Curriculum Vitae — Paul Wedrich PhD FCPS FHEA

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Academic positions.

since 2021: Professor (permantent, W2), Universität Hamburg, Germany
2019-2021: Hirzebruch Research Instructor, Max Planck Institute & University of Bonn, Germany
2017-2019: Postdoctoral Fellow, The Australian National University [ANU], Australia
2015-2017: Research Associate, Imperial College London, United Kingdom

Research visits.

2020: Programme "Knots, Strings, Symplectic Geometry and Dualities", Institut Mittag Leffler (remotely)
2020: Programme "Quantum Symmetries", MSRI Postdoctoral Fellow (4 months)
2018: Programme "Quantum Knot Invariants and Supersymmetric Gauge Theories", KITP (3 weeks)
2017: Programme "Homology theories in low dimensional topology", INI, Cambridge
2016: Max Planck Institute for Mathematics, Bonn (6 months)

Education.

2012-2015: PhD, University of Cambridge. Advisor: Dr Jacob Rasmussen
2011-2012: MASt in Mathematics (Part III) with high distinction, University of Cambridge
2008-2011: BSc in Mathematics with distinction, University of Vienna

Published / accepted papers.

2021: SL2 tilting modules in the mixed case. Joint with Louise Sutton, Daniel Tubbenhauer, and Jieru Zhu. Accepted for publication in *Selecta Mathematica* (2022). arXiv:2105.07724.

2021: gl(2) foams and the Khovanov homotopy type. Joint with Vyacheslav Krushkal. Accepted for publication in *Indiana University Mathematics Journal* (2021). arXiv:2101.05785.

2020: Tangle addition and the knots-quivers correspondence. Joint with Marko Stosic. *Journal of the London Mathematical Society* 104-1 (2021) 341-361. arXiv:2004.10837.

2020: A coupled Temperley-Lieb algebra for the superintegrable chiral Potts chain. Joint with Remy Adderton and Murray T. Batchelor. *Journal of Physics A: Mathematical and Theoretical* 53-36 (2020). arXiv:2004.10392.

2020: The center of SL(2) tilting modules. Joint with Daniel Tubbenhauer. *Glasgow Mathematical Journal* 64 (2022) 165–184. arXiv:2004.10146.

2020: Derived traces of Soergel categories. Joint with Eugene Gorsky and Matthew Hogancamp. *International Mathematical Research Notices*, first published online (2021). arXiv:2002.06110.

2019: Invariants of 4-manifolds from Khovanov-Rozansky link homology. Joint with Scott Morrison and Kevin Walker. Accepted for publication in *Geometry & Topology* (2021). arXiv:1907.12194.

2019: Quivers for SL(2) tilting modules. Joint with Daniel Tubbenhauer. *Representation Theory* 25 (2021) 440-480. arXiv:1907.11560. (6 citations)

2019: Evaluations of annular Khovanov-Rozansky homology. Joint with Eugene Gorsky. *Math Z.* 303-25 (2023). arXiv:1904.04481.

2019: Algèbre diagrammatique et catégorification. Survey paper. Joint with Hoel Queffelec. *Gazette des mathématiciens* 163 (2020).

2018: Khovanov homology and categorification of skein modules. Joint with Hoel Queffelec. *Quantum Topology* 21-1 (2021) 129–209. arXiv:1806.03416.

2017: Rational links and DT invariants of quivers. Joint with Marko Stosic.
International Mathematical Research Notices 6 (2021) 4169–4210. arXiv:1711.03333.

2017: Functoriality of colored link homologies. Joint with Michael Ehrig and Daniel Tubbenhauer.
Proceedings of the London Mathematical Society 117-5 (2018) 996–1040. arXiv:1703.06691.

2017: Extremal weight projectors. Joint with Hoel Queffelec.
Mathematical Research Letters 25-6 (2018) 1911–1936. arXiv:1701.02316.

