Paula Truöl

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Updated: April 2024

RESEARCH INTERESTS

Low-dimensional topology, in particular braids, knots and knot concordance.

EDUCATION

07/2019 – 06/2023	**Doctor of Science** in Mathematics at ETH Zürich, Zurich, Switzerland. Advisor: Peter Feller. Thesis: *On notions of braid positivity and knot concordance.*
Spring 2021	Participant in the AIM Online Research Community 4-Dimensional Topology organized by Miriam Kuzbary, Maggie Miller, Juanita Pinzón-Caicedo and Hannah Schwartz.
08/2016 – 02/2019	**Master of Science** in Mathematics at Universität Ulm (with distinction, 1.0), Ulm, Germany. Thesis: *Massey products and linking numbers.*
08/2017 – 05/2018	**Master of Science** in Mathematics (GPA 4.0) at Syracuse University, Syracuse, NY, USA.
10/2012 – 08/2016	**Bachelor of Science** in Mathematics (1.5) at Universität Ulm, Ulm, Germany. Thesis: *Das Existenzproblem von Hurwitz.*
09/2014 – 02/2015	**Exchange semester** at ETH Zürich, Zurich, Switzerland.
07/2012	**Abitur** (1.0) at Bertha-von-Suttner-Gymnasium, Neu-Ulm, Germany.

EMPLOYMENT

10/2023 – 09/2025	**Postdoctoral fellow** at the Max Planck Institute for Mathematics (MPIM), Bonn, Germany.
07/2019 – 07/2023	**Teaching assistant** at the Department of Mathematics, ETH Zürich, Zurich, Switzerland.
10/2013 – 04/2019	**Teaching assistant** at the Department of Mathematics and Economics, Universität Ulm, Ulm, Germany.
08/2017 – 05/2018	**Teaching assistant** at the Department of Mathematics, Syracuse University, Syracuse, NY, USA.
02/2015 – 04/2015	**Internship** at UZWR (Scientific Computing Centre Ulm) in Ulm, Germany. Project work on fluid dynamics using numerical methods.

PUBLICATIONS

2. 3-braid knots with maximal 4-genus, with Sebastian Baader, Lukas Lewark, Filip Misev. *Trans. Amer. Math. Soc.* Ser. B 11 (2024), pp. 600–621.

1. The upsilon invariant at 1 of 3-braid knots. *Algebr. Geom. Topol.* 23.8 (2023), pp. 3763–3804.

PREPRINTS

2. **Strongly quasipositive links are concordant to infinitely many strongly quasipositive links** (2022). Submitted. ArXiv:2210.06612.

1. **On the nonorientable four-ball genus of torus knots** (2021), with Fraser Binns, Sungkyung Kang, and Jonathan Simone. Submitted. ArXiv:2108.03674.

INVITED TALKS AT CONFERENCES AND WORKSHOPS

07/2024 (planned)	*TBA*, Mini-symposium *Knot theory and low dimensional manifolds*, European Congress of Mathematics, Seville.
04/2024 (planned)	*3-braid knots with maximal 4-genus* , NRW Topology Meeting, Bergische Universität Wuppertal.
04/2024	*3-braid knots with maximal topological 4-genus*, Manifolds and groups in Bologna II, Università di Bologna.
09/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Leaning into Topology Workshop, Pisa.
09/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Swiss Knots, Universität Regensburg.
06/2023	*Notions of braid positivity and knot concordance*, Mini Workshop, Bern.
03/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, The low dimensional workshop, Erdős Center, Alfréd Rényi Institute of Mathematics, Budapest.
11/2022	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Paroles aux jeunes chercheuses et chercheurs en géométrie et dynamique, Orsay Mathematical Institute, Université Paris-Saclay.
09/2022	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Minisymposium Algebra and Low-Dimensional Topology, DMV Annual Meeting 2022, Freie Universität Berlin.
06/2022	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Surfaces in 4-manifolds, Le Croisic.

CONTRIBUTED TALKS AT CONFERENCES AND WORKSHOPS

02/2024	*Sutured Floer homology decomposition Theorem: overview and setup*, BTW4: Knot Floer Homology, Besse.
02/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Winter Braids XII, Tours.
01/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Low dimensional topology, Mathematisches Forschungsinstitut Oberwolfach.
05/2022	*The alternation number of positive 3-braid knots*, Swiss-Mathematical-Society Doctoral Day 2022, Université de Fribourg.
04/2022	*The RGB link construction and candidates for exotic spheres*, BTW2: Sliceness, exotic pairs, and quantum invariants, Aussois.
09/2021	*Concordance of positive braid knots*, MATRIX-MFO Tandem Workshop: Invariants and Structures in Low-Dimensional Topology, Oberwolfach, short talk.

