# Curriculum Vitae — Paul Wedrich

Legal name: Paul Rhode-Wedrich
Family status: married, one child (2025)
Nationality: Austrian
Pronouns: he/him/his

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**Academic positions.**

since 2021: Professor (permanent, 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.**

2024: Programme *Quantum Symmetries Reunion*, SLMath (2 weeks)
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

**Preprints.**

2025: A note on TQFTs for orientable 2-dimensional cobordisms. Joint with Leon J. Goertz. arXiv:2511.19373.
2025: Khovanov skein lasagna modules with 1-dimensional inputs. Joint with Qiuyu Ren, Ian Sullivan, Michael Willis, and Melissa Zhang. arXiv:2510.05273.
2025: From Link Homology to Topological Quantum Field Theories. arXiv:2509.08478.
2025: Perverse schobers of Coxeter type A. Joint with Tobias Dyckerhoff. arXiv:2504.08496.
2024: Braiding on type A Soergel bimodules: semistrictness and naturality. Joint with Catharina Stroppel. arXiv:2412.20587.
2024: Bordered invariants from Khovanov homology. Joint with Matthew Hogancamp and David Rose. arXiv:2404.06301.
2024: Invariants of surfaces in smooth 4-manifolds from link homology. Joint with Scott Morrison and Kevin Walker. arXiv:2401.06600.
2024: A braided (infinity,2)-category of Soergel bimodules. Joint with Yu Leon Lio, Aaron Mazel-Gee, David Reutter, and Catharina Stroppel. arXiv:2401.02956.
2021: A skein relation for singular Soergel bimodules. Joint with Matthew Hogancamp and David Rose. arXiv:2107.08117.

**Published / accepted papers.**

2025: A note on general linear link homology. *Proceedings of the International Conference on Knots, Quivers and Beyond (ICKQB 2025)* (2025) 105–121. arXiv:2504.20745.
2022: A Kirby color for Khovanov homology. Joint with Matthew Hogancamp and David Rose. *Journal of the European Mathematical Society* (2025), published online first. arXiv:2210.05640.
2022: Skein lasagna modules and handle decompositions. Joint with Ciprian Manolescu and Kevin Walker. *Advances in Mathematics* 425 (2023) Paper No. 109071. arXiv:2206.04616.

2021: Link splitting deformation of colored Khovanov–Rozansky homology. Joint with Matthew Hogancamp and David Rose. *Proceedings of the London Mathematical Society* 129-3 (2024) e12620. arXiv:2107.09590.

2021: SL2 tilting modules in the mixed case.Joint with Louise Sutton, Daniel Tubbenhauer, and Jieru Zhu. *Selecta Mathematica* 29-3 (2023) Paper No. 39. arXiv:2105.07724.

2021: gl(2) foams and the Khovanov homotopy type. Joint with Vyacheslav Krushkal. *Indiana University Mathematics Journal* 72-3 (2023) 731–755. 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*, 15 (2022) 11304–11400. arXiv:2002.06110.

2019: Invariants of 4-manifolds from Khovanov-Rozansky link homology. Joint with Scott Morrison and Kevin Walker. *Geometry & Topology* 26-8 (2022) 3367–3420. arXiv:1907.12194.

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

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.

2018: Extremal weight projectors II. Joint with Hoel Queffelec. *Algebraic Combinatorics* 7-1 (2024) 187–223. arXiv:1803.09883.

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.

**Teaching.**

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

2025: Universität Hamburg, lecture course *Lineare Algebra 2.*

2024: Universität Hamburg, lecture course *Lineare Algebra.*

2024: Universität Hamburg, lecture course *Knot homology and categorification.*

2023: Universität Hamburg, ZMP seminar *Knot homology*.
2023: Universität Hamburg, proseminar *Symmetrische Funktionen*.
2023: Universität Hamburg, lecture course *Algebra*.
2023: Universität Hamburg, graduate seminar *Low-dimensional topology*.
2023: Universität Hamburg, lecture course *Lehramt Sekundarstufe: Mathematik 2*.
2022: Universität Hamburg, graduate seminar *Highest weight categories*.
2022: Universität Hamburg, lecture course *Lehramt Sekundarstufe: 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.

**Supervision of Early-Career Researchers.**

postdocs: Jesse Cohen (2023-2025), Universität Hamburg
Mikhail Gorsky (2024-2025, with Dyckerhoff), Universität Hamburg
Laura Marino (since 2024), Universität Hamburg
Daria Poliakova (since 2024, with Holstein), Universität Hamburg
Kostiantyn Tolmachov (since 2024, with Dyckerhoff), Universität Hamburg
PhDs: Leon Goertz (since 2023), Universität Hamburg
Ali Ramsey (since 2025), Universität Hamburg
Isabela Recio (since 2024), Universität Hamburg
Karim Ritter von Merkl (since 2023), Universität Hamburg
since 2024: Committee member on doctoral defenses outside Hamburg: 3
since 2022: Second supervisor/mentor for doctoral students: 1/3, Universität Hamburg
since 2022: Master theses under supervision/completed: 0/7, Universität Hamburg
since 2022: Bachelor theses under supervision/completed: 1/2, Universität Hamburg
since 2021: Mentor for Emmy–Noether application (D. Reutter), Universität Hamburg
2018: Honours theses/summer research cosupervision: 1/1, The Australian National University
2017: MSc thesis supervision, Imperial College London

**Third-party funding.**

since 2024: PI, management committee member, and diversity officer of the Collaborative Research Center 1624 *Higher structures, moduli spaces and integrability*, Universität Hamburg.
since 2023: International PI in the SPARC project *Knots, quivers, and beyond* with Rama Mishra, Pichai Ramadevi, and Johannes Walcher.
since 2021: Member and PI of the Excellence Cluster *Quantum Universe*, Universität Hamburg.
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.

