

# Jeffrey Meier

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## Research Interests

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

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## 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.

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## 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

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## Grants & Awards

- 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*.

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## Publications

1. **Genus two trisections are standard.**  
with Alexander Zupan, *Geometry & Topology* 21 (2017) 1583-1630
2. **Bridge trisections of knotted surfaces in  $S^4$ .**  
with Alexander Zupan, *Trans. of the Amer. Math. Soc.* 369 (2017) 7343-7386
3. **A note on cabled slice knots and reducible surgeries.**  
*Michigan Mathematics Journal* 66(2) (2017) 269-276
4. **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
5. **Doubly slice knots with low crossing number.**  
with Charles Livingston, *New York Journal of Mathematics* 21 (2015), 1007-1026
6. **Fibered ribbon disks.**  
with Kyle Larson, *Journal of Knot Theory and Its Ramifications* 24 (2015), 1550066, pp. 22
7. **Distinguishing smoothly and topologically doubly slice knots.**  
*Journal of Topology* 8(2) (2015), 315-351
8. **Small Seifert fibered surgery on hyperbolic pretzel knots.**  
*Algebraic & Geometric Topology* 14(1) (2014), 439-487
9. **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

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## Preprints (Submitted for publication)

10. **Characterizing Dehn surgery on links via trisections.**  
with Alexander Zupan, arXiv:1707.08955 (July 2017)
11. **Trisections and spun 4-manifolds.**  
arXiv:1708.01214 (August 2017)
12. **Bridge trisections of knotted surfaces in 4-manifolds.**  
with Alexander Zupan, arXiv: arXiv:1710.01745 (October 2017)

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## 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

- Oct. 2017 *Cascade Topology Seminar*, University of Victoria, Berkeley  
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 *14<sup>th</sup> 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 *10<sup>th</sup> Graduate Student Topology and Geometry Conference*, Indiana University

### Seminar Talks

- Dec. 2017 *Geometry Seminar*, University of Virginia  
Oct. 2017 *Topology Seminar*, University of California, Berkeley  
Oct. 2017 *Topology Seminar*, University of California, Davis  
Mar. 2017 *Topology Seminar*, University of Georgia  
Dec. 2016 *Topology Seminar*, Max Plank Institute, Bonn, Germany  
Feb. 2016 *Topology Seminar*, Princeton University  
Dec. 2015 *Topology Seminar*, Georgia Tech University  
Oct. 2015 *Topology Seminar*, Boston College  
Apr. 2015 *Topology Seminar*, Oklahoma State University  
Mar. 2015 *Topology Seminar*, The University of Texas at Austin  
Feb. 2016 *Topology Seminar*, University of Nebraska, Lincoln  
Oct. 2015 *Topology Seminar*, The University of Texas at Austin  
Apr. 2014 *Topology Seminar*, California Institute of Technology  
Apr. 2013 *Topology Seminar*, University of Virginia  
Feb. 2013 *Topology Seminar*, University of California, Davis  
Dec. 2013 *Topology Seminar*, University of California, Santa Barbara  
Nov. 2013 *Topology Seminar*, Indiana University

### Colloquia

- Jan. 2017 *Colloquium*, Utah State University  
Feb. 2014 *Colloquium*, University of Nevada, Reno  
Nov. 2013 *Colloquium*, Sam Houston State University

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## 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. James, now a graduate student at UC Berkeley, and I are in the process of expanding and preparing our results for publication.
- 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.
- 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**
- As an IBL Teaching Assistant at UT Austin, I helped with organization and instruction in IBL classrooms. I also helped with the preparation of IBL course materials.
  - As an instructor at Indiana University, I taught two classes using the IBL methodology: Introduction to Proof and Topics in Euclidean Geometry. Both classes targeted pre-service math teachers.
- 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)

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## Teaching Experience

- 2017–present **Postdoctoral Research and Teaching Assoc.**, *Univ. of Georgia*, Athens, GA.
- Pre-Calculus (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)

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## 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* • **Reviewer:** *Mathematical Reviews (MathSciNet)*

### Seminar & Conference Organization

- 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, *12<sup>th</sup> 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
- Fall 2012 Organizer, *Junior Topology Seminar*, The University of Texas at Austin

### Outreach & Mentorship

See **Involvement in Undergraduate Education**, above.

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## References

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## Teaching References

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