

LUKE JEFFREYS

ADDRESS: School of Mathematics,
University of Bristol,
Fry Building, Woodland Road,
Bristol BS8 1UG

EMAIL: luke.jeffreys@bristol.ac.uk
WEBPAGE: <https://seis.bristol.ac.uk/~pk20963/>
NATIONALITY: British

RESEARCH INTERESTS

My research lies in the intersection of geometry, topology, group theory and dynamics, focussing on the areas of Teichmüller theory, mapping class groups, hyperbolic geometry and, more recently, the Lagrange and Markov spectra.

POSITIONS

MAY 2024 - PRESENT	UNIVERSITY OF BRISTOL, Leverhulme Early Career Fellow Mentor: Viveka Erlandsson
AUG 2023 - MAY 2024	UNIVERSITY OF WISCONSIN-MADISON, Van Vleck Visiting Assistant Professor Mentor: Paul Apisa
OCT 2020 - AUG 2023	UNIVERSITY OF BRISTOL, Heilbronn Research Fellow Mentor: Viveka Erlandsson

EDUCATION

OCT 2016 - JUL 2020	UNIVERSITY OF GLASGOW PhD Mathematics (fully funded by an EPSRC studentship) Thesis title: <i>Single-cylinder square-tiled surfaces: Constructions and applications</i> Supervisors: Vaibhav Gadre and Tara Brendle Examiners: Maxime Fortier Bourque (internal) and Elise Goujard (external)
SEP 2012 - JUN 2016	UNIVERSITY OF ST ANDREWS MMath (Honours) Mathematics First Class Dissertation: <i>Noncommutative Geometry for Pedestrians</i>

PAPERS AND PREPRINTS

1. *Euler characteristics of $SL(2, \mathbb{Z})$ -orbit graphs of origamis*, with Carlos Matheus. Submitted, 40 pages. arXiv:2602.21984
9. *On the monodromy and spin parity of single-cylinder origamis in the minimal stratum*, with Tarik Aougab, Adam Friedman-Brown, and Jiajie Ma. Submitted, 56 pages. arXiv:2502.09498
8. *Diameter bounds for $SL(2, \mathbb{Z})$ -orbits of origamis in $\mathcal{H}(2)$ and the Prym loci in $\mathcal{H}(4)$ and $\mathcal{H}(6)$* , with Carlos Matheus. *Math. Z.* **312**, 123 (2026). doi: [10.1007/s00209-026-04007-6](https://doi.org/10.1007/s00209-026-04007-6)
7. *On the classical Lagrange and Markov spectra: new results on the local dimension, and the geometry of the difference set*, with Harold Erazo and Carlos Gustavo Moreira. *Acta Arith.* **220** (2025), 29–100. doi: [10.4064/aa240821-26-5](https://doi.org/10.4064/aa240821-26-5)
6. *Meanders, hyperelliptic pillowcase covers, and the Johnson filtration*. *Geom. Dedicata* **218**, 93 (2024). doi: [10.1007/s10711-024-00936-w](https://doi.org/10.1007/s10711-024-00936-w)
5. *New gaps on the Lagrange and Markov spectra*, with Carlos Matheus and Carlos Gustavo Moreira. *J. Théor. Nombres Bordeaux.* **36** (2024), no. 1, 311–338. doi: [10.5802/jtnb.1280](https://doi.org/10.5802/jtnb.1280)
4. *Non-planarity of $SL(2, \mathbb{Z})$ -orbits of origamis in $\mathcal{H}(2)$* , with Carlos Matheus. *Bull. London Math. Soc.* **55** (2023), 2258–2269. doi: [10.1112/blms.12849](https://doi.org/10.1112/blms.12849)
3. *Statistical hyperbolicity for harmonic measure*, with Aitor Azemar and Vaibhav Gadre. *Int. Math. Res. Not.* 2022, no. 8, 6289–6309. doi: [10.1093/imrn/rnaa277](https://doi.org/10.1093/imrn/rnaa277)
2. *Single-cylinder square-tiled surfaces and the ubiquity of ratio-optimising pseudo-Anosovs*. *Trans. Amer. Math. Soc.* **374** (2021) 5739–5781. doi: [10.1090/tran/8374](https://doi.org/10.1090/tran/8374)
1. *Minimally intersecting filling pairs on the punctured surface of genus two*. *Topology Appl.* **254** (2019) 101–106. doi: [10.1016/j.topol.2018.12.011](https://doi.org/10.1016/j.topol.2018.12.011)

