metric spaces, and generalisations of hyperbolic groups.

## Publications and Preprints

- [1] (With Davide Spriano and Abdul Zalloum) Hyperbolic models for CAT(0) spaces. *arXiv preprint arXiv:2207.14127*.
- [2] Mapping class groups are quasicubical. *arXiv preprint arXiv:2112.10681*.
- [3] (With Radhika Gupta) Appendix to: “Hierarchically hyperbolic groups and uniform exponential growth” by Carolyn Abbott, Thomas Ng, and Davide Spriano. *arXiv preprint arXiv:1909.00439*.
- [4] (With Thomas Haettel and Nima Hoda) Coarse injectivity, hierarchical hyperbolicity, and semihyperbolicity. *arXiv:2009.14053*. To appear in *Geom. Topol*.
- [5] (With Davide Spriano) Unbounded domains in hierarchically hyperbolic groups. *arXiv:2007.12535*. To appear in *Groups Geom. Dyn*.
- [6] (With Mark Hagen) Projection complexes and quasimedians maps. *arXiv:2108.13232*. To appear in *Algebr. Geom. Topol*.
- [7] The special linear group for nonassociative rings. *J. Group Theory*, 23(2):327–335, 2020.
- [8] Derivations of octonion matrix algebras. *Comm. Algebra*, 47(10):4216–4223, 2019.

## Talks

- *Rank-one isometries of  $CAT(0)$  spaces*, Modern advances in geometric group theory, University of Manchester, September 2022.
- *The top of an HHG structure*, Quotients of HHGs, University of Bristol, August 2022.
- *Hyperbolic models for  $CAT(0)$  spaces*, Hyperbolic groups and their generalisations, Institut Henri Poincaré, June 2022.
- *The large-scale geometry of mapping class groups*, Algebra and geometry seminar, Stockholms Universitet, Feb. 2022.
- *Hyperbolic models for  $CAT(0)$  spaces*, Geometric group theory and topology seminar, Ohio State University, Feb. 2022.
- *Injective metric spaces and group actions*, Geometry seminar, Universität Münster, Jan. 2022.
- *Mapping class groups and  $CAT(0)$  cube complexes*, Metric graph theory and related topics, CIRM, Dec. 2021.
- *Groups via geometry*, Algebra seminar, University of Bristol, Dec. 2021.
- *Finding quasiisometries to  $CAT(0)$  cube complexes*, Algebra seminar, Heriot-Watt University, Nov. 2021.
- *Hyperbolicity and quasicubicality*, Junior Geometry Seminar, University of Bristol, Oct. 2021.
- *Finding quasiisometries to  $CAT(0)$  cube complexes*, Dynamics, geometry and groups seminar, Queen's University, Oct. 2021.
- *The geometrisation conjecture*, Postgraduate seminar, University of Bristol, Oct. 2021.
- *Mapping class groups and injective spaces*, GAGTA, University of Edinburgh, June 2021.
- *Uniform exponential growth for cubical groups*, Young researchers in mathematics, University of Bristol, June 2021.
- *Bicombing the mapping class group*, Geometry and topology seminar, CUNY, Mar. 2021.
- *The field with one element*, Junior algebra colloquium, University of Bristol, Feb. 2021.
- *Uniform exponential growth for cubical groups*, Postgraduate group theory conference 2020, University of Southampton, Jan. 2021.
- *Automorphism towers*, Junior algebra colloquium, University of Bristol, Nov. 2020.
- *Injective metric spaces and groups acting on them*, Dynamics and group geometry early researchers seminar, University of Warwick, Nov. 2020.
- *The Busemann–Petty problem*, Postgraduate seminar, University of Bristol, Nov. 2020.
- *Bicombing the mapping class group*, Algebra seminar, University of the Basque Country, Oct. 2020.
- *A topological proof of Euclid's theorem*, Mingle: annual welcome conference, University of Bristol, Sep. 2020.
- *Mapping class groups in geometric group theory*, Pure postgraduate seminar, University of Southampton, July 2020.
- *Mapping class groups in geometric group theory*, Geometry graduate colloquium, ETH Zürich, Apr. 2020.
- *Folding graphs*, Postgraduate seminar, University of Bristol, Feb. 2020.
- *Coxeter and Artin groups*, Junior algebra colloquium, University of Bristol, Feb. 2020.
- *The envelope trick*, Women and non-binary people in maths, University of Bristol, Nov. 2019.
- *Octonions and the Freudenthal magic square*, Junior algebra colloquium, University of Bristol, Oct. 2019.
- *An introduction to the Masur–Minsky machinery*, Junior topology and group theory

seminar, University of Oxford, Oct. 2019.