RESEARCH TALKS IN SEMINARS

05/2024 (planned)	*3-braid knots with maximal 4-genus*, Séminaire de Géometrie et Topologie de Marseille, Institut de Mathématiques de Marseille.
04/2024 (planned)	*3-braid knots with maximal 4-genus*, Glasgow Geometry & Topology Seminar, Glasgow.
03/2024	*3-braid knots with maximal 4-genus*, MPIM Oberseminar, MPIM Bonn.
12/2023	*Knot concordance and notions of braid positivity*, Pitt AWM Student Seminar, University of Pittsburgh, online.
12/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Low-dimensional topology seminar, MPIM Bonn.
11/2023	*On Baker's conjecture about knot concordance*, MPIM Topology Seminar, MPIM Bonn, short introductory talk.
05/2023	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Low-dimensional topology seminar, MPIM Bonn.
12/2022	*Strongly quasipositive knots are concordant to infinitely many strongly quasipositive knots*, Geometry and Topology Seminar, CIRGET, Université du Québec à Montréal, online.
06/2022	*Concordance and alternation numbers of positive 3-braid knots (and a knot homology invariant)*, LKS-Seminar, Universität Regensburg.
05/2022	*The alternation number and the Upsilon-invariant at 1 of positive 3-braid knots*, Caltech GT Seminar, Caltech, online.
05/2022	*Concordance of positive 3-braid knots and a knot homology invariant*, Oberseminar Geometrie, Université de Fribourg.
02/2022	*The alternation number and the Upsilon-invariant at 1 of positive 3-braid knots*, Knot Online Seminar (K-OS), online.
04/2021	*The upsilon invariants and alternation numbers of positive 3-braid knots*, AIM Research Community "4-Dimensional Topology", online, lightning talk.
04/2021	*Positive 3-braid knots, their upsilon invariants and alternation numbers*, Geometric Topology Grad and Postdoc Seminar (GT GAPS), online.

COLLOQUIUM TALKS

10/2023	*Relating knot theory to algebraic geometry*, Geometry Graduate Colloquium, ETH Zürich, Zurich.
10/2022	*Slice knots - knot theory in dimension 4*, Bern-Fribourg Graduate Seminar, Universität Bern.
05/2022	*Slice knots - knot theory in dimension 4*, Baby Geometri Seminar, Università di Pisa and Scuola Normale Superiore, Pisa.
04/2022	*Slice knots - knot theory in dimension 4*, Bernoullis Tafelrunde, Universität Basel.
11/2021	*What is... a slice knot?*, Zurich Graduate Colloquium, ETH Zürich and Universität Zürich, Zurich.

OUTREACH TALKS

03/2023	*Work as a PhD Student*, short talk at the MindPhair 2023 at ETH Zürich (yearly job-fair for mathematicians, physicists and computational scientists at ETH Zürich).
03/2022	*Work as a PhD Student*, short talk at the MindPhair 2022 at ETH Zürich.

AWARDS

2017	**Fulbright Travel Grant**.
2014 – 2017	**Talanx Scholarship**.
2013 – 2014	**Deutschlandstipendium**: Ulm University and Ernst & Young Foundation Scholarship.
2012 – 2013	**Deutschlandstipendium**: Ulm University and Rotary Club Ulm Scholarship.

TEACHING EXPERIENCE

	ETH Zürich
Spring 2022	Course organizer for *Analysis II* (Civil/Geospatial/Environmental Engineering Bachelor).
Fall 2021	Course organizer for *Analysis I* (Civil/Geospatial/Environmental Engineering Bachelor).
09/2021	Certificate *Learning to Teach*. Programme for Doctoral Teaching Assistants at ETH Zürich. Course leader: Julia Kuark. Duration: 3 classroom days + 12 hours of independent study.
Spring 2021	Course organizer for *Topology*.
Fall 2020	Course organizer for *Linear Algebra I*.
Spring 2020	Course organizer for *Algebraic Topology II*.
Fall 2019	Teaching assistant for *Complex Analysis*.
	Syracuse University
Spring 2018	Teaching assistant for *Calculus III*.
Fall 2017	Teaching assistant for *Calculus III*.
	Universität Ulm
Fall 2013 - Spring 2019	Student teaching assistant for *Analysis I-III, Linear Algebra I-II*. Corrector, tutor in Mathlab and exercise group leader.

CONFERENCE AND SEMINAR ORGANIZATION

09/2024 (planned)	Co-organizer of the *MATRIX-MFO Tandem Workshop: Invariants in Low-Dimensional Toplogy. Combinatorics, Geometry, and Computation* at Mathematisches Forschungsinstitut Oberwolfach, Sept 22–27, 2024.
10/2023 – present	Co-organizer of the *Low-dimensional topology seminar* at MPIM Bonn.
09/2020 – 07/2023	Co-organizer of the *Geometry Graduate Colloquium* at ETH Zürich (funded by the Zurich Graduate School in Mathematics).

OTHER PROFESSIONAL SERVICE

Ongoing	Referee for Pacific Journal of Mathematics, reviewer for zbMATH Open.
09/2021 – 07/2023	Co-organizer of get-togethers for women in math at ETH Zürich and UZH Zürich (funded by the Zurich Graduate School in Mathematics).
08/2021 – 07/2023	Elected member of the Nachdiplom Lectures Committee at the Department of Mathematics of ETH Zürich.
05/2020 – 05/2023	Board member of the Association of the Mid-level Academic Faculty at the Department of Mathematics (VMM) of ETH Zürich.
10/2022	Co-organizer of the first D-MATH (Post)Doctoral Welcome Day at ETH Zürich.
05/2021 – 05/2022	Representative of the Mid-level Academic Faculty in the Department Conference of the Department of Mathematics of ETH Zürich.