2016: Exponential growth of colored HOMFLY-PT homology.
Advances in Mathematics 353 (2019), 471–525. arXiv:1602.02769.

2015: Super q-Howe duality and web categories. Joint with Daniel Tubbenhauer and Pedro Vaz.
Algebraic & Geometric Topology 17-6 (2017), 3703–3749. arXiv:1504.05069v2.

2015: Deformations of colored $sl(N)$ link homologies via foams. Joint with David Rose.
Geometry & Topology 20-6 (2016), 3431–3517. arXiv:1501.02567.

2014: q-holonomic formulas for colored HOMFLY polynomials of 2-bridge links.
Journal of Pure and Applied Algebra. 223-4 (2019), 1434–1439. arXiv:1410.3769v1.

2014: Categorified $sl(N)$ invariants of colored rational tangles.
Algebraic & Geometric Topology 16-1 (2016), 427–482. arXiv:1404.2736v1.

Preprints.

2022: A Kirby color for Khovanov homology. Joint with Matthew Hogancamp and David Rose.
arXiv:2210.05640.

2022: Skein lasagna modules and handle decompositions. Joint with Ciprian Manolescu and Kevin Walker.
arXiv:2206.04616.

2021: Link splitting deformation of colored Khovanov–Rozansky homology. Joint with Matthew Hogancamp and David Rose.
arXiv:2107.09590.

2021: A skein relation for singular Soergel bimodules. Joint with Matthew Hogancamp and David Rose.
arXiv:2107.08117.

2018: Extremal weight projectors II. Joint with Hoel Queffelec. arXiv:1803.09883.

Teaching.

2022: Universität Hamburg, research seminar *Quantum Topology and Categorification.*

2022: Universität Hamburg, graduate seminar *Highest weight categories.*

2022: Universität Hamburg, lecture course *LASek Mathematik 1.*

2022: Universität Hamburg, graduate seminar *Braids, bimodules, bicategories.*

2022: Universität Hamburg, lecture course *Advanced algebra.*

2021: Universität Hamburg, lecture course *Lie algebras.*

2021: Universität Hamburg, LSV *Beweismethoden und schulnahe Beispiele aus der linearen Algebra.*

2020: Universität Bonn, Graduate Seminar S4A2 Representation Theory on *Knot homology.*

2019: Universität Bonn, *Oberseminar representation theory.*

2018: The Australian National University, lecture course *MATH1013 Linear Algebra.*

2016: London Taught Course Centre, intensive course on Khovanov homology.

2015: University of Cambridge, supervisor for Part IB Geometry.

2014: University of Cambridge, supervisor for Part II Algebraic Topology.

2013: University of Cambridge, supervisor for Part IB Geometry.

2011: University of Vienna, teaching assistant for 1st year calculus.

Research student supervision.

2022: Supervisor, 4 Master theses, Universität Hamburg

2022: Supervisor, 1 Bachelor thesis, Universität Hamburg

2018: Co-supervisor, honours student Jack Brand, The Australian National University
Co-supervisor, summer student Hazel Browne, The Australian National University

2017: Thesis supervisor, MSc student Sam Osborne, Imperial College London

Third-party funding and contributions to event organisation.

2022: Minisymposium "Algebra and Low-Dimensional Topology", DVM Annual Meeting, Berlin.

2021: Member and PI of the Excellence Cluster "Quantum Universe", Universität Hamburg

2020: Workshop "Categorification, Hall algebras and quantum cohomology" and learning seminar series, Hausdorff Institute for Mathematics, Bonn.

2020: Felix Klein Lectures 2020, Hausdorff Center for Mathematics, Bonn.

2019: Discovery Early Career Researcher Award (declined), Australian Research Council, 427k AUD. Project title "Homology theories in quantum topology". Highly competitive across disciplines, maximal funding amount secured, one of only two pure mathematics projects funded in 2019.

