Curriculum Vitae: Ian Michael Zemke

Contact Information

Department of Mathematics
Princeton University
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Employment

- Assistant Professor, Princeton University, 2020-2023.

- Instructor, Princeton University 2018-2020

- Postdoctoral Researcher, Princeton University 2017-2018

Education

1. University of California Los Angeles, Los Angeles, Caliornia
   Ph.D., Mathematics, June 2017
   Thesis: TQFT structures in Heegaard Floer homology

2. University of Washington, Seattle, Washington
   B.S., Mathematics, June 2012

Honors and Awards

- NSF Grant (DMS-2204375)

- NSF Postdoctoral Fellowship (DMS-1703685)

- Pacific Journal of Mathematics Dissertation Award (2017)

- UCLA Graduate Division Dissertation Year Fellowship (2016–2017)

Teaching experience

- Instructor at Princeton University:

    1. Mat 103, Calculus 1: Aut 2018, Aut 2020, Spr 2021 (course head), Spr 2022 (course head).
    2. Mat 104, Calculus 2: Spr 2020.
    3. Mat 217, Honors linear algebra: Spr 2019.
    4. Math 350, Introduction to Smooth Manifolds: Aut 2019.
    5. Junior Seminar on knot theory: Aut 2021, Aut 2022.

- TAing at UCLA: Math 3A, 3B, 31A, 31B, 33A, UCLA Autumn 2013–Spring 2016.

- TAing at UW: Math 134/5/6, University of Washington. Autumn 2011–Spring 2012.

- Program TA, University of Washington Math REU 2011, 2012 2013 (Math REU in inverse problems).

Invited Conference and Workshop Talks

- (CMI workshop Gauge Theory and Topology 2023, expected)

- (Oberwolfach 2023, expected)

- *The link surgery formula as a bordered theory.* New Developments in Four Dimensions. Victoria BC. June 13-17 2022.

- *Involutive Heegaard Floer homology and the homology cobordism group.* Georgia Graduate Student Topology and Geometry Workshop. Plenary Lecture. April 1-3.

- *Bordered perspectives on the link surgery formula.* BIRS conference on Interactions of gauge theory with contact and symplectic topology in dimensions 3 and 4. March 6-11 2022.

- *A surgery formula for involutive Heegaard Floer homology.* Fields Institute Workshop on Link Homology and Concordance. October 30–Nov 1, 2020.

- *A surgery formula for involutive Heegaard Floer homology.* Nearly Carbon Neutral Geometry and Topology conference. June 2020.

- *Transverse invariants and exotic surfaces in the 4-ball.* CMI Low dimensional topology workshop. January 2020.

- *Surgery exact triangles and involutive Heegaard Floer homology.* UCLA Geometry and Topology Workshop. January 2020.

- *Ribbon concordances and knot Floer homology.* CRM 50th anniversary program at UQAM in Low dimensional Topology. August/September 2019.

- *Doubling tricks and knot Floer homology.* Floer homotopy and low-dimensional topology. University of Oregon. August 5th-August 7th 2019.

- *Ribbon concordances and knot Floer homology.* Frontiers in Floer homology. Boston College. July 29-August 2 2019.

- *Stabilization distance and link Floer homology.* Knotted surfaces in 4-manifolds. October 26-28, 2018. University of Massachusetts, Amherst, MA.

- *Concordance invariants and the Ozsváth Szabó 4-manifold invariant.* Symplectic geometry and its interactions with low-dimensional topology. June 28-29 2018, Princeton University.

- *Heegaard Floer mixed invariants of mapping tori.* UCLA Topology Workshop, January 2018

- *TQFT structures in link Floer homology.* Thirty Years of Floer Theory for 3-manifolds, Oaxaca Mexico, August 2017

- *Graph cobordisms in Heegaard Floer homology.* 3-manifolds and Floer theories conference, Universität Regensburg, July 2016

Invited Seminar Talks

- Harvard Topology Seminar. *Bordered perspectives on the link surgery formula.* October 2022.

- NCSU Topology Seminar. *Bordered perspectives on the link surgery formula.* September 2022.

- *The link surgery formula and plumbed 3-manifolds.* Gauge theory virtural topology seminar. March 2022.

- *The link surgery formula and plumbed 3-manifolds.* Budapest topology seminar February 2022.

- *The link surgery formula and plumbed 3-manifolds.* Stanford topology seminar. February 2022.

- *The link surgery formula and plumbed 3-manifolds.* Oxford topology seminar. January 2022.

- *Heegaard Floer homology and complex curves with non-cuspidal singularities.* Freemath Seminar. June, 2021.

- *Surgery formulas in involutive Heegaard Floer homology.* UGA Topology Seminar. March, 2021.

- *A few refinements of Heegaard Floer genus and clasp number bounds.* MIT Geometry and Topology seminar. October 2020.

- *A surgery formula for involutive Heegaard Floer homology.* Stanford Topology Seminar. June 2020.

- *Ribbon concordances and knot Floer homology.* Stony Brook topology seminar. March 2020.

- *Ribbon concordances and knot Floer homology.* Rice Topology Seminar. November 2019.

- *Ribbon concordances and knot Floer homolog.* MIT Topology Seminar. October 2019.

- *Ribbon concordances and knot Floer homology.* AMS Sectional meeting. Wisconsin. September 2019.

- *Ribbon concordances and knot Floer homology.* Rutgers Geometry and Topology Seminar. April 2019.

- *Ribbon concordances and knot Floer homology.* Princeton University Topology Seminar. April 2019.

- *Ribbon concordances and knot Floer homology.* AMS Sectional Meeting, Auburn Alabama. March 2019.

- *Link Floer homology and the stabilization distance.* UGA/Georgia Tech Joint Topology Seminar. January 2019.

