

Curriculum vitae

Research interests

Low-dimensional topology: knots and links; 3- and 4-manifolds

Employment

Max-Planck-Institut für Mathematik, Bonn, Germany

Lise Meitner research group leader (tenure track W2 position) Aug 2020 – present
Research group leader/advanced researcher (temporary W2 position) Aug 2017 – Jul 2020

Brandeis University, Waltham, USA

Postdoctoral instructor Jul 2014 – Jun 2017

Extended research visits

Hausdorff Institute for Mathematics, Bonn, Germany

Visitor, Junior Hausdorff Trimester Program (Topology) Sep – Dec 2016

Education

Rice University, Houston, USA

Ph.D. Mathematics May 2014

Casson towers and filtrations of the smooth knot concordance group

Thesis advisor: Tim D. Cochran

M.A. Mathematics Dec 2012

State University of New York, College at Geneseo, Geneseo, USA

B.A. Mathematics and Biochemistry May 2009

summa cum laude

Honours in mathematics

Grants and awards

- **AIM SQuaRE grant**

American Institute for Mathematics, 2019–21; project titled ‘Studying knot concordance via branched covers of S^4 ’, joint with Ryan Blair, Patricia Cahn, Alexandra Kjuchukova, Kent Orr, and Hannah Schwartz.

- **Experiential learning and teaching grant**

Experiential learning and teaching at Brandeis, Spring 2017; project titled ‘An experiential learning approach to MATH 23b’, awarded 1,600 USD to support a course assistant in a partially flipped course on mathematical proof-writing.

- **AMS-Simons travel grant**

American Mathematical Society, Simons Foundation 2015–17; awarded annually to 60 early-career US mathematicians, 2,000 USD per year for two years to be used for research-related travel.

- **AWM-NSF travel grant**

Association for Women in Mathematics, National Science Foundation, June 2015; awarded 960 USD for travel to the Princeton low-dimensional topology workshop 2015.

- **Nettie S. Autrey fellowship**

Rice University Office of Graduate & Postdoctoral Studies, 2013–14; awarded annually to a single graduate student in the Schools of Natural Sciences or Engineering.

- **Robert Lowry Patten award**

Rice University Graduate Student Association, 2013; one of four annual awards recognising service towards improving PhD student life and education.

Past and upcoming research talks

2022

Annual conference, Indian women in mathematics • Colloquium, Georg-August-Universität Göttingen • Stanford topology seminar • Montana state university mathematics seminar • Columbia geometric topology seminar • Colloquium in pure mathematics, University of Hamburg • SUNY Geneseo mathematics colloquium • Princeton topology seminar • Durham topology seminar • New developments in four dimensions, conference at University of Victoria • SFB-lecture, Universität Regensburg

2021

AMS special session on invariants of knots and links, Joint mathematics meetings, Washington DC • MPIM topology seminar • Building bridges seminar • Regensburg low-dimensional geometry and topology seminar • Nearly Carbon Neutral Geometry and Topology conference • Minisymposium on low-dimensional topology, European Congress of Mathematics • Hausdorff Center for Mathematics Symposium • Special session on recent advances in low-dimensional topology, AMS southeastern sectional meeting • Geometry and Topology seminar, Paris 6

2020

Clay Mathematics Institute Workshop: Low-dimensional topology • MPIM topology seminar • Geometry and topology seminar, CIRGET (Montreal) • University of Wisconsin-Milwaukee topology seminar • University of North Carolina, Chapel Hill AWM lecture series • Tech topology conference

2019

Duke University geometry/topology seminar • Banff International Research Station Workshop: Unifying 4-dimensional knot theory • LMS Durham Symposium: Pseudoholomorphic Curves and Gauge Theory in Low-Dimensional Topology • Swissknots 2019 • Conference on knot concordance and low-dimensional manifolds, Le Croisic, France • Knots and braids in Norway • Indiana University topology seminar • Rice University topology seminar • Winterbraids IX (contributed talk)