**Awards, honours, and offers.**

2025: Frontiers of Science Award, to be awarded at the International Congress for Basic Science 2025
2022: Lecturer of the semester (summer semester 22), Department of Mathematics, Universität Hamburg
2019: Lectureship at the University of Essex, UK (declined)
2014: Smith-Knight & Rayleigh-Knight Prize
2012: Scholarship at Churchill College, Cambridge
2012: High distinction in Cambridge Part III exams, PhD position offered without 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

**Contributions to event organisation.**

2026: Program (3 months) *Quantum topology, character varieties and low-dimensional geometry*, IPAM.
2025: Summer school and workshop (2 weeks) *Higher structures*, CRC 1624, Hamburg.
2025: School and conference *Categorification in low-dimensional topology*, Bochum.
2025: International mathematics competition *Naboj*, Hamburg.
2025: Workshop *Knots, quivers and beyond*, Indian Institute of Technology, Bombay.
2024: International mathematics competition *Naboj*, Hamburg.
2022: Minisymposium *Algebra and Low-Dimensional Topology*, DVM Annual Meeting, Berlin.
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: 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 2025: Spokesperson for the *Mathematisches Seminar der Universität Hamburg*.
since 2024: Member of the management committee of the Collaborative Research Center 1624.
since 2024: Member of the departmental structure commission.
since 2023: Member of the Beate Naroska Guest Professorship selection committee.
since 2023: Equal opportunity representative at the Department of Mathematics.
since 2022: ERASMUS international exchange coordinator at the Department of Mathematics.
since 2022: Editor for *Abhandlungen aus dem mathematischen Seminar der Universität Hamburg*.
since 2022: Member of hiring committees for one W2, two W3 and three W1 positions.
2020: Research group leader, Junior Trimester Programme *New Trends in representation theory*, HIM.
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.**

since 2024: Member of the Mathematische Gesellschaft in Hamburg (gegr. 1690)
since 2021: Member of the German Mathematical Society
since 2018: Fellow of the Higher Education Academy
since 2018: Member of the Australian Mathematical Society

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

since 2014: Member of the London Mathematical Society

since 2013: Fellow of the Cambridge Philosophical Society

**Refereeing.**

I currently review around ten papers per year for journals including:

- *Advances in Mathematics*
- *Algebraic & Geometric Topology*
- *Algebras and Representation Theory*
- *Annals of Mathematics*
- *Annals of Representation Theory*
- *Annales scientifiques de l'École normale supérieure*
- *Arkiv för Matematik*
- *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 as referee for the ARC (Australia), DFG (Germany), Dutch Research Council (Netherlands), SNSF (Switzerland), and the NSF (USA).

**Selected outreach and public engagement talks.**

2025: *A Tale of Quantum Computation and Categorification*, talk at the "20 years of MIN Faculty - Symposium", Universität Hamburg.

2025: *Ein Blick in die vierte Dimension*, as plenary talk at the 25th anniversary celebrations of the PriMa project, Hamburg, approx. 400 participants, mostly primary school children and parents.

2023: *Knoten, Henkel und Wurmlöcher — Ein Ausflug in vierdimensionale Räume*, as part of the public exhibition *Wie alles begann*, Museum der Arbeit, Hamburg, approx. 150 participants, mostly adults.

**Selected conference talks and lecture series (and invitations for future dates).**

2025: Simons Collaboration Meeting *New Structures in Low-Dimensional Topology*, New York
Conference *Modern Developments in Low-Dimensional Topology*, ICTP, Trieste
*International Congress of Basic Science*, Beijing
Conference *New perspectives on skein modules*, CIRM, Luminy

2024: Summer school *Baby Steps Beyond the Horizon*, Banach Center
Mini-course at conference *Belalp*, Switzerland
Programme *Quantum Symmetries Reunion*, SLMath
Conference *Diagrammatic Intuition and Deep Learning in Mathematics*, University of York
Mini-course at Simons Semester *Knots, homologies, and physics*, Warsaw
Conference *Quantum Topology Biennial: Representation Theory*, Les Diablerets

2023: Quantum Universe Lecture Series *Correlators, topological field theory and categorification*
Spring School in Representation Theory, lecture series, University of Kent
Workshop *Algebra, geometry, and combinatorics of link homology*, AIM

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

**Selected research seminar talks (and invitations for future dates).**

2025: UC Berkeley
Uppsala Universitet
BIMSA

2024: Universität Bochum
Institut de Mathématiques de Jussieu

2023: Higher Structures & Field Theory (online)
Stanford University
UC Berkeley
UC Davis
Université catholique de Louvain

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