

Jeffrey Meier

Research Interests

Low-dimensional topology, knot theory, 4-manifolds, knot concordance, Dehn surgery, Heegaard-Floer homology, trisections, knotted surfaces in 4-manifolds

Appointments

- 2017–present **Postdoctoral Associate**, *University of Georgia*, Athens, GA.
2014–2017 **NSF Postdoctoral Fellow**, *Indiana University*, Bloomington, IN.
Fall 2016 **Guest Researcher**, *Hausdorff Institute for Mathematics*, Bonn, Germany.
2014–2016 **Zorn Postdoctoral Fellow**, *Indiana University*, Bloomington, IN.

Education

- 2009–2014 **Ph.D. Mathematics**, *The University of Texas at Austin*, Austin, TX.
◦ Advisor: Cameron McA. Gordon
◦ Thesis: Exceptional Seifert fibered surgeries on Montesinos knots; and Distinguishing smoothly and topologically doubly slice knots
- 2007–2009 **Masters Mathematics**, *University of Nevada, Reno*, Reno, NV.
◦ Advisor: Slaven Jabuka
◦ Thesis: A recursive formula for the Khovanov homology of a family of pretzel knots
- 2002–2007 **B.S. Mathematics**, *California State University, Long Beach*, Long Beach, CA.
◦ B.A. Spanish Language and Linguistics
◦ Minor in Chemistry

Grants & Awards

- 2019–2021 **AIM SQuaRE Grant**, *Trisections, Knotted Surfaces, and Symplectic 4-Manifolds*.
- 2017–2020 **NSF Grant DMS-1758087**, *FRG: Collaborative Research: Trisections – New directions in low-dimensional topology*, \$127,790.
- 2014–2017 **NSF Grant DMS-1400543**, *Mathematical Sciences Postdoctoral Research Fellowship*, \$150,000.
- 2010–2014 **Graduate Research Assistantships & RTG Fellowships**, *UT Austin*.
◦ Cameron McA. Gordon: Knot theory (Summer 2010, Summer 2012, & 2013)
◦ Michael Starbird: Methods in Inquiry Based Learning (2011 & Fall 2012)
- 2012 **David Burton, Jr. Graduate Fellowship in Mathematics**, *UT Austin*.

Publications and Submitted Preprints

1. **Doubly pointed trisection diagrams and surgery on 2–knots.**
with David Gay, arXiv:1806.05351, *Submitted for publication*
2. **Bridge trisections of knotted surfaces in 4–manifolds.**
with Alexander Zupan, arXiv:1710.01745, *To appear in Proc. Nat. Acad. Sci. U.S.A.*
3. **Trisections and spun 4–manifolds.**
arXiv:1708.01214, *To appear in Mathematical Research Letters*
4. **Characterizing Dehn surgery on links via trisections.**
with Alexander Zupan, arXiv:1707.08955, *To appear in Proc. Nat. Acad. Sci. U.S.A.*
5. **Genus two trisections are standard.**
with Alexander Zupan, *Geometry & Topology* 21 (2017) 1583-1630
6. **Bridge trisections of knotted surfaces in S^4 .**
with Alexander Zupan, *Trans. of the Amer. Math. Soc.* 369 (2017) 7343-7386
7. **A note on cabled slice knots and reducible surgeries.**
Michigan Mathematics Journal 66(2) (2017) 269-276
8. **Classification of trisections and the Generalized Property R Conjecture.**
with Trenton Schirmer and Alexander Zupan, *Proc. of the Amer. Math. Soc.* 144(11) (2016), 4983-4997
9. **Doubly slice knots with low crossing number.**
with Charles Livingston, *New York Journal of Mathematics* 21 (2015), 1007-1026
10. **Fibered ribbon disks.**
with Kyle Larson, *Journal of Knot Theory and Its Ramifications* 24 (2015), 1550066, pp. 22
11. **Distinguishing smoothly and topologically doubly slice knots.**
Journal of Topology 8(2) (2015), 315-351
12. **Small Seifert fibered surgery on hyperbolic pretzel knots.**
Algebraic & Geometric Topology 14(1) (2014), 439-487
13. **Isolation-by-distance and outbreeding depression are sufficient to drive parapatric speciation in the absence of environmental influences.**
with Guy Hoelzer, Rich Drewes, and René Doursat
PLoS Computational Biology 4(7):e1000126 (2008), pp. 11

