

# ISAAC SUNDBERG

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updated  
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## Academic Positions

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**Postdoctoral fellow** — Max-Planck-Institut für Mathematik (MPIM), Bonn, Germany 2022-2024

## Education

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**Ph.D. Mathematics** — Bryn Mawr College, Bryn Mawr, Pennsylvania, USA 2022

*Dissertation:* Khovanov homology & uniqueness of surfaces in the 4-ball

*Advisor:* Paul Melvin

**M.A. Mathematics** — Bryn Mawr College, Bryn Mawr, Pennsylvania, USA 2018

*Thesis:* On fibering 3-manifolds

**B.S. Mathematics** — University of Wisconsin La Crosse, La Crosse, Wisconsin, USA 2016

## Research Interests

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Low-dimensional topology: exotic phenomena in 4-dimensions; isotopy of surfaces in 4-manifolds; Khovanov homology; link homology theories; cobordism categories; concordance and sliceness; knots and links.

## Publications, Preprints, & Software

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*Finding nontrivial Khovanov homology classes*

In preparation (2024)

*Almost concordance in  $S^1 \times S^2$*  — with Arunima Ray and Rob Sniderman

In preparation (2024)

*KhNoDe* — a program for studying the nontriviality of Khovanov homology classes

Python + SymPy (2023)

*Seifert surfaces in the 4-ball* — with Kyle Hayden, Maggie Miller, and JungHwan Park

Preprint arXiv:2205.15283 (2022)

*Khovanov homology and exotic surfaces in the 4-ball* — with Kyle Hayden

Journal für die reine und angewandte Mathematik (Crelles Journal), 2024-809 (2024), 217-246

*Relative Khovanov-Jacobsson classes* — with Jonah Swann

Algebraic & Geometric Topology, 22-8 (2022), 3983-4008

*Multiplication operators on weighted Banach spaces of a tree* — with Robert F. Allen

Bulletin of the Korean Mathematical Society, 54:3 (2017), 747-761

## Invited Talks

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**2024** — Pisa Geometry Seminar • European Congress of Mathematics (withdrew)

**2023** — MPIM Topology Seminar • Heidelberg Symplectic Topology Seminar • MPIM Oberseminar • Hamburg Research Seminar on Quantum Topology and Categorification (QTCat)

**2022** — MPIM Low-dimensional Topology Seminar (3 talk mini-series) • Rutgers-Newark Colloquium • Philadelphia Area Contact/Symplectic/Topology (PATCH) Seminar • MPIM Low-dimensional Topology Seminar • Algebra and Low-Dimensional Topology Minisymposium, DMV Jahrestagung (Freie Universität Berlin) • Princeton Topology Seminar • Duke Geometry & Topology Seminar

**2021** — University of Oregon Topology Seminar • MIT Geometry & Topology Seminar • Columbia Geometric Topology Seminar • Philadelphia Area Contact Topology Seminar (5 talk mini-series) • Nearly Carbon Neutral Geometric Topology Conference • AIM Research Community in 4-dimensional Topology

## Teaching Positions

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### Max-Planck-Institut für Mathematik — Instructor

Slice Knots and Knot Concordance (with Arunima Ray) 2023

### Bryn Mawr College — Instructor

Math 201: Transitions to Higher Mathematics (with Lisa Traynor) 2022

Math 201: Transitions to Higher Mathematics (with Lisa Traynor) 2021

Math 101: Calculus I 2020

### Bryn Mawr College — Teaching Assistant

Math 303: Abstract Algebra I (2 sections) 2019

Math 205: Theory of Probability 2019

Math 312: Topology 2018

Math 304: Abstract Algebra II 2018

Math 303: Abstract Algebra I 2017

Math 295: History of Mathematics 2017

Math 303: Abstract Algebra I (2 sections) 2016

### University of Wisconsin La Crosse — Tutor

Murphy Learning Center 2013-2016

## Awards & Honors

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### National Science Foundation