- *The stabilization distance and link Floer homology.* Michigan State University Geometry and Topology Seminar. November 2018.

- *Heegaard Floer mixed invariant of mapping tori.* Stony Brook University Seminar in Topology and Symplectic geometry, March 2018.

- *Heegaard Floer mixed invariant of mapping tori.* University of Virginia geometry seminar, February 2018.

- *Heegaard Floer mixed invariants of four dimensional mapping tori.* MIT Geometry and Topology Seminar, October 2017.

- *Link cobordisms and TQFTs in Heegaard Floer homology.* Oxford Topology Seminar, May 2017.

- *TQFT structures and Heegaard Floer homology.* Claremont College Topology Seminar, January 2017.

- *Link Floer homology and link cobordisms.* Caltech Geometry and Topology Seminar, January 2017.

- *Link cobordisms and functoriality in link Floer homology.* CMS Sectional Meeting, Niagara Falls, Ontario, December 2016.

- *Link cobordisms and functoriality in link Floer homology.* AMS Sectional Meeting, Raleigh, NC., November 2016.

- *Link cobordisms and functoriality in link Floer homology.* Columbia Symplectic Geometry, Gauge theory and Categorification Seminar, October 2016.

- *Link cobordisms and functoriality in link Floer homology.* AMS Sectional Meeting, Denver, CO., October 2016.

- *Link cobordisms and functoriality in link Floer homology.* Rice Topology Seminar, September 2016.

- *Graph TQFTs and basepoint moving maps in Heegaard Floer homology.* University of Georgia Topology Seminar, February 2016.

- *Basepoints in Heegaard Floer homology.* Oregon State University Topology Seminar, January 2016.

- *Graph TQFTs and basepoint moving maps in Heegaard Floer homology.* Caltech Geometry and Topology Seminar, January 2016.

- *A graph TQFT for hat Heegaard Floer homology.* Caltech Geometry and Topology Seminar, April 2015.

Publications and preprints

1. *Lattice homology, formality, and plumbed L-space links* (with M. Borodzik and B. Liu). arXiv preprint.

2. *An involutive dual knot formula* (with K. Hendricks, J. Hom, and M. Stoffregen) arXiv preprint.

3. *Naturality and functoriality in involutive Heegaard Floer homology* (with K. Hendricks, J. Hom, and M. Stoffregen) arXiv preprint

4. *The equivalence of lattice and Heegaard Floer homology.* arXiv preprint.

5. *Bordered manifolds with torus boundary and the link surgery formula.* arXiv preprint

6. *A note on PL-slice disks and rationally slice knots* (with K. Hendricks, J. Hom, and M. Stoffregen) arXiv preprint

7. *Heegaard Floer homology and plane curves with non-cuspidal* singularities (with M. Borodzik and B. Liu) arXiv preprint

8. *On the quotient of the homology cobordism group by Seifert spaces* (with K. Hendricks, J. Hom, and M. Stoffregen) Trans. Amer. Math. Soc. Ser. B 9 (2022), 757–781.

9. *Surgery exact triangles and involutive Heegaard Floer homology* (with K. Hendricks, J. Hom, and M. Stoffregen) arXiv preprint

10. *New Heegaard Floer slice genus and clasp number bounds* (with A. Juhasz) arXiv preprint

11. *Transverse invariants and exotic surfaces in the 4-ball* (with A. Juhasz and M. Miller) Geom. Topol. 25 (2021), no. 6, 2963–3012.

12. *Knot cobordisms, bridge index, and torsion in Floer homology* (with A. Juhasz and M. Miller) J. Topol. 13 (2020), no. 4, 1701–1724.

13. *Knot Floer homology and strongly-homotopy ribbon concordances* (with M. Miller) Math. Res. Lett. 28 (2021), no. 3, 849–861.

14. *Khovanov homology and ribbon concordances* (with A.S. Levine) Bull. Lond. Math. Soc. 51 (2019), 6, 1099-1103.

15. *Knot Floer homology obstructs ribbon concordance.* Annals of Mathematics (2) 190 (2019), no. 3, 931-947.

16. *Stabilization distance bounds from link Floer homology* (with A. Juhasz) arXiv preprint

17. *Distinguishing slice disks using knot Floer homology* (with A. Juhasz) Selecta Math. (N.S.) 26, 5 (2020)

18. *Concordance surgery and the Ozsvath-Szabo 4-manifold invariant* (with A. Juhasz) Accepted, Journal of the EMS

19. *Contact handles, duality, and sutured Floer homology* (with A. Juhasz) Geometry & Topology, 24 (2020) 179-307

20. *Duality and mapping tori in Heegaard Floer homology.* Journal of Topology 14 (3), 1027-1112.

21. *Connected sums and involutive knot Floer homology.* Proc. London Math. Soc. (2019) 119: 214-265.

22. *Link cobordisms and absolute gradings on link Floer homology.* Quantum Topology. 10 (2019), 207-323.

23. *Link cobordisms and functoriality in link Floer homology.* Journal of Topology. (2019) 12: 94-220.

24. *Naturality and mapping class groups in Heegaard Floer homology* (with A. Juhasz and D. Thurston). Mem. Amer. Math. Soc. 273 (2021), no. 1338, v+174 pp.

25. *A connected sum formula for involutive Heegaard Floer homology* (with K. Hendricks and C. Manolescu). Selecta Math. (N.S.), (2018) 24; 1183-1245

26. *Quasistabilization and basepoint moving maps in link Floer homology.* Algebraic & Geometric Topology, Volume 17, Number 6 (2017) 3461-3518

27. *Graph cobordisms and Heegaard Floer homology.* arXiv preprint

28. *A graph TQFT for hat Heegaard Floer homology.* Quantum Topol. 12 (2021), no. 3, 439–460.