

## Maggie Miller: Curriculum Vitae

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### Research Interests

I am interested in questions about geometric topology and knotting in dimensions 3 and 4. In particular, I think about knotted surfaces smoothly or locally flatly embedded in 4-manifolds.

### Professional Positions

2023 –	<b>Assistant Professor, University of Texas at Austin</b> Department of Mathematics
2021 –	<b>Clay Research Fellow, Clay Mathematics Institute</b>
2021 – 2023	<b>Stanford Science Fellow, Stanford University</b> <i>STEM postdoctoral fellowship</i> Faculty mentor: Ciprian Manolescu
2020 – 2021	<b>NSF Postdoctoral Fellow, Massachusetts Institute of Technology</b> Scientific sponsor: Tomasz Mrowka

### Education

2015 – 2020	<b>Ph.D. in Mathematics, Princeton University</b> NSF Graduate Fellow, Charlotte Elizabeth Procter Fellow Dissertation: “Extending fibrations of knot complements to ribbon disk complements” Advised by David Gabai
2011 – 2015	<b>Bachelor of Science: Mathematics Honors Option, University of Texas at Austin</b> High Honors, Special Honors in Mathematics, Dean’s Honored Graduate Senior Thesis: “Fiberedness of almost-Montesinos knots” Advised by Cameron Gordon

### Awards/Fellowships

2025	Alfred P. Sloan Research Fellowship
2023	Forbes 30 Under 30 (Science)
2023	Maryam Mirzakhani New Frontiers Prize
2021 – 2025	Clay Research Fellowship
2021 – 2024	Stanford Science Fellowship
2020 – 2021	NSF Mathematical Sciences Postdoc Research Fellowship
2018	Princeton Mathematics Graduate Teaching Award
2016 – 2020	National Science Foundation Graduate Research Fellowship
2015	College of Natural Sciences Dean’s Honored Graduate, UT Austin

## Papers and Preprints

- [32] M. Hughes, A. Kjuchukova, M. Miller, *Branched covers of open manifolds*, arxiv.org:2508.09842 [math.GT], Aug. 2025. Submitted.
- [31] S. Kim, M. Miller, J. Yoo, *Non-split alternating links bound unique minimal genus Seifert surfaces up to isotopy in the 4-ball*, arXiv: 2406.11718 [math.GT], June 2024. To appear in Compos. Math.
- [30] A. Conway, I. Dai, M. Miller,  *$\mathbb{Z}$ -disks in  $\mathbb{C}P^2$* , arXiv: 2403.10080 [math.GT], Mar. 2024. To appear in Compos. Math.
- [29] M. Hughes, S. Kim, M. Miller, *Branched covers of twist-roll spun knots*, arXiv: 2402.11706 [math.GT], Feb. 2024. Submitted.
- [28] A. J. Lobb, M. Miller, A. Ray, *Morphisms in Low Dimensions*, Oberwolfach Rep. **20**(1):215–259, 2023.
- [27] M. Hughes, S. Kim, M. Miller, *Non-isotopic splitting spheres for a split link in  $S^4$* , Proc. London Math. Soc. (3) **130**(4):e70038, 2025.
- [26] P. Aceto, N. A. Castro, M. Miller, JH. Park, A. Stipsicz, *Slice obstructions from genus bounds in definite 4-manifolds*, arXiv:2303.10587 [math.GT], Mar. 2022. Submitted.
- [25] M. Miller, *Explicitly describing fibered 3-manifolds through families of singularly fibered surfaces*, Frontiers in geometry and topology, Proc. Sympos. Pure Math. **109**:195–214, 2024.
- [24] M. Klug and M. Miller, *Concordance of spheres in 4-manifolds with an immersed dual sphere*, arXiv:2211.07177 [math.GT], Nov. 2022. Submitted.
- [23] J. Joseph, J. Meier, M. Miller, A. Zupan, *Bridge trisections and Seifert solids*, Algebr. Geom. Topol. **35**(3):1501–1522, 2025.
- [22] K. Hayden, S. Kim, M. Miller, JH. Park, and Isaac Sundberg, *Seifert surfaces in the 4-ball*, arXiv:2205.15283 [math.GT], May 2022. To appear in J. Eur. Math. Soc.
- [21] J. Joseph, J. Meier, M. Miller, A. Zupan, *Bridge trisections and classical knotted surface theory*, Pac. J. Math. **319**(2):343–369, 2022.
- [20] M. Hughes, S. Kim, M. Miller, *Knotted handlebodies in the 4-sphere and 5-ball*, to appear in J. Eur. Math. Soc.
- [19] M. Hughes, S. Kim, M. Miller, *Band diagrams of immersed surfaces in 4-manifolds*, Algebr. Geom. Topol. **25**(3):1731–1791, 2025.
- [18] K. Hayden, A. Kjuchukova, S. Krishna, M. Miller, M. Powell, and N. Sunukjian, *Brunnian exotic surface links in the 4-ball*, to appear in Mich. Math. J.
- [17] M. Miller and B. Ozbagci, *Lefschetz fibrations on nonorientable 4-manifolds*, Pac. J. Math. **312**(1):177–202, 2021.
- [16] M. Miller and P. Naylor, *Trisections of nonorientable 4-manifolds*, Michigan Math. J. **74**(2):403–447, 2024.
- [15] M. Miller and A. Zupan, *Equivalent characterizations of handle-ribbon knots*, Comm. Anal. Geom. **31**(9):2157–2194, 2023.
- [14] P. Aceto, J. Meier, A. N. Miller, M. Miller, JH. Park, and A. I. Stipsicz, *Branched covers bounding rational homology balls*, Algebr. Geom. Topol. **21**(7):3569–3599, 2021.