2018

Workshop on twisted and quantum knot invariants, Durham University • Workshop on Topologie, Oberwolfach (contributed talk) • 29. Nordrhein-Westfalen topology meeting, Universität Bonn • MPIM topology seminar

2017

Université de Genève séminaire de topologie et géométrie • Universität Regensburg SFB seminar • Universität Bern mathematics colloquium • Universität Bonn topology oberseminar • Georgia international topology conference, UGA • AMS special session on invariants of knots, links and 3-manifolds, AMS spring eastern sectional meeting, Hunter College, City University of New York • Rice University topology seminar • UT Austin topology seminar • Conference on Floer homologies and topology of 4-manifolds, UMass Amherst • Notre Dame topology seminar • Geometry and topology seminar, CIRGET (Montreal) • Brandeis University topology seminar • UC Riverside special colloquium, • Bowdoin College colloquium • AMS Session on topology and manifolds, Joint mathematics meetings, Atlanta (contributed talk)

2016

UNC Charlotte special colloquium • Hausdorff Center for Mathematics seminar • Hausdorff Institute for Mathematics knot concordance and 4-manifolds seminar • Topology in dimension 3.5: a conference

in memory of Tim Cochran • Indiana University topology seminar • Rice University topology seminar • San Francisco State University special colloquium • University of Virginia geometry seminar • Lafayette College mathematical adventures and diversions • SUNY Geneseo mathematics department colloquium • AMS Session on topology and knot theory, Joint mathematics meetings, Seattle (contributed talk)

2015

Brandeis University IGERT seminar • Session on low-dimensional topology and geometric group theory, 2015 CMS winter meeting, Montreal • AMS special session on geometric perspectives on knot theory, AMS central sectional meeting, Loyola University • Moab topology conference • AWM research symposium (poster presentation) • Brandeis University EveryTopic seminar

2014

Syracuse University topology seminar • Wesleyan University topology seminar • AMS special session on knot concordance and 4-manifolds, AMS central sectional meeting, University of Wisconsin-Eau Claire • Boston College topology seminar • Workshop on topology and invariants of smooth 4-manifolds, Simons Center for Geometry and Physics • University of Wisconsin-Eau Claire STEM colloquium • AMS special session on knots and their invariants, Joint mathematics meetings, Baltimore (contributed talk)

2013

AMS special session on geometric aspects of 3-manifold invariants, AMS central sectional meeting, Washington University at St. Louis • AMS special session on geometric topology in low dimensions, AMS central sectional meeting, Washington University at St. Louis • Rice University topology seminar (2 talks) • Lehigh University geometry and topology conference • SUNY Geneseo mathematics department colloquium

Teaching and mentorship

Postdocs mentored (MPIM)

• JungHwan Park	Jul 2017 – Jun 2018
• Paolo Aceto	Sep 2017 – Aug 2018
• Filip Misev	Mar 2018 – Feb 2020
• Sümeyra Sakallı	Sep 2018 – Aug 2020
• Alexandra Kjuchukova	Oct 2018 – Aug 2020
• Alberto Cavallo	Nov 2018 – Aug 2020
• Wenzhao Chen	Sep 2019 – Aug 2021
• Anthony Conway	Sep 2019 – Dec 2020
• Marco Marengon	Sep 2020 – Aug 2021
• Biji Wong	Sep 2020 – Jan 2022
• Tom Hockenhull	Sep 2020 – Aug 2022
• Patrick Orson	Sep 2021 – Aug 2022
• Abhishek Mallick	Sep 2021 – Aug 2022
• Katherine Raoux	Sep 2021 – Aug 2022

Students (MPIM/Universität Bonn)

- PhD thesis:
 - Benjamin Matthias Ruppik, Knotted surfaces, Casson-Whitney unknotting and deep slice disks 2018-22
- PhD thesis committee member:

