

Hannah Schwartz

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Positions

- **Postdoctoral Research Associate** Fall 2020 - Present
Princeton University
Princeton, NJ
- **Postdoctoral Fellow** Fall 2019 - Summer 2020
Max-Planck-Institut für Mathematik
Bonn, Germany

Education

- **Bryn Mawr College**
Bryn Mawr, PA
 - Doctor of Philosophy, Mathematics** 2015 - 2019
 - ◇ Advisor: Paul Melvin
 - ◇ Thesis:
Exotic Phenomena in Dimension Four
 - ◇ Comprehensive examination topics: Algebra, Analysis, & Topology
 - Master of Arts, Mathematics** 2013 - 2015
 - ◇ Advisor: Paul Melvin
 - ◇ Thesis:
On and Off the Grid: An Exploration of Heegaard Floer Homology
- **Occidental College**
Los Angeles, CA
 - Bachelor of Arts, Mathematics** 2009 - 2013
 - ◇ Graduated Cum Laude with honors

Teaching Experience

- **Course Head, Princeton University**
MAT175: Multivariable Calculus for Econ *Fall 2022*
- **Instructor, Princeton University**
FRS177: Aerial Knot Theory *Fall 2021*
MAT103: Calculus I *Spring 2021*
MAT175: Multivariable Calculus for Econ *Fall 2020, Spring 2022*

- **Calculus Workshop Organizer, Bryn Mawr College** Fall 2018
Taught a series of trigonometry and logarithm review workshops
- **Instructor, Bryn Mawr College** Spring 2018
Calculus II
- **Teaching Assistant, Bryn Mawr College** 2013 – 2017
Real Analysis I and II, Number Theory, Topology, Linear Algebra, Multivariable Calculus
- **Teaching Assistant, Center for Talented Youth**
Class: Geometry through Art, Haverford College 2014
Class: Geometry through Art, University of California, Santa Cruz 2013
- **Peer Math Adviser** 2011 - 2013
Occidental College

Awards, Grants & Honors

Research grants:

- NSF Mathematical Sciences Topology Grant 2022- 2025
Project titled *Understanding Smooth Structures via Regular Homotopy of Surfaces in 4-Manifolds*
Award number 2204367
- AIM SQuaRE Grant, American Institute of Mathematics 2019
Project titled *Studying knot concordance via branched covers of S^4*
Joint with Ryan Blair, Patricia Cahn, Alexandra Kjuchukova, Kent Orr, and Arunima Ray
- AIM SQuaRE Grant, American Institute of Mathematics 2017
Project titled *Stabilization in 4-dimensional topology*
Joint with Dave Auckly, Hee Jung Kim, Paul Melvin, and Danny Ruberman
- Bryn Mawr College Research Fellowship Fall 2016, Fall 2018 - Spring 2019

Academic Awards and Honors:

- Community Building Honor Roll, Bryn Mawr College Spring 2019
- Doris Sill Carland Fellowship Fall 2017 - Spring 2018
- The Dean’s Certificate in Pedagogy Spring 2016
- Bryn Mawr College Tuition Scholarship 2013 - 2019
- Benedict Freedman Senior Prize in Mathematics, Occidental College 2013
- Benedict Freedman Prize for Mathematical Promise, Occidental College 2013

Papers

- D. Gabai, P. Naylor and H. Schwartz, *Doubling Gluck twists: A five-dimensional approach* (in progress)
- J. Joseph and H. Schwartz, *The 0-cobordance of knotted 2-spheres* (in progress)

- P. Naylor and H. Schwartz, *Gluck twisting roll spun knots*, Algebraic and Geometric Topology **22**(2) (2022), 973–990. DOI 10.2140/agt.2022.22.973
- H. Schwartz, *Duals of non-zero square*, Math. Research Letters **29**(1) (2022) 275–284.
- P. Naylor and H. Schwartz, *Gluck twisting roll spun knots*, Algebraic and Geometric Topology **22**(2) (2022), 973–990. DOI 10.2140/agt.2022.22.973
- H. Schwartz. *A 4-dimensional light bulb theorem for disks*, arXiv:2109.13397, September 2021 (submitted).
- Jason Joseph, Michael Klug, Ben Ruppik, and Hannah Schwartz. *Unknotting numbers of 2-spheres in the 4-sphere*, Journal of Topology **14** (2021), 1321–1350.
- H. Schwartz. *A note on the complexity of h-cobordisms*, Algebr. Geom. Topol. **20** (7) 3313 - 3327, 2020. <https://doi.org/10.2140/agt.2020.20.3313>
- P. Melvin and H. Schwartz. *Higher order corks*, Invent. Math. (2020). <https://doi.org/10.1007/s00222-020-01009-x>
- H. Schwartz. *Equivalent non-isotopic spheres in 4-manifolds*, Journal of Topology **12**, (2019).
- D. Auckly, H. J. Kim, P. Melvin, D. Ruberman, and H. Schwartz. *Isotopy of surfaces in 4-manifolds after a single stabilization*, Advances in Mathematics **341**, (2019).

