

Kristen Hendricks
Department of Mathematics
Rutgers University
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Research Interests

I am interested in low-dimensional topology, symplectic topology, and knot theory. Most of my work is on equivariant versions of various Floer-theoretic invariants of manifolds and knots.

Appointments

Rutgers University

Associate Professor, July 2021 – Present

Assistant Professor, September 2019 – June 2021

Michigan State University

Assistant Professor, August 2016 – August 2019

University of California Los Angeles

E. R. Hedrick Assistant Adjunct Professor, July 2013 – June 2016

Simons Center for Geometry and Physics

Visiting Student, Spring 2013

Mathematical Sciences Research Institute

Program Associate, Homology Theories of Knots and Links, Spring 2010

Education

Columbia University, New York, New York

Ph.D. in Mathematics, May 2013. Advised by Robert Lipshitz and Peter Ozsváth.

Thesis: *Localization and Heegaard Floer Homology*.

Harvard College, Cambridge, Massachusetts

AB in Mathematics (magna cum laude), May 2008.

Thesis: *Morse Theory and the Bott Periodicity Theorem*. Advised by Véronique Godin.

Awards, Grants, and Honors

- Board of Trustees Research Fellowship for Scholarly Excellence, Rutgers University, 2021.
- Sloan Research Fellowship (September 2019 – September 2023)
- National Science Foundation: Principal Investigator, faculty early career development grant DMS-1751857 “CAREER: Equivariant Floer Theory and Low-dimensional Topology” (July 2018 - June 2023).

- National Science Foundation: Principal Investigator, research grant DMS-1663778 “Group Actions and Floer Theoretic Invariants” (July 2015- June 2019).
- Distinguished Teaching Award, UCLA Department of Mathematics, 2015.
- Roger Bigelow Merriman Prize for Best Scholar in Eliot House, Harvard University, 2008.
- Junior Phi Beta Kappa, Harvard University, 2007.
- Detur Prize for Academic Achievement, Harvard University, 2005.

Mathematics Papers and Preprints

A rank inequality for the knot Floer homology of branched double covers. Algebraic & Geometric Topology **12** (2012), 2127-2178.

Localization and the link Floer homology of doubly-periodic knots. Journal of Symplectic Geometry **13** (2015), 545-608.

A spectral sequence for the Floer cohomology of symplectomorphisms of trivial polarization class. International Mathematics Research Notices **2017** (2017), No. 2, 509-528.

Involutive Heegaard Floer homology. Joint with C. Manolescu. Duke Mathematical Journal, **166** (2017), No. 7, 1211-1299.

A flexible construction of equivariant Floer homology and applications. Joint with R. Lipshitz and S. Sarkar. Journal of Topology, **9** (2016), No. 4, 1153-1236.

A connected sum formula for involutive Heegaard Floer homology. Joint with C. Manolescu and I. Zemke. Selecta Mathematica, **24** (2018), No. 2, 1183-1245.

A simplicial construction of G -equivariant Floer homology. Joint with R. Lipshitz and S. Sarkar. Accepted for publication by Proceedings of the London Mathematical Society. arXiv:1609.09132.

Involutive bordered Floer homology. Joint with R. Lipshitz. Transactions of the American Mathematical Society, **372** (2019), No. 1, 389-424.

A note on knot concordance and involutive knot Floer homology. Joint with J. Hom. Proceedings of the Georgia International Topology Conference, **102** (2019).

Applications of involutive Heegaard Floer homology. Joint with J. Hom and T. Lidman. Journal of the Institute of Mathematics of Jussieu, 2019, DOI:10.1017/S147474801900015X.

Correction to the paper “A flexible construction of equivariant Floer homology and applications.” Joint with R. Lipshitz and S. Sarkar. Journal of Topology, 2020, DOI:10.1112/topo.12124.

Rank inequalities for the Heegaard Floer homology of branched double covers. Joint with T. Lidman and R. Lipshitz. Accepted for publication in Documenta Mathematica. arXiv:2007.03023.

