

GARY GUTH

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EDUCATION

University of Oregon, Eugene, OR
Doctor of Philosophy, Mathematics
Thesis Advisor: Dr. Robert Lipshitz

September 2018 - June 2024

University of California, Berkeley, Berkeley, CA
Bachelor of Arts, Mathematics (with Honors)

August 2013 - June 2017

RESEARCH INTERESTS

Low dimensional topology, usually applying tools from Heegaard Floer homology to answer questions about knots and surfaces in 3- and 4-manifolds.

PAPERS AND PREPRINTS

For Exotic Surfaces with Boundary, One is Not Enough

A result of Baykur-Sunukjian states that homologous surfaces in a 4-manifold become isotopic after a finite number of internal stabilizations, i.e. attaching tubes to the surfaces. A natural question is how many stabilizations are needed before the surfaces become isotopic. In particular, given an exotic pair of surfaces, is a single stabilization always enough to make the pair smoothly isotopic? We answer this question by studying how the stabilization distance between surfaces with boundary changes with respect to satellite operations. Using a range of Floer theoretic techniques, we show that there are exotic disks in the four-ball which have stabilization distance greater than one, giving the first examples of exotic behavior in the four-ball for which “one is not enough”.

Ribbon Homology Cobordisms and Link Floer Homology (Submitted)

We make use of link Floer homology to study cobordisms between links embedded in 4-dimensional ribbon homology cobordisms. Combining results of Daemi–Lidman–Vela-Vick–Wong and Zemke, we show that ribbon homology concordances induce split injections on the minus version of link Floer homology. We also make use of reduced link Floer homology to give restrictions on the number of critical points in ribbon homology concordances.

INVITED RESEARCH TALKS

Frontiers in Geometry and Topology Summer School, ICTP (“lightning talk”)	<i>August 2022</i>
New Developments in Four Dimensions Conference (“lightning talk”)	<i>June 2022</i>
Geometric Topology Grad and Postdoc Seminar (Zoom)	<i>April 2022</i>
University of Oregon Topology Seminar	<i>April 2022</i>
Annual Meeting of the MAA at Western Washington University (“lightning talk”)	<i>April 2022</i>

WORKSHOPS AND CONFERENCES ATTENDED

Frontiers In Geometry and Topology Conference , International Center for Theoretical Physics	<i>August 2022</i>
Frontiers In Geometry and Topology Summer School , International Center for Theoretical Physics	<i>August 2022</i>
New Developments in Four Dimensions , University of Victoria	<i>June 2022</i>
Annual Meeting of the Pacific Northwest MAA , Western Washington University	<i>April 2022</i>
Cascade Topology Conference , Boise State University (moved online)	<i>November 2021</i>
Tech Topology Summer School , Georgia Tech (moved online)	<i>July 2021</i>
Cascade Topology Conference , Online	<i>September 2021</i>

SERVICE

TA for Jen Hom's mini-course on "Heegaard Floer Homology and Topology in Dimension 3.5" at the Frontiers in Geometry and Topology summer school

August 2022

TEACHING EXPERIENCE

Instructor of record for the following courses:

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|------------------------|-------------------------------------|
| 1. Calculus III | Spring 2022 |
| 2. Calculus II | Summer 2021 |
| 3. Calculus I | Summer 2020, Winter 2022 |
| 4. Business Calculus I | Summer 2019 |
| 5. Trigonometry | Spring 2019, 2020, 2021 |
| 6. College Algebra | Fall 2018, Winter 2018, Winter 2020 |

Teaching assistant for the following courses:

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| 1. Introduction to Statistics | Fall 2019 |
| 2. Business Calculus I | Fall 2021 |
| 3. College Algebra I | Fall 2020 |
| 4. Business Calculus I | Summer 2019 |

COMPUTER SKILLS

Languages: \LaTeX , Sage, Python