

Benjamin Morris, Ph.B.

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🌐 <https://benjimorris.github.io/>

🆔 0009-0005-9057-9021

Current Position

📌 University of Leeds, Leeds (UK)

PhD Candidate in Pure Mathematics, supervisor: Prof. Paul Martin

Research Interests

- 📌 My research currently concerns the algebraic structures which appear at the interface between mathematical physics (especially lattice models in statistical mechanics), low-dimensional topology, and representation theory. My doctoral studies have focused on the representation theory of diagram algebras/categories, and explicit, combinatorial constructions of such categories. I enjoy solving problems in algebra and topology by combinatorial and algorithmic methods and am experienced in performing and managing large calculations with computer algebra software, especially Mathematica (although I am always keen to learn more languages!).


Keywords

- 📌 Diagram categories, cellular algebras, representation theory, tensor categories, cobordism categories.

Short CV

- 📌 In 2021, I obtained a Ph.B. with first class honours, from the Australian National University, under the supervision of Assoc. Prof. Vladimir Mangazeev.
- 📌 My PhD has so far resulted in two papers. During this time I have given 17 research talks at seminars, international conferences, and workshops. In 2025 I won a LMS Travel Grant for Early Career Researchers to attend the IMPAN conference “Yang-Baxter Equation and all that” in Poland.
- 📌 In Leeds, I have strived to foster an active, collaborative, and fair research environment by taking on various roles including: organiser for a Pure Maths Seminar for PhD students, running three reading groups among peers, volunteering as a buddy for first year PhD students, and attending and supporting initiatives such as the IDEAL conference. By actively participating in the algebra seminar I was able to establish an international collaboration with Dr D. Ibarra and Dr G Montoya-Vega.
- 📌 In March 2025, I helped to coordinate and write the successful application for the project: “Mathematics and Implementation of Quantum Computing” (MIQC), jointly funded by the University of Leeds and Universität Hamburg. This is an interdisciplinary project between the Algebra group in Leeds, the Higher Structure group in Hamburg, and the Quantum group (Physics) in Leeds. In February and March 2026, I co-organised two workshops in Leeds as part of this project.
- 📌 In April 2026, I organised a conference “Introduction to Modern Advances in Algebra” for PhD and MSc students in algebra. This successfully received small grant funding from 5 different sources.

Education

- 2022 – 2026¹ 📌 **Ph.D. in Mathematics**, University of Leeds, Leeds, United Kingdom.
- 2018 – 2021 📌 **Ph.B. with First Class Honours in Mathematics**, Australian National University, Canberra, Australia. Certificate 
Thesis: *Towards a Factorised Solution of the Yang-Baxter Equation with $U_q(\mathfrak{sl}_4)$ Symmetry.*

Research Publications

¹expected

- 1 **B. Morris** and P. P. Martin, *On semisimplicity criteria and non-semisimple representation theory for the kdar-yu algebras*, [submitted to *Mathematische Zeitschrift*], Dec. 2025. arXiv: 2512.24535 [math.RT].
[URL: https://arxiv.org/abs/2512.24535](https://arxiv.org/abs/2512.24535).
- 2 D. Ibarra, G. Montoya-Vega, and **B. Morris**, *Temperley-Lieb categories on non-orientable surfaces*, Jun. 2025. arXiv: 2506.14319 [math.CT]. [URL: https://arxiv.org/abs/2506.14319](https://arxiv.org/abs/2506.14319).

Talks

Presentations at conferences and workshops




- 1 **Morris, B**, *Temperley-Lieb Categories on Non-Orientable Surfaces*, Categorical Structures, Groupoids, and the Yang-Baxter Equation: A Mini-Workshop in Torino, (Turin, Italy), [upcoming], Jun. 2026.
- 2 **Morris, B**, *Generalised roots of unity: Interpolating between temperley-lieb and brauer representation theory*, VUB–Leeds Algebra School, (Brussels, Belgium), [Upcoming Poster], Jun. 2026.
- 3 **Morris, B**, *Some non-semisimple representation theory for the Kadar-Yu algebras*, The Interplay Between Skew Braces and Hopf-Galois Theory, (Leeds, UK), Feb. 2026.
- 4 **Morris, B**, *Temperley-Lieb categories on non-orientable surfaces*, Higher Structures: Recent developments and applications, (Hamburg, Germany), [Gong Show Talk], Sep. 2025.
- 5 **Morris, B**, *Temperley-Lieb categories on non-orientable surfaces*, The Yang-Baxter equation and all that, (Bedlewo, Poland), Jun. 2025.
- 6 **Morris, B**, *A diagram category for non-orientable surfaces*, Introduction to Modern Advances in Algebra, (Manchester, UK), Apr. 2025.
- 7 **Morris, B**, *A diagram category for non-orientable surfaces*, Biracks and Biquandles: Theory, applications, and new perspectives, (Leeds, UK), Dec. 2024.
- 8 **Morris, B**, *An unorientable extension of the Temperley-Lieb category*, Topological aspects of low-dimensional quantum physics, (Maynooth, Ireland), [Poster], Apr. 2024.
- 9 **Morris, B**, *Towards a factorised solution of the Yang-Baxter equation with $U_q(sl_n)$ symmetry*, SIDE 14.2 (Symmetries and Integrability of Difference Equations), (Warsaw, Poland), Jun. 2023.
- 10 **Morris, B**, *Towards a factorised solution of the Yang-Baxter equation with $U_q(sl_n)$ symmetry*, Applications of Hecke and related algebras, (Les Houches, France), Feb. 2023.
- 11 **Morris, B**, *Towards a factorised solution of the Yang-Baxter equation with $U_q(sl_n)$ symmetry*, 65th Annual Meeting of the Australian Mathematical Society, (Newcastle, Australia), Dec. 2021.