2019: Workshop (2 weeks) "Categorification in quantum topology and beyond" at the Erwin Schrödinger Institut [ESI], Vienna.

2018: Conference "Classical and quantum three-manifold topology" at Monash University.

2017: Junior Trimester Programme "Symplectic Geometry and Representation Theory", HIM, Bonn.

Community, department and university service.

since 2022: ERASMUS international exchange coordinator at the department of Mathematics.

since 2022: Editor for *Abhandlungen aus dem mathematischen Seminar der Universität Hamburg*.

2022: Member on two W1 hiring committees.

2020: Research group leader in the Junior Trimester Programme "New Trends in representation theory", HIM, Bonn.

2019-2020: Member of the board of the Mathematical Institute, University of Bonn.
Representative of the non-professorial scientific staff.

2018-2019: Member of the Early Career Academic Development Committee, College of Science, ANU.
Representative of the Mathematical Sciences Institute.

2018-2019: Development of the ECRVP funding scheme at the Mathematical Sciences Insitute, ANU.

2018-2019: Organiser of the Mathematical Sciences Institute Colloquium at ANU.

Professional memberships.

2021: Member of the German Mathematical Society

2018: Fellow of the Higher Education Academy

2018: Member of the Australian Mathematical Society

2018: Member of the ANU Ally Network for LGBTIQ* inclusion

2014: Member of the London Mathematical Society

2013: Fellow of the Cambridge Philosophical Society

Refereeing.
I review five to ten papers per year, with a target turnaround time of less than three months. In the past years I was a referee for:

- *Advances in Mathematics*
- *Algebraic & Geometric Topology*
- *Algebras and Representation Theory*
- *Annales scientifiques de l'École normale supérieure*
- *Communications in Mathematical Physics*
- *Compositio Mathematicae*
- *Crelle's Journal*
- *Duke Mathematical Journal*
- *Inventiones Mathematicae*
- *Fundamenta Mathematicae*
- *Geometry & Topology*
- *International Mathematical Research Notices*
- *International Symposium on Comp. Geometry*
- *Journal for Pure and Applied Algebra*
- *Journal of Combinatorial Algebra*
- *Journal of Knot Theory and its Ramifications*
- *Journal of the LMS*
- *Journal of Topology*
- *Letters in Mathematical Physics*
- *Mathematische Annalen*
- *Mathematische Zeitschrift*
- *Michigan Mathematical Journal*
- *Notices of the AMS*
- *Pacific Journal of Mathematics*
- *Proceedings of the LMS*
- *PLOS ONE*
- *Quantum Topology*
- *SIGMA*
- *Transformation Groups*

In the recent past I have also served on an NSF panel.

Selected conference talks and lecture series.

