

William Rushworth - Curriculum Vitae

PERSONAL INFORMATION

Department of Physics and Mathematics
University of Hull
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Born 5 August 1991, United Kingdom; British citizen.

EMPLOYMENT

University of Hull, Lecturer, 2022-

Syracuse University, Philip T. Church Postdoctoral Fellow, 2021-22

McMaster University, Postdoctoral Fellow, 2018-21

EDUCATION

Durham University

PhD, 2018

- Thesis: *Virtual knot homology and concordance*, supervised by Prof. Andrew Lobb.

University of Leeds

MPhys, BSc Theoretical Physics, First class, 2014

- Masters Thesis: *Integrable systems of Calogero-Moser type*, supervised by Prof. Simon Ruijsenaars.

PUBLICATIONS

On knots that divide ribbon knotted surfaces, with Hans U. Boden, Ceyhun Elmacioglu, Anshul Guha, Homayun Karimi, Yun-chi Tang, and Bryan Wang Peng Jun. Submitted. Preprint available [here](#).

Minimal crossing number implies minimal supporting genus, with Hans U. Boden. **Bull. Lond. Math. Soc.** 53, 2021. Preprint available [here](#).

On ribbon graphs and virtual links, with Scott Baldridge and Louis Kauffman. **European J. Combin.** 103, 2022. Preprint available [here](#).

Generalized Fishburn numbers and torus knots, with Colin Bijaoui, Hans U. Boden, Beckham Myers, Robert Osburn, Aaron Tronsgard, and Shaoyang Zhou. **J. Combin. Theory Ser. A** 178, 2021. Preprint available [here](#).

Virtual Khovanov homology, expository article (peer reviewed). Encyclopedia of Knot Theory, CRC Press, 2021.

Ascent concordance, **Algebr. Geom. Topol.** 21, no. 6, 2021. Preprint available [here](#).

A parity for 2-colourable links, **Osaka J. Math.** 58, no. 4, 2021. Preprint available [here](#).

Additional gradings on generalisations of Khovanov homology and invariants of embedded surfaces, with Vassily Manturov, **J. Knot Theory Ramifications** 27 (9), 2018. Preprint available [here](#).

Computations of the slice genus of virtual knots, **Topology Appl.** 253, 2019. Preprint available [here](#).

Doubled Khovanov homology, **Canad. J. Math.** 70, 2018. Preprint available [here](#).

SELECTED TALKS Session: *Knots and Braids in Dimensions 3 and 3.5*, Nearly Carbon Neutral Geometric Topology conference, June 2021

Special Session: *Low-dimensional topology*, Canadian Mathematical Society Summer Meeting, June 2021

[Trends in Low Dimensional Topology](#), virtual seminar, May 2020

Special Session: *Low-dimensional topology*, Canadian Mathematical Society Summer Meeting (invited speaker), June 2020, Meeting postponed

~~Special Session: *Knots and Links in 3-Manifolds*, American Mathematical Society Spring Central Sectional Meeting (invited speaker), April 2020 Meeting cancelled~~

Topology seminar, Dartmouth College, February 2020

Special Session: *Topology*, Canadian Mathematical Society Winter Meeting (invited speaker), December 2019

Geometry and Topology seminar, University of Waterloo, November 2019

Special Session: *Topology*, Canadian Mathematical Society Winter Meeting (invited speaker), December 2018

Transpennine Topology Triangle (invited speaker), University of Sheffield, January 2018

Scottish Topology Seminar (invited speaker), University of Aberdeen, October 2017

Geometry and Topology seminar, Durham University, October 2017

Russian-Chinese Conference on Knot Theory and Related Topics, Bauman State Technical University, July 2017 (delivered remotely)

EL:ECTRIC postgraduate topology conference, University of Sheffield, June 2017

TEACHING

At the University of Hull:

2022–23 Trimester 2 Lecturer: Applied complex analysis.

2022–23 Trimester 1 Lecturer: Differential geometry.

At Syracuse University:

2021–22 Spring Instructor: MAT331 Linear Algebra I.

2021–22 Fall Instructor: MAT296 Calculus II.

At McMaster University:

- 2020–21 Winter Instructor: MATH 3To3 Inquiry In Topology.
- 2020–21 Fall Instructor: MATH 1Bo3 Linear Algebra I.
- 2019–20 Winter Instructor: MATH 3To3 Inquiry In Topology.
- 2019–20 Winter Instructor: MATH 1Bo3/1ZC3 Linear Algebra I / Engineering Mathematics II.
- 2018–19 Winter Instructor: MATH 1Bo3/1ZC3 Linear Algebra I / Engineering Mathematics II.
- 2018–19 Fall Instructor: MATH 2Zo3 Engineering Mathematics III.

At Durham University:

- 2016–17 Teaching Assistant: Analysis I, Linear Algebra I, Algebra II
- 2015–16 Teaching Assistant: Analysis I, Linear Algebra I, Calculus I

Student research supervision

- 2021–22 Summer Co-supervisor: *Knot theory in 4-dimensions*, Fields Undergraduate Summer Research Program, Fields Institute.
Topics included: knotted surfaces, Morse theory, Alexander invariants.
- 2020–21 Winter Supervisor: MATH 4Wo3 reading course in Khovanov homology and Conway mutation for Karim Eltanahy. McMaster University.
- 2020–21 Fall Supervisor: MATH 4Wo3 reading course in algebraic topology for Matthew How. McMaster University.
Topics included: the fundamental group, simplicial and cellular homology, cohomology.
- 2019–20 Summer Co-supervisor: Stewart Award recipient Matthew How (undergraduate summer research project), McMaster University.
Topics included: low-dimensional manifolds, Dehn surgery, Kirby calculus, the Casson invariant.
- 2018–19 Summer Co-supervisor: *An exploration of quantum invariants of knots and modularity*, Fields Undergraduate Summer Research Program, Fields Institute.
Topics included: the (coloured) Jones polynomial, Khovanov homology, skein algebras.

AWARDS

- 2012 Undergraduate Research Bursary, Institute of Physics

SERVICE & ACTIVITIES

- Co-organizer of *Workshop on Link Homology and Concordance*, three-day workshop at the Fields Institute, Toronto. Supported by the Fields Institute and the National Science Foundation.

Referee for **J. Knot Theory Ramifications, Canad. Math. Bull., Bull. Lond. Math. Soc., European J. Combin., New York J. Math.**

Part of the Association for Women in Mathematics Mentor Network.