AWARDS AND GRANTS

2026	<i>Top 3 Poster Commendation</i> , British Mathematical Colloquium (BMC) 2026
2025	<i>Workshop Grant</i> , Clay Mathematics Institute (CMI)
2025	<i>Research Workshop Grant</i> , International Centre for Mathematical Sciences (ICMS)
2024	<i>University Housing Honored Instructor Spring 2024</i> , University of Wisconsin-Madison
2023	<i>Leverhulme Early Career Fellowship</i> , Leverhulme Trust
2023	<i>Heilbronn Small Grant</i> , Heilbronn Institute for Mathematical Research
2023	<i>Heilbronn Focused Research Grant</i> , Heilbronn Institute for Mathematical Research
2021	<i>William Jack Prize for the best PhD thesis in mathematics 2019/20</i> , University of Glasgow
2021	<i>Jon Nimmo Prize for Teaching Excellence 2021</i> , University of Glasgow

- 2019 | *Recognizing Excellence in Teaching (RET) Associate Fellowship*, University of Glasgow
 2019 | *College of Science and Engineering Graduate School Mobility Scholarship*, University of Glasgow
 2016 | *EPSRC Doctoral Studentship*, University of Glasgow/EPSRC

TEACHING EXPERIENCE

- APR 2026 - JUN 2026 | LEVERHULME EARLY CAREER FELLOW, UNIVERSITY OF BRISTOL
 Taught Course Centre (TCC): “Hyperbolic surfaces, their length spectra, and connections to Markoff triples”, joint with Laura Monk
- AUG 2023 - MAY 2024 | VAN VLECK VISITING ASSISTANT PROFESSOR, UNIVERSITY OF WISCONSIN-MADISON
 MATH 211 - Calculus, Fall 2023 (Lecturer)
 MATH 240 - Introduction to Discrete Mathematics, Spring 2024 (Lecturer)
- SEP 2021 - AUG 2023 | HEILBRONN RESEARCH FELLOW, UNIVERSITY OF BRISTOL
 Topics in Modern Geometry, a final year/master’s level topics course (Lecturer)
- SEP 2019 - APR 2020 | GRADUATE TEACHING ASSISTANT, UNIVERSITY OF GLASGOW
Role required separate application and interview, and involved lecturing
 Engineering Mathematics ENG 1063 Block 4: Differential Calculus (Lecturer);
 Mathematics 1
- SEP 2016 - MAR 2019 | TEACHING ASSISTANT, UNIVERSITY OF GLASGOW
 Mathematics 1R, 1S, 1Y (Introductory algebra and calculus); 2E: Introduction to Real Analysis; 2F: Foundations of Pure Mathematics; 3H: Algebra

SUPERVISION

- 2023 - 2024 | *Supervision of a Madison Experimental Mathematics Lab (MXM) research project “Non-planarity in $SL(2, \mathbb{Z})$ -orbits of origamis”*
 Students: David Jiang, Phoebe Kuang, Shu Han Liao, Zhenliang Liu (UW-Madison)
 Graduate student: Ron Yang (UW-Madison)
- 2021 - 2022 | *Supervision of a master’s dissertation: “Square-tiled surfaces and Teichmüller theory”*
 Student: Sophie Wright, University of Bristol

INVITED RESEARCH VISITS

- 26 JAN - 31 JAN 2025 | PERSPECTIVES ON MARKOV NUMBERS
 Banff International Research Station (BIRS), Canada
- 6 FEB - 11 FEB 2022 | DAGSTUHL SEMINAR: ‘COMPUTATION AND RECONFIGURATION IN LOW-DIMENSIONAL TOPOLOGICAL SPACES’
 Schloss Dagstuhl, Leibniz-Zentrum für Informatik (attended remotely)
- 15 MAR - 24 APR 2020 | ‘DYNAMICS: TOPOLOGY AND NUMBERS’ TRIMESTER PROGRAM
 Hausdorff Research Institute for Mathematics (HIM), Bonn
 Funding awarded by HIM (Visit cancelled due to COVID-19)
- 29 JUL - 30 AUG 2019 | CENTRE DE MATHÉMATIQUES LAURENT SCHWARTZ
 ÉCOLE POLYTECHNIQUE, FRANCE
 Invited by Prof Carlos Matheus (CNRS)
 Funding awarded by the University of Glasgow College of Science and Engineering Graduate School Mobility Scholarship 2019

SELECTED SEMINAR/CONFERENCE TALKS

- 5 FEB 2026 | *Euler characteristics of $SL(2, \mathbb{Z})$ -orbit graphs of square-tiled surfaces*
 GEOMETRY AND TOPOLOGY SEMINAR
 University of Warwick, UK
- 27 MAR 2025 | *On the complement of the Lagrange spectrum in the Markov spectrum*
 SELECTED TOPICS IN MATHEMATICS (ONLINE)
 University of Liverpool, UK
- 9 JAN 2025 | *Local dimension in the Lagrange and Markov spectra*
 UC SAN DIEGO GROUP ACTIONS SEMINAR (ONLINE)
 UC San Diego, USA
- 9 DEC 2024 | *$SL(2, \mathbb{Z})$ -invariants of single-cylinder square-tiled surfaces*
 NORTH BRITISH GEOMETRIC GROUP THEORY (NBGGT) SEMINAR
 University of Glasgow, UK
- 20 APR 2024 | *The monodromy and spin parity of single-cylinder square-tiled surfaces*
 SPECIAL SESSION ON DEVELOPMENTS IN HYPERBOLIC-LIKE GEOMETRY AND DYNAMICS I