MSPRF proposal recommended for funding (declined for lack of funding) 2023

### Bryn Mawr College

Community Building Honor Roll 2019, 2022

Doris Sill Carland Award for Excellence in Teaching 2021

Research Assistantship 2020, 2021

Convocation Speaker Representing the Graduate Student Association 2018

McPherson Graduate Award for Excellence 2018

### UW La Crosse

Department of Mathematics: Outstanding Service Award 2016

SIAM Award for Outstanding Efforts & Accomplishments in the Chapter 2016

## Supervision & Mentorship

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**M.S. Advisor** — supervised the research and completion of the M.S. thesis, academic well-being, and professional development of the student through regular one-on-one meetings

Alejandro Garcías Rivas, University of Bonn, *Corks and 4-manifolds* 2023-2024

**M.S. Mentor** — provided guidance on the M.S. thesis, academic well-being, and professional development of the student through occasional group meetings

Shun Ming Samuel Lee, University of Bonn, with Peter Teichner 2023-2024

Maximilian David Hans, University of Bonn, with Peter Teichner 2023-2024

Cara Hobohm, University of Bonn, with Arunima Ray 2023-2024

Avalon Vanis, Bryn Mawr College, with Paul Melvin 2022-2023

Xingya Wang, Bryn Mawr College, with Paul Melvin 2017-2018

**Research Mentor** — supervised short-term reading and research projects through regular meetings

Verochka Lavrova (Summer Student Intern Program at MPIM), with Luciana Basualdo Bonatto 2023

Aisha Mechery (Directed Reading Program at Bryn Mawr College) 2020

## Service & Outreach

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<b>Speaker</b> — Pride Math Month, University of Bonn	2024
<b>Committee Member</b> — Gender Equality Task Force, MPIM	2022-2024
<b>Referee</b> — Transactions of the American Mathematical Society	2021-2022
<b>Committee Member</b> Prelim Restructuring Committee, Bryn Mawr College	2021-2022
<b>Graduate Student Association</b> — Bryn Mawr College Co-chair (2017-2019) • Representative to Graduate Council (2017-2019) • Committee Chair for Diversity, Equity, & Inclusion (2017-2019) • Departmental Representative (2019-2020)	2017-2020
<b>President</b> — AMS Graduate Student Chapter, Bryn Mawr College	2018-2020
<b>President</b> — Mathematics & Statistics Club, UW La Crosse	2015-2016
<b>Tutor/Staff</b> — FastTrack Remedial Mathematics Camp, UW La Crosse	2015
<b>Staff</b> — Girls in Science Day Camp, UW La Crosse	2015

## Organization

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<b>Organizer</b> — Low-Dimensional Topology Seminar, MPIM	2023-2024
<b>Topic Group Organizer</b> — Nearly Carbon Neutral Geometric Topology (with Alex Manchester)	2023
<b>Founder/Organizer</b> — Graduate Research Seminar	2019-2022
<b>Co-founder/Co-organizer</b> — Directed Reading Program, Bryn Mawr College (with Aisha Mechery)	2019-2020
<b>Organizer</b> — Professional Development Seminar organizer	2018-2019

## Contributed Talks, Conferences, & Workshops

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<b>2024</b> — Invariants in Low-Dimensional Topology (MFO)
<b>2023</b> — MPIM Open Problem Seminar • Morphisms in Low Dimensions (MFO)
<b>2022</b> — Topology in Dimension 4.5 (BIRS) • MPIM Topology Seminar • DMV Jahrestagung (Freie Universität Berlin) • Braids in Low-Dimensional Topology (ICERM)
<b>2021</b> — Tech Topology Summer School on 4-manifolds • Nearly Carbon Neutral Geometric Topology Conference
<b>2020</b> — Nearly Carbon Neutral Geometric Topology Conference
<b>2019</b> — Graduate Student Topology and Geometry Conference (UIUC) • EPaDel MAA Section Meeting • Graduate Student Conference in Algebra, Geometry, & Topology (Temple)
<b>2018</b> — MSRI Summer Graduate School on H-Principles (Tambara Institute/University of Tokyo) • Graduate Student Conference in Algebra, Geometry, & Topology (Temple) • Summer Geometry/Topology RTG mini-conference (Princeton) • Topology Student Workshop (Georgia Tech) • EPaDel MAA Section Meeting
<b>2016</b> — AMS Session on Undergraduate Research (JMM Seattle)