Keegan Boyle

EMAIL	kboyle@nmsu.edu
WEBPAGE	https://sites.google.com/view/keeganboyle/
RESEARCH INTERESTS	I study 3 and 4-dimensional topology with a focus on knots and group actions.
EDUCATION	**University of Oregon**, Eugene Ph.D. in Mathematics, June 2019 Advisor: Robert Lipshitz Thesis: On symmetries of knots and their surgeries. **University of Colorado**, Boulder B.A. in Mathematics, Spring 2012 B.M. in Harp Performance, Spring 2012
EMPLOYMENT HISTORY	-Assistant Professor at New Mexico State University, 2024 - present -Postdoctoral Scholar at the University of British Columbia, 2019 - 2024 -Graduate Educator at the University of Oregon, 2013 - 2019
TEACHING	**New Mexico State University** Fall 2024 - present - Instructor: Calculus I, Calculus I Honors, and Intro to Linear Algebra. **University of British Columbia** Fall 2019 - Spring 2024 - Instructor: Differential Calculus with Applications to Life Sciences, Integral Calculus with Applications to Life Sciences, Calculus Survey, Mathematical Proof, and Differential Equations. **University of Oregon** Fall 2013 - Spring 2019 - Instructor: College Algebra, Elementary Functions, Calculus I, Calculus II, University Math III, Introduction to Proofs. - Teaching Assistant: Introduction to Probability and Statistics, Calculus for Business and Social Science Majors.
RESEARCH	**Published or accepted work**

1. Negative amphichiral knots and the half-Conway polynomial (with Wenzhao Chen). Accepted for publication in *Revista Matemática Iberoamericana*, 2023. https://arxiv.org/abs/2206.03598.

2. Equivariant topological slice disks and negative amphichiral knots (with Wenzhao Chen). Accepted for publication in the *Indiana University Mathematics Journal*, 2023. https://arxiv.org/abs/2207.12593.

3. Strongly invertible knots, invariant surfaces, and the Atiyah-Singer signature theorem (with Antonio Alfieri). Accepted for publication in the *Michigan Mathematical Journal*, 2022. https://arxiv.org/abs/2109.09915.

4. Equivariantly slicing strongly negative amphichiral knots (with Ahmad Issa). Accepted for publication in *Algebraic & Geometric Topology*, 2022. https://arxiv.org/abs/2109.01198.

5. Equivariant 4-genera of strongly invertible and periodic knots (with Ahmad Issa). *Journal of Topology*, 2022. https://arxiv.org/abs/2101.05413

6. Equivariant cobordisms between freely-periodic knots (with Jeffrey Musyt). *Canadian Mathematical Bulletin*, 2022. https://arxiv.org/abs/2111.10678

7. Rank inequalities on knot Floer homology of periodic knots. *Bulletin of the London Mathematical Society*, 2022. https://arxiv.org/abs/1810.01526.

8. Orbifold Covers. *Mathematical Research Postcards*, 2021. Link.

9. Involutions of alternating links. *Proceedings of the American Mathematical Society*, 2021. https://arxiv.org/abs/2002.08191.

10. On the virtual cosmetic surgery conjecture. *New York Journal of Mathematics*, 2018. https://arxiv.org/abs/1701.02361.

Preprints and Unpublished work

11. Freely 2-Periodic knots have two canonical components. (with Nicholas Rouse) Submitted 2024. https://arxiv.org/abs/2403.07157.

12. Obstructions to free periodicity and symmetric L-space knots. (with Nicholas Rouse) Submitted 2023. https://arxiv.org/abs/2310.01705.

13. A classification of symmetries of knots. (with Nicholas Rouse and Ben Williams) Submitted 2023. https://arxiv.org/abs/2306.04812.

14. An interesting 2-periodic alternating knot. 2021. Link.
15. Quotients of definite periodic knots are definite, 2018. https://arxiv.org/abs/1810.01524

SELECTED TALKS

"Equivariant crossing changes for strongly invertible knots" at the University of Oregon Topology Seminar, July 30, 2024.

"Alexander polynomials and symmetric knots" at the University of Pisa Geometry Seminar, March 21, 2024.

"Equivariant slice disks for symmetric knots" at the CMS Winter Meeting, December 3, 2022.

"Involutions on the 4-ball and strongly negative amphichiral knots" at the World of GroupCraft II conference, September 2, 2022.

"A lower bound on the equivariant unknotting number for strongly negative amphichiral knots" at the Interactions of gauge theory with contact and symplectic topology in dimensions 3 and 4 workshop, March 10, 2022.

"Equivariant knot signatures" in the Topology Seminar at the University of Victoria, October 28, 2021.

"Periodic knots and Alexander polynomials" in Topology, coast to coast: a virtual conference, May 13, 2020.

"Symmetries of alternating knots" in the Topology Seminar at University of British Columbia, November 6, 2019.

"The virtual cosmetice surgery conjecture" in the Topology Seminar at the University of Oregon, November 7, 2017.

"The virtual cosmetic surgery conjecture" in the Symplectic Geometry, Gauge theory and Categorification Seminar at Columbia University, October 20, 2017.

SERVICE

UBC topology seminar co-organizer (with Ahmad Issa, then Ben Williams), Fall 2020 - Spring 2022.

Summer undergraduate research co-supervisor (with Liam Watson) for a project tabulating trivial-capped tangles, Summer 2020.

Graduate student member of the math department's Graduate Affairs Committee at University of Oregon, Fall 2018 - Spring 2019.

Graduate Mentor for first year mathematics graduate students at the University of Oregon, Fall 2017 - Spring 2018.

Awards Postdoc Teaching Prize, University of British Columbia Mathematics Department, 2024.

Jack and Peggy Borsting Award for Scholastic Excellence, University of Oregon Mathematics Department, 2019.

Jack Hodges Award for Excellence in Mathematics, University of Colorado Mathematics Department, 2011.