## Papers and Preprints (continued)

- [13] A. Juhász, M. Miller, and I. Zemke, *Transverse invariants and exotic surfaces in the 4-ball*, *Geom. Topol.* **25**(6):2963–3012, 2021.
- [12] M. R. Klug and M. Miller, *Concordance of surfaces and the Freedman-Quinn invariant*, *J. Topol.* **14**(2):560–586, 2021.
- [11] N. A. Castro, G. Islambouli, M. Miller, and M. Tomova, *The relative  $\mathcal{L}$ -invariant of a compact 4-manifold*, *Pac. J. Math.* **315**(2):305–346, 2021.
- [10] I. Dai and M. Miller, *The 0-concordance monoid is infinitely generated*, *Proc. Amer. Math. Soc.* **151**(8):3601–3609, 2023.
- [9] M. Miller, *The effect of link Dehn surgery on the Thurston norm*, *Int. Math. Res. Not. IMRN* **2023**(22): 19069–19114, 2023.
- [8] A. Juhász, M. Miller, and I. Zemke, *Knot cobordisms, torsion, and Floer homology*, *J. Topol.* **13**(4):1701–1724, 2020.
- [7] P. Lambert-Cole and M. Miller, *Trisections of 5-manifolds*, 2019 MATRIX Annals, MATRIX Book Ser., Springer, pp. 117–134, 2021.
- [6] M. Miller and I. Zemke, *Knot Floer homology and strongly homotopy-ribbon concordances*, *Math. Res. Lett.* **28**(3):849–861, 2021.
- [5] M. Miller, *A concordance analogue of the 4-dimensional light bulb theorem* *Int. Math. Res. Not. IMRN* **2021**(4):2565–2587, 2021.
- [4] M. C. Hughes, S. Kim, and M. Miller, *Isotopies of surfaces in 4-manifolds via banded unlink diagrams*, *Geom. Topol.* **24**(3):1519–1569, 2020.
- [3] M. Miller, *Extending fibrations on knot complements to ribbon disk complements*, *Geom. Topol.* **25**(3):1479–1550, 2021.
- [2] S. Kim and M. Miller, *Trisections of surface complements and Price twist*, *Algebr. Geom. Topol.* **20**(1):343–373, 2020.
- [1] M. Miller, *Concordances from the standard surface in  $S^2 \times S^2$* , *J. Knot Theory Ramifications* **29**(9):1950–57, 2019.