	2024 AMS SPRING CENTRAL SECTIONAL MEETING University of Wisconsin-Milwaukee, USA
9 NOV 2023	<i>Non-planarity of $SL(2, \mathbb{Z})$-orbits of origamis</i> GEOMETRY SEMINAR Indiana University, USA
16 DEC 2022	<i>Meanders, hyperelliptic pillowcase covers, and the Johnson filtration</i> WEIHNACHTSWORKSHOP ON GEOMETRY AND NUMBER THEORY 2022 Universität des Saarlandes, Germany
6 OCT 2022	<i>On the complement of the Lagrange spectrum in the Markov spectrum</i> PURE MATHEMATICS COLLOQUIUM University of St Andrews, UK
19 JUL 2022	<i>Constructing hyperelliptic pillowcase covers from meanders</i> SPECIAL SESSION ON COMBINATORIAL AND COMPUTATIONAL ASPECTS IN TOPOLOGY AT THE AMS-SMF-EMS JOINT INTERNATIONAL MEETING Université de Grenoble-Alpes, Grenoble, France
24 FEB 2022	<i>Non-planarity of $SL(2, \mathbb{Z})$-orbits of origamis in genus two</i> GEOMETRY AND TOPOLOGY ONLINE University of Warwick, UK
13 MAR 2021	<i>Constructions and applications of $[1, 1]$-square-tiled surfaces</i> SPECIAL SESSION ON GROUPS, GEOMETRY, AND TOPOLOGY 2021 AMS SPRING SOUTHEASTERN SECTIONAL MEETING Online (formerly Georgia Institute of Technology)
12 MAR 2021	<i>Ratio-optimising pseudo-Anosovs and single-cylinder pillowcase covers</i> GEOMETRY AND TOPOLOGY SEMINAR Columbia University, USA
20 OCT 2020	<i>The statistical hyperbolicity of Teichmüller space</i> GEOMETRY AND TOPOLOGY SEMINAR University of Bristol, UK
19 JUN 2019	<i>Single-cylinder square-tiled surfaces</i> GÉOMÉTRIE ET DYNAMIQUE DANS LES ESPACES DE MODULES (SÉMINAIRE 'PLAT') Institut Henri Poincaré, France

SERVICE ACTIVITIES

2024 - PRESENT & 2021 - 2023	<i>Co-Organiser of the GEOMETRY AND TOPOLOGY SEMINAR</i> University of Bristol
2020 - PRESENT	<i>Referee for Acta Arithmetica, Algebraic and Geometric Topology, Bulletin of the London Mathematical Society, Geometriae Dedicata, Journal of the European Mathematical Society, Journal of Knot Theory and Its Ramifications, Journal of Topology and Analysis, Mathematical Proceedings of the Cambridge Philosophical Society, and Topology and its Applications</i>
19 - 23 JUN 2023	<i>Organiser of "SQUARE-TILED SURFACES: A CLASSIFICATION OF CYLINDER BLOCK SHEARING ORBITS" FOCUSED RESEARCH WORKSHOP</i> University of Bristol, supported by a Heilbronn Focused Research Grant
22 - 23 MAY 2023	<i>Co-Organiser of "TWO-DAY GEOMETRY MEETING" MINI-CONFERENCE</i> University of Bristol, partially supported by a Heilbronn Small Grant
NOV 2020	<i>LMS Newsletter Microthesis, "Single-Cylinder Square-Tiled Surfaces", LMS Newsletter, Issue: 491 - November 2020, pp. 36-37</i>
31 JAN 2020	<i>Submitted code to the surface_dynamics package of the SageMath software</i>
15 NOV 2019	<i>Outreach at STEMFEST'19, Glasgow Science Centre</i>
2017 - 2018	<i>Co-Organiser of the MATHEMATICS AND STATISTICS POSTGRADUATE SEMINAR</i> University of Glasgow

REFEREES

PROF CARLOS MATHEUS	CMLS ÉCOLE POLYTECHNIQUE	carlos.matheus@math.cnrs.fr
DR VINCENT DELECROIX	UNIVERSITÉ DE BORDEAUX	vincent.delecroix@u-bordeaux.fr
DR VIVEKA ERLANDSSON	UNIVERSITY OF BRISTOL	v.erlandsson@bristol.ac.uk
DR MELISSA LINDSEY (TEACHING)	UNIVERSITY OF WISCONSIN-MADISON	melissa.lindsey@wisc.edu