

Morgan Weiler: Curriculum Vitae

Contact Information

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Employment

Fall 2021-current NSF Postdoctoral Fellow, Cornell University

Fall 2019-Spring 2021 RTG Lovett Instructor, Mathematics Department, Rice University

Education

May 2019 Ph.D. in Mathematics, University of California, Berkeley
thesis advisor: Michael Hutchings

May 2013 B.A. in Mathematics, University of California, Berkeley

Awards and Honors

2021-2024 NSF Mathematical Sciences Postdoctoral Research Fellowship

January 2020 AWM-NSF Travel Grant

Fall 2018, 2017, and 2016 UC Berkeley Research Training Group in Geometry and Topology
Fellowship

Fall 2015-Spring 2016 Berkeley Connect Fellowship

List of Publications

Research areas: symplectic and contact geometry, dynamics, Floer homology. MSC 37J05, 53D35, 53D40.

Preprints:

1. Caden Farley, Tara S. Holm, Nicki Magill, Jemma Schroder, Morgan Weiler, Zichen Wang, and Elizaveta Zabelina, “Four-periodic infinite staircases for four-dimensional polydisks,” submitted, arXiv:2210.15069.
2. Nicki Magill, Dusa McDuff, and Morgan Weiler, “Staircase patterns in Hirzebruch surfaces,” submitted, arXiv:2203.06453.
3. Jo Nelson and Morgan Weiler, “Embedded contact homology of prequantization bundles,” Revisions requested by the *Journal of Symplectic Geometry*. arXiv:2007.13883.

Published or accepted:

1. Maria Bertozzi, Tara S. Holm, Emily Maw, Dusa McDuff, Grace T. Mwakyoma, Ana Rita Pires, and Morgan Weiler, “Infinite staircases for Hirzebruch surfaces.” *Research Directions*

in *Symplectic and Contact Geometry and Topology*, ed. Bahar Acu et. al., Springer AWMS Vol. 27, pp. 47-157 (2021). arXiv:2010.08567.

2. Leo Digiosia, Jo Nelson, Haoming Ning, Morgan Weiler, and Yirong Yang, “Symplectic embeddings of four-dimensional polydisks into half integer ellipsoids,” to appear in the *Journal of Fixed Point Theory and Applications*. arXiv:2010.06687.
3. Morgan Weiler, “Mean action of periodic orbits of area-preserving annulus diffeomorphisms,” *Journal of Topology and Analysis*, Vol. 13, No. 4, pp. 1013-1074 (2021). <https://doi.org/10.1142/S1793525320500363>, arXiv:1810.05091.
4. Sam Hopkins and Morgan Weiler, “Pattern avoidance in permutations on the Boolean lattice,” *Order* Vol. 33, No. 2, pp. 299-310 (2016).

In Media

- Sloman, Leila. “Mathematicians Discover the Fibonacci Numbers Hiding in Strange Spaces.” *Quanta*, October 17, 2022. <https://www.quantamagazine.org/mathematicians-surprised-by-hidden-fibonacci-numbers-20221017/>.

Invited Conference Talks

1. *September 26-30, 2022* Perspectives in equivariant topology, Cologne, Germany. “ECH cobordism maps and 4D toric symplectic embeddings.”
2. *July 4-July 8, 2022* Convexity in contact and symplectic topology, conference in honor of Emmanuel Giroux, Paris, France. “ECH capacities and fractals of infinite staircases of 4D symplectic embeddings.”
3. *April 25-29, 2022* Braids in Low-Dimensional Topology, ICERM, Providence, RI. “Computations of ECH capacities and infinite staircases of 4D symplectic embeddings.”
4. *April 8-9, 2022* AMS-AWM Special Session: Women and Gender Minorities in Symplectic and Contact Geometry III, Joint Mathematics Meetings, virtual. “Fractals, ECH capacities, and symplectic embeddings of four-dimensional ellipsoids into Hirzebruch surfaces.”
5. *November 20-21, 2021* Special Session on Low Dimensional Symplectic and Contact Topology, Their Invariants and Interactions, Fall Southeastern Sectional Meeting of the AMS, virtual. “Fractals, ECH capacities, and symplectic embeddings of four-dimensional ellipsoids into Hirzebruch surfaces.”
6. *June 22-26, 2020* Holomorphic curves and low-dimensional topology, Dubrovnik, Croatia. (cancelled due to COVID-19)
7. *April 6-9, 2020* Workshop on Classical and Quantum Aspects of Symplectic Geometry, Nantes, France. (cancelled due to COVID-19)
8. *January 15, 2020* AMS-AWM Special Session on Women in Topology, Joint Mathematics Meetings, Denver, CO. “The embedded contact homology of Seifert fiber spaces.”
9. *January 12, 2018* AMS-AWM Special Session: Women in Symplectic and Contact Geometry and Topology, Joint Mathematics Meetings, San Diego, CA. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms.”