2023: Quantum Universe Lecture Series "Correlators, topological field theory and categorification"
2022: Conference "Recent developements in link homology theories". Les Diablerets, online
Conference "From Subfactors to Quantum Topology – in Memory of Vaughan Jones", Geneva
Conference "QUACKS II". University of Oregon
DMV Annual Meeting 2022, Topology and Geometry Section, Berlin
2021: Workshop: "Foam Evaluation", ICERM
Conference: "HCM Symposium", Hausdorff Center for Mathematics, Universität Bonn
Mini-course at Workshop: "Perspectives on quantum link homology theories", Regensburg
Georgia Topology Conference 2021, online
Workshop: "Perspectives on Knot Homology", Banff International Research Station, online
2020: Workshop: QUAntum groups, Categorification, Knot invariants, and Soergel bimodules, online
Categorification Learning Seminar: Two talks on "Derived annular Khovanov-Rozansky invariants"
Workshop: "Soergel Bimodules and Categorification of the Braid Group", ICERM
2019: Conference: "Mathematics and Physics of Knots", Institute Mittag Leffler
Conference: "Hilbert schemes, categorification and combinatorics", UC Davis
Workshop mini-course: "Quantum Topology and hyperbolic geometry III", Quy Nhon, Vietnam
Conference: "Quantum Topology and hyperbolic geometry III", Da Nang, Vietnam
Workshop: "Hidden Algebraic Structures in Topology", Caltech
Conference: "Aspects of Higher Representation Theory", Brussels.
2018: Mini-course at Workshop "Classical and quantum three-manifold topology", Monash University.
Workshop "Categorified Hecke algebras, link homology and Hilbert schemes", AIM
Conference "Interactions of low-dimensional topology and higher representation theory", Zürich
Conference "Categorification and Higher Representation Theory", Institute Mittag Leffler
Meeting: "Topological Quantum Field Theory and Categorification", IESC
Workshop: "Categorification in mathematical physics" SCGP Stony Brook
Workshop: "Modular Forms and Quantum Knot Invariants", Banff International Research Station
Conference: "Quantum Knot Homology and Supersymmetric Gauge Theories", Aspen
2017: Conference: "Representation Theory and Combinatorics of Torus Links", University of Massachusetts
Workshop: "Quantum topology and categorified representation theory", Isaac Newton Institute
Workshop: "Physics and knot homologies", Isaac Newton Institute
2016: Conference: "Quantum invariants and low-dimensional topology", MATRIX, Australia
ESI Simons Lecture Series, Erwin Schrödinger Institut, Vienna
Workshop: "Homological Methods in Algebra and Geometry", AIMS Ghana
Conference: "Knots in Hellas", Greece (keynote talk)
Conference: "SwissMAP", Switzerland

2015: Workshop: “Physics and mathematics of knot homologies”, SCGP Stony Brook
Conference, “Winter Braids V”, France

Seminar talks.

2022: Beijing Institute of Technology
TU Dresden
Universität Hamburg
University of Virginia

2021: Boston College
CUNY Medgar Evers
Institut de Mathématiques de Jussieu
Universität Göttingen
Universität Hamburg

2020: George Washington University
Kansas State University
LA Topology Seminar
MSRI (2x)
Paris LAGA/IMJ-PRG
Stanford University
UC Berkeley
UC Davis
University of Birmingham
University of Massachusetts, Amherst

2019: Australian National University (2x)
IST Lisbon
Montana State University
Technische Universität Kaiserslautern
Universität Bielefeld
University of Essex
Universität Hamburg
University of Leicester
Université de Montpellier
University of Oklahoma
Universität Stuttgart
Universität Wien
Universität Zürich (2x)

2018: Australian National University
Claremont Topology Seminar
Melbourne University
Monash University
TU München
UC Santa Barbara
Uppsala Universitet

2017: Australian National University
Kings College London
IST Lisbon
QGM Aarhus University
University College London University of Cambridge
University of Sydney
Universität Wien
Universität Zürich

2016: Université de Montpellier
Université catholique de Louvain
University of Oregon
Universität Wien
Universität Bonn
Max Planck Institut für Mathematik

2015: California Institute of Technology
Columbia University
Université catholique de Louvain
ETH Zürich
Durham University
QGM Aarhus University

2014: Institut de Mathématiques de Jussieu
Université de Genève
QGM Aarhus University
Erwin Schrödinger Institut
University of Cambridge

2013: University of Cambridge
Universität Wien

2012: IST Austria
Universität Bonn

Awards, honours, and offers.

2019: Discovery Early Career Researcher Award (427k EUR, Australian Research Council, declined)

2019: Lectureship at the University of Essex, UK (declined)

2018: Level B (assistant professor) performance-based salary loading at ANU

2014: Smith-Knight & Rayleigh-Knight Prize

2012: Scholarship at Churchill College, Cambridge

2012: High distinction in Cambridge Part III exams, offered PhD position without prior application

2011: Excellence Award (10k EUR) from the Carinthian branch of the Federation of Austrian Industry

2011: Excellence scholarships, ranked 1st in Mathematics at Universität Wien in final two years