- Tynan Kelly, Twisted linking numbers and Casson-Gordon invariants (Brandeis) 2015
- Katherine Raoux, Tau-invariants for knots in rational homology spheres (Brandeis) 2016
- Jason Joseph, Applications of Alexander ideals to knotted surfaces in 4-space (UGA) 2020
- Oliver Singh (Durham) 2022
- Masters thesis:
 - Didac Violan Aris, The proper h -cobordism theorem and the 4-dimensional Poincaré conjecture 2018-19
 - Constanze Schwarz, Donaldson's theorem as a sliceness obstruction 2020-21
 - Isacco Nonino, Smooth structures on non-compact 4-manifolds 2021-22
 - Fadi Mezher, Kreck's modified surgery and applications to the classification of manifolds 2021-22
- Masters thesis, second evaluator:
 - Mihail Arabadji, Indeterminacy of triple linking numbers 2019-20
 - Freya Bretz, Surface graphs, surface bundles and spin structures 2020
- Bachelors thesis:
 - Miriam Ruß, Milnor's invariants of links 2018
 - Ekin Ergen, Fundamentals of 3-manifold topology 2019
 - Magdalena von Wunsch-Rolshoven, 3-manifolds as branched covers 2020
 - Arne Beines, The bridge number of knots 2020
 - Felix Bertram, Generalised Whitehead manifolds 2020
 - Frieda Kern, Universal branching links 2021
 - Yves Etienne Jäckle, The trace embedding lemma 2021
 - Line Uhe, The algebraic knot concordance group 2022
 - Maximilian Hans, Integer homology spheres and the Birman-Craggs homomorphisms 2022
- Bachelors thesis, second evaluator:
 - Florian Tecklenburg, Euler number of a map 2020
 - Pauline Kranenburg, Wirtinger-Präsentierung für Knotengruppen 2022

Lecture and seminar courses

- **Calculus II**, Rice University Summer 2011
- **Calculus II**, Rice University Fall 2011
- **Sequences and series**, Rice Emerging Scholars Program, Rice University Summer 2012
- **Introduction to algebra, Part II**, Brandeis University (honours course) Spring 2015
- **Applied linear algebra**, Brandeis University Spring 2015
- **Topology I**, Brandeis University (first-year PhD course) Fall 2015, Fall 2014
- **Introduction to topology**, Brandeis University (honours course) Fall 2015
- **Introduction to proofs**, Brandeis University (writing-intensive course) Spring 2017, Spring 2016

- **Topology II**, Brandeis University (first-year PhD course) Spring 2017
- **Topology of 4-manifolds**, MPIM/Universität Bonn (masters-level course, co-taught with Peter Teichner) Winter 2018/19
- **Topological manifolds**, MPIM/Universität Bonn (masters-level course, co-taught with Mark Powell) offered online, 30+ regular viewers worldwide Winter 2020/21
- **Topological manifolds II**, MPIM/Universität Bonn (masters-level seminar course, co-taught with Mark Powell) Summer 2021
- **Einführung in die Topologie und Geometrie**, Universität Bonn (undergraduate course, in German, co-taught with Daniel Kasprowski) Summer 2021

Minicourses

- **The double suspension theorem**, 3 lectures, MPIM/Universität Bonn Jan 2022
- **Slice knots and knot concordance**, 3 lectures, Winterbraids XI, Dijon Dec 2021
- **Topological 4-manifolds: the disc embedding theorem and beyond**, 5 lectures, Tech topology summer school Jul 2021
- **Exotic \mathbb{R}^4 s**, 2 lectures, MPIM/Universität Bonn Jan 2018

Reading courses (Brandeis University)

- **Abstract algebra**, Doreen Reuchsel (post-baccalaureate student) Spring 2015
- **Mathematical biology**, Gabriel Pimentel (undergraduate student, Brazil scientific mobility program) Summer 2015
- **4-manifolds**, Anthony Villafranca, McKee Krumpak, Langte Ma (masters/PhD students) Spring 2016

