

Curriculum Vitae - Harry Petyt

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Contact Details

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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 Mathematics, University of Warwick.

Research Interests

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

Publications and Preprints

- [1] (*With Davide Spriano and Abdul Zalloum*) Hyperbolic models for $\text{CAT}(0)$ spaces.
- [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

- *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; 3rd year undergraduate course “Perspectives in Mathematics”.
- Teaching assistant, University of Bristol; 4th year undergraduate course “Topics in Discrete Mathematics”.
- 2019–2020 · Teaching assistant, University of Bristol; 4th 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 1st – 3rd 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

- 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, $\text{CAT}(0)$ 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*.