## Select Outreach Activities

2023 –	UT Austin undergraduate Putnam practice (with Theresa Martines)
2019 – 2023	Geometric Topology Grad and Postdoc Seminar (sole organizer until June 2021, then joint with Tam Cheetham-West and Luya Wang)
Summer 2021	Mentor in the Summer Research – Early Identification Program (Program meant to encourage unrepresented students to pursue graduate education) <i>Mentored an undergraduate research project in 4-dimensional topology</i>
2015 – 2020	Noetherian Ring (Princeton women in mathematics) graduate representative <i>Co-founded a Noetherian Ring lecture series at Princeton in Spring 2019</i>
2018 – 2020	Princeton Graduate Teaching Fellow <i>Developed and led instructor orientations for grad students in 2018 and 2019</i>
2017 – 2020	Princeton Science Café (STEM outreach to children aged 9–15)

## Teaching Activities

I am mentoring PhD theses of the following UT Austin PhD students with expected graduation dates: Remy Bohm (2027), William Ghanem (2027), Aru Mukherjea (2027), Jennifer Rozenblit (2027).

Spring 2025	M 367K Topology I NSC 110H (Mathematics of Puzzles and Games)
Fall 2024	M 427L Advanced Calculus for Applications II
Fall 2023	M 392C Topics in Topology: Knotted Surfaces
2021 – 2023	Reading courses at Stanford University in: intro to low-dimensional topology, three-manifolds, surfaces in 4-manifolds (twice), general 4-manifold topology
2018 – 2020	Princeton Mathematics Department Graduate Teaching Fellow <i>Led training sessions for new math graduate instructors, assisted with university-wide supplementary training</i>

## Select Mathematical Organization Activities

August 2025	Knots, groups, and manifolds at Centre de recherches mathématiques (with A.N. Miller, J. Meier, A. Moore, J.M. Nogueira, L. Piccirillo, A. Reid)
June 2025	Trisectors Workshop 2025: Connections with Diffeomorphisms at the University of Texas at Austin (with Jeffrey Meier, Laura Starkston, Alexander Zupan)
August 2024	BIRS Workshop #24w5291 “What’s your trick? A non-traditional conference in low-dimensional topology,” at the Banff International Research Station (with John Baldwin, Andrew Lobb, Lisa Piccirillo, Liam Watson)
June 2024	Trisectors Workshop 2024: Connections with Knotted Surfaces at University of Nebraska–Lincoln (with Román Aranda, Jeffrey Meier, Laura Starkston, Alexander Zupan)

## Selected Invited Talks

I have a full list of both past and upcoming invited talks available on my website with URLs to abstracts when available.

2026	International Congress of Mathematicians address (topology)
2025	Dartmouth College mathematics colloquium “Seifert surfaces in 4D,” Georgia International Topology Conference
2024	“Surfaces in 4-Manifolds,” (lecture series), principal talks at 41st Workshop in Geometric Topology at Calvin College “Fibered knots vs. 4D conjectures,” (lecture series) Math Science Lectures in Honor of Raoul Bott at Harvard University, CMSA
2023	“Splitting in $S^4$ ,” UCLA Mathematics Colloquium
2022	“Building concordances and knotted handlebodies,” PIMS Rising Stars Colloquium at UBC “Knotted handlebodies,” University of Chicago Mathematics Colloquium
2021	“Concordance of surfaces,” UC Berkeley Mathematics Colloquium “Concordance of Lightbulbs,” Stanford Mathematics Colloquium