Invited Seminar Talks

1. *February 3, 2023* University at Buffalo Geometry and Topology Seminar.
2. *November 5, 2022* GATSBY Seminar at Brown.
3. *October 27, 2022* MIT Symplectic Seminar. “Infinite staircases of 4D symplectic embeddings.”
4. *October 12, 2022* Edinburgh Algebraic and Symplectic Geometry Seminar. “Infinite staircases of 4D symplectic embeddings.”
5. *March 28, 2022* University of Maryland, College Park Geometry-Topology Seminar. “A Cantor set of infinite staircases of ellipsoid embedding functions of Hirzebruch surfaces.”
6. *October 20, 2021* Australian Geometric Topology Webinar, Zoom. “Ellipsoid embedding functions of Hirzebruch surfaces.”
7. *October 5, 2021* Cornell University Topology and Geometric Group Theory seminar. “Ellipsoid embedding functions of Hirzebruch surfaces.”
8. *July 13, 2021* Institut Henri Poincaré Symplectic trimester seminar, Zoom. “Progress towards new examples of knot-filtered ECH.”
9. *April 26, 2021* University of Oklahoma Analysis seminar, Zoom. “The action spectrum of embedded contact homology and infinite staircases of symplectic embeddings.”
10. *November 17, 2020* Cornell Topology and Geometric Group Theory seminar, Zoom. “Infinite staircases of symplectic embeddings.”
11. *September 21, 2020* Georgia Tech Geometry Topology seminar, Zoom. “The embedded contact homology of prequantization bundles.”
12. *June 5, 2020* Symplectic Zoominar (CRM-Montreal, Princeton/IAS, Tel Aviv, and Paris), Zoom. “Infinite staircases of symplectic embeddings of ellipsoids into Hirzebruch surfaces”
13. *May 1, 2020* Western Hemisphere Virtual Symplectic seminar, Zoom, with Jo Nelson. “ECH of prequantization bundles and lens spaces”
14. *April 27, 2020* Joint Los Angeles topology seminar, Zoom. “Embedded contact homology and surface dynamics”
15. *March 9, 2020* Rice Topology Seminar. “The embedded contact homology of prequantization bundles”
16. *November 7, 2019* Stony Brook University Symplectic Geometry Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”
17. *October 18, 2019* Rio de Janeiro Symplectic Seminar. “Mean action of periodic orbits of annulus symplectomorphisms”
18. *April 17, 2019* UC Berkeley Topology Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”
19. *April 15, 2019* Stanford University Symplectic Geometry Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”
20. *February 5, 2019* UC Davis Geometry/Topology Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”
21. *December 3, 2018* Princeton University/Institute for Advanced Study Symplectic Geometry Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”

22. *October 25, 2018* University of California, Santa Cruz Geometry & Analysis Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”
23. *September 10, 2018* Rice Topology Seminar. “Mean action of periodic orbits of area-preserving annulus symplectomorphisms”

Other Academic Talks

1. *October 26, 2020* Rice Undergraduate Mathematics Colloquium and Topology Seminar, report on products of the Summer 2020 SIREN
2. *November 7 and 14, 2018* UC Berkeley Contact Geometry Seminar
3. *January and July 2013* REU research talks at the Joint Mathematics Meetings and Permutation Patterns 2013

Service and Outreach

Refereed three papers since graduation.

Reviewer for MathSciNet.

Mentoring:

- *Summer 2022* Lead organizer for Cornell University’s SPUR (Summer Program for Undergraduate Research) program on symplectic embeddings of toric domains and their embedding capacity functions. <https://math.cornell.edu/undergraduate-research>
- *June 2022* Mentor for Kylerec “Quantitative Symplectic Geometry” graduate student workshop. <https://kylerec.wordpress.com/>
- *Summer 2020* Mentor for Rice University Professor Jo Nelson’s remote Summer Integrated Research Experience Network (SIREN) on symplectic embeddings of polydisks, resulting in the paper by Digiosia et. al.

Outreach Math Talks:

- *February 10, 2021* Lanier Middle School Math Club, Zoom. “Continued Fractions and Square Packings.”
- *YouTube channel* <https://www.youtube.com/channel/UCb1EQ0gDtE7JPS2fNxJ1nkA>

Organizing:

- *Fall 2021-current* Postdoc co-organizer, Cornell Math Explorer’s Club. <https://math.cornell.edu/mec>
- *Fall 2020-Spring 2021* Faculty co-organizer, AWM mentorship program for freshmen, Rice University.
- *Fall 2019-Spring 2020* Faculty organizer, Horizons Colloquium Series at Rice University. <https://sites.google.com/view/anmiller/horizons>
- *January 2020* Co-organizer, special session “AMS-AWM Special Session on Women in Symplectic and Contact Geometry,” Joint Mathematics Meetings, Denver, CO.
- *April 2019* Co-organizer, special session “New Advances in Symplectic and Contact Topology,” AWM Research Symposium, Rice University, Houston TX.

- *January 2016* Co-organizer, Kylerec graduate student workshop in symplectic geometry, New Orleans, LA. <http://math.mit.edu/~kyler/workshop/schedule.html>

Teaching

At Cornell University

Spring 2022 Math 4540, Differential Geometry

Fall 2021 Math 1110, Calculus I

At Rice University

Spring 2021 Math 238, Rice Connect

Spring 2021 Math 212, Multivariable Calculus

Fall 2020 Math 370, Calculus on Manifolds

Spring 2020 Math 501, Topics in Differential Geometry (graduate Riemannian geometry)

Fall 2019 Math 102, Calculus II

At UC Berkeley

Spring 2018 Math 191, experimental courses in mathematics, “Introduction to mathematical research via knot theory”

Fall 2015-Spring 2016 Graduate student mentor for Berkeley Connect

As a graduate student instructor (teaching assistant) at UC Berkeley

Spring 2019 Math 110, Linear Algebra

Spring 2017 Math 55, Discrete Mathematics

Summer 2016 Math W53, Multivariable Calculus (online)

Spring 2015 Math 54, Linear Algebra and Differential Equations

Fall 2014 Math 53, Multivariable Calculus

Spring 2014 Math 53, Multivariable Calculus

Fall 2013 Math 16A, Analytic Geometry and Calculus