Seminar talks



- 12 **Morris, B**, *TBA*, North British Mathematical Physics Seminar, (York, UK), [upcoming], Jul. 2026.
- 13 **Morris, B**, *TBA*, Research Seminar on Quantum Topology and Categorification (QTCat), (Hamburg, Germany), [Upcoming], Jun. 2026.
- 14 **Morris, B**, *How to make lasagna*, Pure PGR Seminar, (Leeds, UK), Feb. 2026.
- 15 **Morris, B**, *Semi simplicity criteria for the Kadar-Yu algebras*, York Algebra Seminar, (York, UK), Nov. 2025.
- 16 **Morris, B**, *Semi simplicity criteria for the Kadar-Yu algebras*, Algebra Seminar, (Leeds, UK), Nov. 2025.
- 17 **Morris, B**, *The Yang-Baxter equation and quantum group symmetry*, MaPLe, (Leeds, UK), Nov. 2024.
- 18 **Morris, B**, *What's the deal with cellular algebras*, Pure PGR Seminar, (Leeds, UK), Oct. 2024.

- 19 **Morris, B**, *Algebra from statistical mechanics*, STAMP, (Edinburgh, UK), Apr. 2024.
- 20 **Morris, B**, *An unorientable extension of the Temperley-Lieb category*, JLAC, (London, UK), Mar. 2024.
- 21 **Morris, B**, *Lattice statistical mechanics is algebra*, Pure PGR Seminar, (Leeds, UK), Mar. 2024.
- 22 **Morris, B**, *Towards a factorised solution of the Yang-Baxter equation with $U_q(sl_n)$ symmetry*, Pure PGR Seminar, (Leeds, UK), Jan. 2023.




Conference Organisation

- 15/04–17/04/2026  *Introduction to Modern Advances in Algebra III*, Leeds (United Kingdom)
(organisers: O. McGrath, B. Mills, **B. Morris**)
- 26/03–27/03/2026  *Dijkgraaf-Witten Theory, Tensor Categories, and Applications*,
Leeds (United Kingdom)
(local organisers: P. Huston, P.P. Martin, J.F. Martin, **B. Morris**)
- 17/02/2026  *Mathematical and Physical underpinnings of Topological Quantum Computation*
Leeds (United Kingdom)
(organisers: P.P. Martin, E. Rowell, **B. Morris**)

Research Visits




- 14/06 – 24/06/2026²  Visiting PhD Student @ Universität Hamburg, Germany
Supported by Leeds-Hamburg joint project: MIQC
(host Prof. P. Wedrich) – 2 weeks
- 11/2019 – 02/2020  Summer Research Scholar @ Australian National University, Canberra, Australia
“ Q -operators in Integrable Systems”
(host A/Prof. V. Mangazeev) – 3 months

Grants

- 2026  Conference grants. “Introduction to Modern Advances in Algebra”.
Organisers: O. McGrath, B. Mills, **B. Morris**.
Funding bodies: Heilbronn Institute, MAGIC Maths, LMS (London Mathematical Society),
EPSRC “RepNet grant”, University of Leeds. £ 8700
- 2025–2026  Participant in: “Mathematics and Implementation of Quantum Computing” (MIQC).
Grant Holders: Prof. P. P. Martin, Prof. C. Schweigert
Funding bodies: University of Leeds, Universität Hamburg. £ 7600
- 2025  ECR Travel Grants to attend “Yang-Baxter Equation and all that” (Bedlewo, Poland).
Grant Holder: **B. Morris**
Funding bodies: London Mathematical Society. £ 500

Teaching experience

University of Leeds, Leeds (UK)

- Supervision  **MATH5000M Summer MSc dissertation** AY 2025 – 26
(Joint supervision with Dr Ilaria Colazzo)
- Demonstrator  **MATH1110 Real Analysis** AYs 2023 – 24, 2024 – 25, 2025 – 26
-  **MATH1120 Introduction to Group Theory** AY 2024 – 25

²upcoming

Teaching experience (continued)

	▪ MATH1050 Calculus and Mathematical Analysis	AY 2023 – 24
	▪ MATH1055 Numbers and Vectors	AY 2023 – 24
Marker	▪ MATH2130 Further Linear Algebra and Discrete Mathematics	AY 2025 – 26
	▪ MATH3071 Groups and Symmetry	AY 2023 – 24
Australian National University, Canberra (Australia)		
Demonstrator	▪ ODEs (SDU-ANU Joint Science College)	AY 2022
	▪ Mathematical Abstraction I (SDU-ANU Joint Science College)	AY 2022
	▪ MATH2301 Applied Mathematics I	AY 2022

Other Teaching Roles

Australian National University, Canberra (Australia)

Private Tutor	▪ MATH1115 Advanced Mathematics and Applications 1 Private tuition for undergraduate student in pure mathematics	AY 2022
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Academic Service

Other organisational experience

2025	▪ Wrote successful grant application for Leeds-Hamburg joint funding partnership, “MIQC”.
2024 – 2025	▪ Co-organised the Pure PGR Seminar @ University of Leeds (UK).

Student Mentoring

2024-2025	▪ Buddy for first year PhD Students in Mathematics @ the University of Leeds
2019	▪ Peer assisted learning (PAL) mentor for first year chemistry students @ ANU
	▪ Academic mentor for for first year students in STEM @ Ursula Hall, ANU

Other

Programming Languages

- Mathematica, Python, MatLab.

Language

- English (native).

References

Available on Request