- *What are hierarchically hyperbolic groups?*, Dynamics and group geometry early researchers seminar, University of Warwick, Oct. 2019.
- *Scissors congruence and the envelope trick*, Mingle: annual welcome conference, University of Bristol, Sep. 2019.
- *What is a relatively hyperbolic group?*, Junior geometry seminar, University of Cambridge, Mar. 2019.
- *Shapes of spaces*, Postgraduate seminar, University of Bristol, Dec. 2018.
- *Introduction to tropical geometry*, Warwick-Imperial Autumn meeting, University of Warwick, Dec. 2018.
- *Sphere packings, kissing numbers, and integers*, Junior geometry and topology seminar, University of Warwick, June 2018.
- *Octonions and exceptional groups*, Warwick-Imperial spring meeting, Imperial College London, Mar. 2018.
- *An introduction to surreal numbers and combinatorial games*, Mathematics society talk series, University of Warwick, Feb. 2018.

## Teaching

- 2020–2021 · Demonstrator, University of Bristol; 3<sup>rd</sup> year undergraduate course “Perspectives in Mathematics”.
- Teaching assistant, University of Bristol; 4<sup>th</sup> year undergraduate course “Topics in Discrete Mathematics”.
- 2019–2020 · Teaching assistant, University of Bristol; 4<sup>th</sup> year undergraduate course “Topics in Modern Geometry”.
- 2018–2019 · Class teacher, University of Bristol: running training sessions for Bristol’s *International Mathematics Competition* team.
- 2017–2018 · Leader of “Maths Café”, University of Warwick: covering all 1<sup>st</sup> – 3<sup>rd</sup> year courses.
- Supervisor, University of Warwick: twice-weekly meetings with a group of five first year undergraduates.
- 2016–2017 · “Maths Café” assistant, University of Warwick.

## Conferences Attended

- Sep. 2022 *Modern advances in geometric group theory* – University of Manchester.
- Aug. 2022 *Quotients of HHGs* – University of Bristol.
- July 2022 *International congress of mathematicians 2022* – Cancelled.
- June 2022 *Geometric and asymptotic group theory with applications 2022* – Stevens Institute, New Jersey (Online).
- June 2022 *Hyperbolic groups and their generalisations* – IHP, Paris.
- Apr. 2022 *Mapping class groups and  $\text{Out}(F_n)$*  – IHP, Paris (Online).
- Apr. 2022 *Groups acting on fractals* – CIRM, Luminy.
- Mar. 2022 *Week at infinity* – (Online).
- Dec. 2021 *Metric graph theory and related topics (Victor Chepoi conference)* – CIRM, Luminy.
- Sep. 2021 *The unity of mathematics: a conference in honour of Sir Michael Atiyah* – Isaac Newton Institute, Cambridge.
- Aug. 2021 *Geometry in non-positive curvature and Kähler groups* – IHES, Paris (Online).
- Aug. 2021 *World of groupcraft* – (Online).
- July 2021 *Young geometric group theory X* – Newcastle University (Online).

- July 2021 *Artin groups, CAT(0) geometry, and related topics* – Ohio State University (Online).
- June 2021 *Beyond hyperbolicity* – Ohio State University (Online).
- June 2021 *Geometric group theory without boundaries II* – (Online).
- June 2021 *Geometric and asymptotic group theory with applications 2021* – University of Edinburgh (Online).
- June 2021 *Young researchers in mathematics 2021* – University of Bristol (Online).
- Jan. 2021 *Postgraduate group theory conference 2020* – University of Southampton (Online).
- Nov. 2020 *Masterclass in condensed mathematics* – University of Copenhagen (Online).
- July 2020 *Geometric group theory without boundaries* – (Online).
- July 2020 *Groups with geometrical and topological flavours* – (Online).
- June 2020 *Virtual geometric group theory conference* – CIRM, Luminy (Online).
- May 2020 *Workshop on polyhedral products in geometric group theory* – Fields Institute, Toronto (Online).
- May 2020 *Spring graduate school on polyhedral products in geometric group theory* – Fields Institute, Toronto (Online).
- Jan. 2020 *Interactions between geometry, dynamics and group theory* – University of Bristol.
- Sep. 2019 *Bielefeld–Southampton geometric group theory meeting* – University of Southampton.
- Sep. 2019 *Heilbronn annual conference* – University of Bristol.
- July 2019 *Aspects of geometric group theory* – IHES, Paris.
- July 2019 *Young geometric group theory VIII* – UPV/EHU, Bilbao.
- May 2019 *Non-positive curvature* – IMPAN, Warsaw.
- Jan. 2019 *Master class on groups and geometries* – CIRM, Luminy.
- July 2018 *Graphs, surfaces, and cube complexes* – University of Warwick.
- Apr. 2018 *Geometry of Teichmüller space and mapping class groups* – University of Warwick.

## Awards

- 2022 Kovalevskaya grant.
- 2022 LMS–EPSRC travel grant to attend the International Congress of Mathematicians.
- 2018–2022 EPSRC PhD studentship.
- 2018 Undergraduate Research Scholarship Scheme funding award.

## Service

- 2018–2022 Founder and organiser of Bristol Junior Geometry Seminar.
- Refereeing *Bulletin of the London Mathematical Society*.