Surgery exact triangles in involutive Heegaard Floer homology. Joint with J. Hom, M. Stoffregen, and I. Zemke. Submitted. arXiv:2011.00113.

Bordered Floer homology and contact structures. Joint with A. Alishahi, V. Földvári, J. Licata, I. Petkova, and V. Vértesi. Submitted. arXiv:2011.08672

On the quotient of the homology cobordism group by Seifert spaces. Joint with J. Hom, M. Stoffregen, and I. Zemke. Accepted for publication in Transactions of the American Mathematical Society. arXiv:2103.04363.

A note on PL-disks and rationally slice knots. Joint with J. Hom, M. Stoffregen, and I. Zemke. Submitted. arXiv:2107.09022.

Naturality and functoriality in involutive Heegaard Floer homology. Joint with J. Hom, M. Stoffregen, and I. Zemke. Submitted. arXiv: 2201.12906

Teaching and Service

Courses taught:

- Math 354, Linear Optimization (Rutgers, Spring 2022)
- Math 540, Algebraic Topology I (Rutgers, Fall 2021)
- Math 311, Introduction to Real Analysis (Rutgers, Spring 2021)
- Math 540, Algebraic Topology I (Rutgers, Fall 2020)
- Math 549, Lie Groups (Rutgers, Spring 2020)
- Math 135, Calculus I (Rutgers, Fall 2019)
- Math 310, Abstract Algebra I and Number Theory (MSU, Spring 2019)
- Math 327H, Honors Introduction to Analysis (MSU, Fall 2018)
- Math 996, Special Topics in Topology (MSU, Spring 2018)
- Math 320, Analysis I (MSU, Fall 2017)
- Math 254H, Honors Multivariable Calculus (MSU, Fall 2017)
- Math 961, Algebraic Topology II (MSU, Spring 2017)
- Math 132, Calculus I (MSU, Fall 2016)
- Math 131A: Analysis (UCLA, Spring 2016)
- Math 115A: Linear Algebra (UCLA, Winter 2016)
- Math 32B: Multivariable Calculus (UCLA, Winter 2016)
- Math 32A: Multivariable Calculus (UCLA, Fall 2015)
- Math 227A: Algebraic Topology II (UCLA, Spring 2015)
- Math 131A: Real Analysis (UCLA, Winter 2015)
- Math 1: Precalculus (UCLA, Fall 2014)
- Math 120A: Differential Geometry (UCLA, Fall 2014)
- Math 131B: Real Analysis (UCLA, Spring 2013)
- Math 31B: Integration and Infinite Series (UCLA, Winter 2013)
- Math 131B: Real Analysis (UCLA, Winter 2013)
- Math 131A: Real Analysis (UCLA, Fall 2013)
- Math S110D.I: Calculus II (Columbia University, Summer 2011)
- Math V1101.12: Calculus I (Columbia University, Fall 2010)

Postdoctoral Supervision:

- A. Mallick (Beginning Fall 2022).
- K. Raoux (Fall 2017-present). Co-supervised with M. Hedden.

Graduate Supervision:

- K. Sangam (Spring 2021 – Present)
- A. Parikh (Fall 2021 – Present)
- S. Raghunath (Spring 2022 – Present)

Undergraduate research supervision through Rutgers' DIMACS REU:

- Relationships between combinatorial knot invariants, Summer 2021.
- Algebraic Invariants of Pretzel Knots, Summer 2020.

Undergraduate research supervision through MSU's Exchange Research Program:

- Combinatorial Knot Theory and Immersed Curves, Fall 2017

Undergraduate research supervision as a TA for the Columbia University Topology REU:

- Heegaard Floer Homology and the Fundamental Group, Summer 2013
Project Organizer: Jennifer Hom
- Knot Floer Homology and Concordance, Summer 2012
Project Organizer: Jennifer Hom and Peter Horn
- Knot Floer Homology: Properties and Computations, Summer 2011
Project Organizer: Jennifer Hom

Outreach:

- Ran a weeklong "Girls' Topology Camp," a mathematics day camp for middle school girls, in June 2018 and June 2019 at MSU.
- Ran a knot theory activity at the MSU Spartan Girls' Math and Science Day in March 2018.
- Spoke in the MSU Mathematics Topical Seminar for Undergraduates in March 2018, the MSU REU Colloquium in June 2017 and June 2019, the MSU AWM Colloquium in March 2019, at the Rutgers Young Scholars Program in November 2019, and in the Rutgers Undergraduate Mathematics Association (RUMA) in September 2020.