Book Chapters

14. **Shrinking starlike sets.**
with Boldizsár Kalmár and Patrick Orson
in *The 4-dimensional Disc Embedding Theorem* (based on lectures by Michael H. Freedman)
edited by Stefan Behrens, Boldizsár Kalmár, Min Hoon Kim, Mark Powell, and Arunima Ray
to be published by Oxford University Press

Selected Talks

Mini-courses

- Aug. 2017 *Southeastern Undergraduate Mathematics Workshop*, Georgia Tech University
Fall 2016 *Junior Trimester in Topology*, Hausdorff Institute for Mathematics, Bonn, Germany

Conference Talks

- Jul. 2018 *A Celebration of the Mathematics of Bob Gompf*, The University of Texas at Austin
Apr. 2018 *Spring 2018 Redbud Conference*, Oklahoma State University
Feb. 2017 *Knotted Embeddings*, CIRM, Luminy-Marseille, France
Feb. 2017 *Winter Braids VIII*, CIRM, Luminy-Marseille, France
Oct. 2017 *Cascade Topology Seminar*, University of Victoria, Canada
Mar. 2017 *Trisections and Low-Dimensional Topology*, American Institute of Mathematics
May 2016 *Georgia Topology Conference*, University of Georgia
Apr. 2016 *Integrated Conference in Geometry, Dynamics, and Topology*, Eastern Illinois Univ.
Apr. 2016 *14th Graduate Student Topology and Geometry Conference*, Indiana University
Feb. 2016 *Synchronizing Smooth and Topological 4-Manifolds*, Banff Inter. Research Station
May 2015 *Moab Topology Conference*, Utah State University, Moab
Mar. 2015 *AMS Spring Central Sectional Meetings*, Michigan State University
Oct. 2014 *AMS Fall Western Sectional Meetings*, San Francisco State University
Jun. 2013 *Low-dimensional Topology and Geometry in Toulouse*, Université Paul Sabatier
Apr. 2013 *AMS Sectional Meeting Contributed Paper Session*, Boston College
Mar. 2012 *10th Graduate Student Topology and Geometry Conference*, Indiana University

Seminar Talks

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| Jun. 2018 | California Institute of Technology | Oct. 2015 | Boston College |
| Mar. 2018 | North Carolina State University | Apr. 2015 | Oklahoma State University |
| Dec. 2017 | University of Virginia | Mar. 2015 | The University of Texas at Austin |
| Oct. 2017 | University of California, Berkeley | Feb. 2016 | University of Nebraska, Lincoln |
| Oct. 2017 | University of California, Davis | Oct. 2015 | The University of Texas at Austin |
| Oct. 2017 | Georgia Tech University | Apr. 2014 | California Institute of Technology |
| Aug. 2017 | University of Georgia | Apr. 2013 | University of Virginia |
| Dec. 2016 | Max Plank Institute, Bonn, Germany | Feb. 2013 | University of California, Davis |
| Feb. 2016 | Princeton University | Dec. 2013 | University of California, Santa Barbara |
| Dec. 2015 | Georgia Tech University | Nov. 2013 | Indiana University |

Colloquia

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| Apr. 2018 | Oklahoma State University | Feb. 2014 | University of Nevada, Reno |
| Jan. 2017 | Utah State University | Nov. 2013 | Sam Houston State University |