Past and Upcoming Research Talks

2022

Georgia Tech Topology Conference • Tetrahedral Geometry/Topology Seminar • Rice University topology Seminar • Philadelphia Area Weekly Topology Seminar (PACT) • University of Notre Dame topology seminar • University of Arkansas topology seminar • University of Oregon • Philadelphia Area Monthly Topology Seminar (PATCH) • AMS Special Session on Knot Theory in Dimension Four, Joint Math Meetings • Special Session on Geometric Topology in the Middle Dimensions, AMS Spring Central Sectional Meeting

2021

Tech Topology Summer School, Georgia Tech • Michigan State University topology seminar • California Institute of Technology topology seminar • Brandeis University topology seminar • Occidental College math department colloquium • University of California San Diego topology seminar

2020

AMS Special Session on Knotted surfaces and Concordances • Princeton University • Virtual Trisections Seminar • Nearly Carbon Neutral Geometry Topology (NCNGT) • Geometry Topology Graduate and Postdoc Seminar (GT GAPS) • Oxford University • Cambridge University • New Faculty Talk, Princeton University

2019

University of Glasgow • New Guests at the MPIM, MPI-Oberseminar at the Max Planck Institute for Mathematics • Workshop on 4-manifolds, MPIM • 4-manifolds: Confluence of High and Low Dimensions, Fields Institute • Knot Concordance and Low Dimensional Manifolds, *Le Croisic, France* • University of Pennsylvania • Math Club, Penn State Brandywine • Georgia Tech • AMS Special Session on Women in Topology, Joint Math Meetings

2018

Duke University topology seminar • “Knotted surfaces in 4-manifolds” conference, UMass Amherst • MPIM Topology Seminar, Max Planck Institute for Mathematics • University of California Davis topology seminar • Graduate School of Arts and Sciences (GSAS) Research Symposium, Bryn Mawr College • The topology and geometry of low-dimensional manifolds: a celebration of the mathematics of Bob Gompf, University of Texas at

Austin • Low-dimensional topology and its interactions with symplectic geometry, RTG mini-conference at Princeton University • Philadelphia Area Contact/Topology (PACT) Seminar

2017

Philadelphia Area Contact/Topology (PACT) Seminar • Boston College topology seminar • University of Virginia topology seminar • University of Nebraska topology seminar • Low Dimensional Topology & Gauge Theory Workshop, Casa Matemática Oaxaca • Graduate Student Topology Conference, at Michigan State • Tetrahedral Geometry/Topology Seminar (TGTS), joint seminar of Elizabethtown College, Franklin and Marshall College, Lebanon Valley College, and Millersville University • Albright College Undergraduate Math Seminar

Service

- **Volunteer with Prison Teaching Initiative (PTI) of Princeton University**

Instructor for Basic Mathematics MATH 015C Fall 2022
Tutor Spring 2022
Instructor for Elementary Algebra MATH 020 Fall 2021

- **Conference Co-organizer**

“Topology in Dimension 4.5” Workshop Fall 2022
at The Banff International Research Station (BIRS)
Topic session “Beyond the chalkboard: Topology through outreach” Summer 2021
at the virtual Nearly Carbon Neutral Geometric Topology Conference
AIM 4-dimensional topology (online) research community Spring 2021

- **Seminar Co-organizer**

Princeton Topology Seminar Fall 2020 - Current

- **Refereeing and Quick opinions**

Duke Mathematical Journal, Journal of Topology, International Mathematics Research Notices, Michigan Mathematical Journal, Bulletin of the London Mathematical Society, Mathematical Research Letters, Inventiones Mathematicae

- **Association for Women in Mathematics (AWM) Representative**

Girl Scout STEM Expo March 2018

- **Organizer**

Graduate School of Arts and Sciences (GSAS) Research Symposium April 2017

- **GSAS Math Department Representative**

Bryn Mawr College Fall 2016 - Spring 2017

- **Math Awareness Week Event Co-Organizer**

Bryn Mawr Math Department Spring 2016 & 2017

- **Graduate Recruiting at the Joint Math Meetings**

January 2014, 2015

- **Mentor for 6th Grade Math Team**

Annandale Elementary School, Los Angeles, CA Spring 2013

Computer Skills

- Programming Languages
 - Experienced with \LaTeX
 - Familiar with Mathematica