Seminar organization:

- Rutgers Topology Seminar, co-organizer, Fall 2019-present
- Trends in Low-Dimensional Topology Seminar, April 2020-October 2020
- UCLA Participating Topology Seminar, organizer, Spring 2015
- Columbia University Graduate Topology Seminar, co-organizer, 2010-2013

Conference organization:

- Upcoming: SMS Summer School on Floer Homotopy Theory, July 2022.
- Upcoming: MSRI Semester on Floer Homotopy Theory, Fall 2022.
- Upcoming: AIM Workshop on Floer theory of symmetric products and Hilbert schemes, December 2022.
- Midwest Topology Seminar, Michigan State University, May 2019. Co-organized with G. Angelini-Knoll, T. Gerhardt, and M. Hedden.
- AMS Special Session in Floer-Theoretic Invariants of Manifolds and Knots, University of Denver, October 2016. Co-organized with Jonathan Hanselman.

Refereeing and reviewing:

- Referee/reviewer for *Advances in Mathematics*, *Algebraic & Geometric Topology*, *Bulletin of the London Mathematical Society*, *Communications in Analysis and Geometry*, *Geometry & Topology*, *Journal of the American Mathematical Society*, *Journal of Knot Theory and its Ramifications*, *Journal of the Mathematical Society of Japan*, *Mathematische Annalen*, *Journal of Topology* *Pacific Journal of Mathematics*, *Proceedings of the London Mathematical Society*, *Transactions of the American Mathematical Society*, and *Quantum Topology*.

Invited Minicourses:

- *Involutive Heegaard Floer homology*
ISM Discovery School "Progress In Low Dimensions," UQAM, Montreal, August 2019
- *Lagrangian Floer homology and equivariant Lagrangian Floer homology*
Floer Homology and Homotopy Theory Summer School, UCLA, July 2017
- *Floer homology and involutions*
William Rowan Hamilton Geometry and Topology Workshop, Trinity College, Dublin, August 2016

Departmental Colloquia

- University of Michigan Mathematics Colloquium, February 2020
- Georgia Institute of Technology Mathematics Colloquium, October 2019
- Calvin College Mathematics Colloquium, February 2019
- Northeastern University Mathematics Colloquium, December 2018
- Fordham University Mathematics Colloquium, December 2018
- Rutgers University Mathematics Colloquium, December 2018
- Stony Brook University Mathematics Colloquium, November 2018
- Rutgers University-Newark Mathematics Colloquium, January 2016
- University of Colorado-Boulder Mathematics Colloquium, January 2016
- Michigan State University Mathematics Colloquium, December 2015
- Kansas State University Mathematics Colloquium, December 2015

- University of Nevada Reno Mathematics Colloquium, October 2015
- CSU Long Beach Mathematics Colloquium, October 2013