Involvement in Undergraduate Education

- Directed Reading Programs** Directed Reading Programs pair graduate students with motivated undergraduate students for semester-long reading courses.
- As a graduate student at UT Austin, from 2013 to 2014, I mentored three students in readings in knot theory and algebraic topology.
 - As a postdoc at Indiana University, I introduced and organized a Directed Reading Program with fellow postdoc Corrin Clarkson.
 - As a postdoc at University of Georgia, I introduced and organized a DRP.
- REU Leader**
- (Summer of 2015) I supervised Sam Pilgrim in an investigation of the relationship between the braid group and bridge trisections of knotted surfaces in four-space. Sam has continued this project as a graduate student at the University of Hawaii.
 - (Summer of 2016) I supervised James Dix in a project aimed at understanding constructions of knotted projective planes and Klein bottles in four-space.
- IU MSI STEM Initiative** The Indiana University Minority Serving Institutions STEM Initiative is a partnership between IU and a collection of Historically Black Colleges and Universities aimed at increasing the number of African-American graduate students, scholars, and professionals in the STEM disciplines. I participated in this program in the summer of 2016, mentoring a young woman, whose goal is to become a math professor, in an introduction to topology.
- UGA MathCamp** I designed a mini-course for the 2018 UGA MathCamp, a summer math program for Georgia high school students.
- IE Grad Program** The Intellectual Entrepreneurship Pre-Graduate Internship Program aims to raise awareness and preparation among first-generation college students and underrepresented minorities for graduate school study. In the fall of 2012 and the spring of 2013, I mentored students in readings in algebraic topology and knot theory.
- Inquiry Based Learning and Flipped Classrooms**
- As an IBL Teaching Assistant at UT Austin, I helped with organization and instruction in IBL classrooms. I also helped prepare IBL course materials.
 - As an instructor at Indiana University, I taught two classes using the IBL methodology. Both classes targeted pre-service math teachers.
 - As a postdoc at the University of Georgia, I implemented a flipped classroom when teaching Precalculus in an effort to implement active learning techniques.
- Talks**
- *Mini-Course: An Introduction to Knotted Surfaces in Four-Space*, Southeastern Undergraduate Mathematics Workshop, Georgia Tech (August 2017)
 - *Double Slicing Knots*, IU Math Club (April 2016)
 - *Knots, Seifert Surfaces, and the Slice-Ribbon Conjecture*, UT Austin Math Club (February 2013)
- Journals** Referee, *Rose-Hulman Undergraduate Mathematics Journal*
- Conferences** Co-organizer, *First Annual Texas Topology and Geometry Undergraduate Conference*, The University of Texas at Austin (February 2013)

Teaching Experience

- 2017–present **Postdoctoral Research and Teaching Assoc.**, *Univ. of Georgia*, Athens, GA.
- Graduate Topics Course: Theory of Trisections (Fall 2018)
 - Pre-Calculus (Fall 2018, Fall 2017)
- 2014–2016 **Zorn Postdoctoral Fellow**, *Indiana University*, Bloomington, Indiana.
- Topics in Euclidean Geometry for Teachers (Fall 2015)
 - Introduction to Mathematical Proof for Teachers (Spring 2015)
 - Calculus II (Fall 2014)
- 2010–2012 **Teaching Assistant**, *The University of Texas at Austin*, Austin, Texas.
- Topology (Fall 2011, Fall 2012)
 - Introduction to Proof (Spring 2011)
 - Introduction to Mathematics (Fall 2010)
 - Calculus III (Spring 2010)
- 2010–2013 **Instructor**, *Austin Community College*, Austin, Texas.
- Pre-Calculus (Fall 2013)
 - College Algebra (Spring 2012, Fall 2012, Spring 2013)
 - College Math (6 times, 2010–2011)
- 2007–2009 **Instructor**, *University of Nevada, Reno*, Reno, Nevada.
- Calculus I (Summer 2009)
 - Pre-Algebra (Summer 2008)
 - College Algebra (Fall 2007 & Spring 2008)

Service to the Profession

Referee

Geometry & Topology • *Transactions of the AMS* • *Proceedings of the AMS* • *Algebraic & Geometric Topology* • *Communications in Analysis and Geometry* • *Michigan Mathematical Journal* • *New York Journal of Mathematics* • *Rose-Hulman Undergraduate Mathematics Journal* • *Proceedings of Symposia in Pure Mathematics*
Reviewer: *Mathematical Reviews (MathSciNet)*

Seminar & Conference Organization

- Apr. 2018 Co-organizer, *Special Session: Trisections and Low-Dimensional Topology*, AMS Sectional Meeting, Northeastern University, Boston, MA
- Feb. 2018 Organizer, *Winter Trisectors Meeting*, University of Georgia, Athens, GA
- Mar. 2017 Co-organizer, *Trisections and Low-Dimensional Topology*, American Institute of Mathematics, San Jose, CA
- Oct. 2016 Co-organizer, *4-Manifolds and Knot Concordance*, Max Plank Institute for Mathematics, Bonn, Germany
- Apr. 2014 Co-organizer, *12th Graduate Student Topology and Geometry Conference*, The University of Texas at Austin
- Feb. 2013 Co-organizer, *First Annual Texas Topology and Geometry Undergraduate Conference*, The University of Texas at Austin
- Aug. 2012 Co-organizer and Presenter, *Becoming Effective Calculus TAs – A workshop for incoming graduate students*, The University of Texas at Austin

References

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Teaching References

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