Service & Outreach

- **Scientific committee**, MPIM, August 2017 – present; advise on selection of new guests at MPIM.
- **Gender equality officer**, MPIM, November 2020 – present.
- **Moderator**, MPIM Preprints, September 2020 – present.
- **Outreach event organisation**
 - Graduate research opportunities for women, a conference for undergraduate women in mathematics, Universität Bonn, March 2022
 - Teatime with women in mathematics, event for PhD students and postdocs, Universität Bonn/MPIM, June 2021
 - Virtual screening, *Picture a scientist*, MPIM, March 2021
- **Outreach talks and event participation**
 - Participant, Train the Trainer workshop, Universität Heidelberg, March 2022
 - Speaker, *Welche Form hat unser Universum?*, Bonner Mathenacht, November 2021
 - Invited guest, Ally day, Teatime for people in mathematics, Universität Bonn mathematics department, November 2021
 - Speaker, *Knoten in der Mathematik*, Bonner Matheclub, June 2021
 - Moderator, discussion on *Picture a scientist*, Universität Bonn mathematics department, May 2021

- Invited guest, Upstream lunch break, Universität Heidelberg, February 2021, February 2022
- Invited guest, Teatime for women in mathematics, Universität Bonn mathematics department, January 2021
- Judge, AWM Essay Contest: Biographies of contemporary women in mathematics, 2016, 2017, 2018, 2020, 2021, 2022.
- Panelist, Increasing Diversity in STEM and Ways in which High School and Middle School girls can make contributions: A Panel Discussion, Sonia Kovalevsky Day, University of Wisconsin-Eau Claire, 2014
- Panelist, Women in Grad School: A Panel Discussion, Women’s Resource Center, Rice University, 2012
- Panelist, I Know What You Should Do Next Summer: A Panel Discussion, Nebraska Conference for Undergraduate Women in Mathematics, 2009
- **Referee reports and quick opinions for:** *Inventiones Mathematicae*, *Geometry & Topology*, *Journal of Topology*, *Journal für die reine und angewandte Mathematik (Crelle’s journal)*, *Compositio Mathematica*, *Advances in Mathematics*, *Algebraic & Geometric Topology*, *Forum of Mathematics*, *Sigma*, *International Mathematical Research Notices*, *Michigan Mathematical Journal*, *NYJM Monographs*, *Communications in Analysis and Geometry*, *Bulletin of the London Mathematical Society*, *Journal of Knot Theory & its Ramifications*, *Topology Proceedings*, *Topology & its Applications*.
- **Reviewer**, Mathematical Reviews, Zentralblatt MATH.
- **Conference (co-)organisation:**
 - MFO workshop: Morphisms in low dimensions, January 2023
 - MATRIX-MFO tandem workshop: Invariants and Structures in Low-Dimensional Topology, September 2021
 - AMS special session on women in topology, Joint mathematics meetings, January 2017, January 2019, January 2020
 - Workshop on 4-manifolds, MPIM, September 2019
 - Workshop on four-manifolds: Confluence of high and low dimensions, Fields Institute, July 2019
 - Workshop on smooth concordance classes of topologically slice knots, American Institute for Mathematics, June 2019
 - AWM special session on 3- and 4-manifolds, AWM research symposium, Rice University, April 2019
 - Conference on 4-manifolds and knot concordance, MPIM, October 2016
- **Seminar (co-)organisation:**
 - Topology seminar, MPIM, August 2017 – present
 - EveryTopic seminar, Brandeis University, Spring 2017, 2015–16
 - Spectral sequences seminar, Brandeis University, Fall 2014
 - Heegaard-Floer “computationar”, Rice University, Spring 2014
 - 4-manifolds seminar, Rice University, Spring 2014
 - Characteristic classes seminar, Rice University, Summer 2012
 - Knot invariants seminar, Rice University, Summer 2011
- **Undergraduate advisor** (18 advisees), Brandeis University 2015–16
- Examining committee for a postdoctoral position, SISSA (Trieste)
- NSF merit review panel

Miscellaneous

- Languages:
 - English (near-native/spoken since early childhood)
 - German (B2/C1)
 - Bengali (native)
 - Hindi (conversant)
- Citizenship: India

Last updated March 28, 2022