Invited Conference Talks

- Georgia Tech Topology Conference, Georgia Tech (Virtual), December 2021
- Georgia Topology Conference, UGA (Virtual), June 2021
- Floer homology in Low-Dimensional Topology, Simons Center for Geometry and Topology (Virtual), Stony Brook University, January 2021
- Interaction of Gauge Theory With Contact and Symplectic Topology in Dimensions Three and Four, Banff International Research Station (Virtual), June 2020
- UCLA Workshop on Low-Dimensional Topology, UCLA, January 2020
- Categorical Symplectic Topology Conference, Cambridge University, UK, March 2019
- Midwest Topology Seminar, University of Kentucky, September 2018
- UCLA Workshop on Low-Dimensional Topology, UCLA, January 2018
- Workshop on Thirty Years of Floer Theory for 3-manifolds, Casa Matemática Oaxaca, Oaxaca, August 2017
- Floer Homology and Homotopy Theory Workshop, UCLA, July 2017
- Georgia International Topology Conference, University of Georgia, May 2016
- CMS Special Session on Geometry and Topology: Interactions With Floer Theory, Niagara, December 2016
- AMS Special Session on Low-Dimensional Topology, North Carolina State University, November 2016
- Perspectives in Topology and Geometry of 4-manifolds, Inter University Center, Dubrovnik, June 2016
- Workshop on Flavours of Gauge Theory, Fields Institute, University of Toronto, May 2016
- Topological and Quantitative Aspects of Symplectic Manifolds, Columbia University, March 2016
- Synchronizing Smooth and Topological 4-Manifolds, Banff International Research Station, February 2016
- Princeton Low-Dimensional Topology Workshop, Princeton University, June 2015
- Georgia Topology Conference, University of Georgia at Athens, June 2015
- AMS Special Session on Knot Theory and Floer-Type Invariants, Michigan State University, March 2015
- AMS Special Session on Interactions Between Knots and Manifolds, San Francisco State University, October 2014
- William Rowan Hamilton Geometry and Topology Workshop, Trinity College, August 2014
- AMS Special Session on Invariants in Low-Dimensional Topology, University of Maryland Baltimore County, March 2014
- AMS Special Session on Geometric Implications of 3-Manifold Invariants, Washington University, October 2013
- Workshop in Low-Dimensional Topology, Simons Center for Geometry and Physics, May 2013
- AMS Special Session on Homological Invariants in Low-Dimensional Topology, Boston College, April 2013

- AWM Special Session on Low Dimensional Topology, Santa Clara University, March 2013
- AMS Special Session in Low-Dimensional Topology, University of South Florida, March 2012

Other Invited Conference Participation

- Interactions of gauge theory with contact and symplectic topology in dimensions 3 and 4, Banff International Research Station (Virtual), March 2022
- LMS Durham Symposium 2019: Pseudoholomorphic Curves and Gauge Theory in Low-Dimensional Topology, August 2019
- Floer Homology and Homotopy Workshop 2019, University of Oregon, August 2019
- AIM Workshop in Smooth Concordance Classes of Topologically Slice Knots, San Jose, June 2019
- AIM Workshop in Four Manifolds and Branched Double Covers, San Jose, June 2019

Other Invited Talks

- Stony Brook Geometry/Topology Seminar, November 2021
- Stanford Topology Seminar (Virtual), May 2021
- Princeton Topology Seminar (Virtual), April 2020
- University of Oregon Topology Seminar, May 2018
- Columbia University Symplectic Geometry, Gauge Theory, and Categorification Seminar, March 2018
- Stony Brook Seminar in Topology and Symplectic Geometry, February 2018
- Rice University Topology Seminar, November 2016
- McMaster University Topology Seminar, October 2016
- California Institute of Technology Topology Seminar, March 2016
- Rutgers University Topology Seminar, January 2016
- Indiana University Topology Seminar, April 2015
- Louisiana State University Topology Seminar, September 2014
- Columbia University Topology Seminar, September 2014
- University of Texas at Austin Topology Seminar, September 2014
- University of Southern California Geometry & Topology Seminar, April 2014
- Claremont Colleges Topology Seminar, March 2014
- Duke University-University of North Carolina Topology Seminar, February 2013
- Columbia University Symplectic Geometry, Gauge Theory, and Categorification Seminar, February 2013
- California Institute of Technology Geometry and Topology Seminar, November 2012
- Indiana University Topology Seminar, March 2012
- Michigan State University Topology Seminar, January 2012
- Joint Los Angeles Topology Seminar, October 2011
- Princeton Topology Seminar, October 2011
- Columbia University Geometric Topology Seminar, September 2011