Jack Calcut

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Employment

Oberlin College
Professor of Mathematics	*2021–24*
Chair of Mathematics	*2019–20, 2022–23*
Associate Professor of Mathematics	*2015–21*
Assistant Professor of Mathematics	*2010–15*

Michigan State University
Postdoctoral Instructor	*2008–10*

Mentor: Selman Akbulut

University of Texas at Austin
Postdoctoral Instructor	*2004–07*

Mentor: Bob Gompf

Education

University of Maryland
Ph.D. in Mathematics	*1999–04*

Advisor: Elmar Winkelnkemper

Michigan State University
B.S. in Mathematics	*1994–99*

Advisors: Lee Sonneborn and John Masterson

Primary Research Interests

Geometric topology, low-dimensional topology, and ends of manifolds.

Publications (Oberlin students in bold burgundy)

22. (with **L. Axon**) *The end sum of surfaces*, accepted in *Topology at Infinity of Discrete Groups*, Contemp. Math. volume in honor of Mike Mihalik, Amer. Math. Soc., Providence, RI, 2024, 37 pp.

21. (with R.M. Young) *Cones*, Mathematical Gazette **106** (2022), 549–550.

20. (with C. Guilbault and **P. Haggerty**) *Extreme nonuniqueness of end-sum*, Journal of Topology and Analysis **14** (2022), 461–503.

19. (with **J. Li**) *Artin presentations, triangle groups, and 4-manifolds*, Boletín de la Sociedad Matemática Mexicana **28** (2022), 15 pp.

18. (with R. Gompf) *On uniqueness of end sums and 1-handles at infinity*, Algebraic and Geometric Topology **19** (2019), 1299–1339.

17. (with **J. Metcalf-Burton**) *Double branched covers of theta-curves*, Journal of Knot Theory and Its Ramifications **25** (2016), 9 pp.

16. *Rational angled hyperbolic polygons*, The Mathematics Student **85** (2016), 103–111.

15. (with H.E. Winkelnkemper) *The explicit algebraic autonomy of Artin Presentation Theory and the Fox Calculus. I*, Boletín de la Sociedad Matemática Mexicana **22** (2016), 251–261.

14. (with **P. Haggerty**) *Connected sum at infinity and 4-manifolds*, Algebraic and Geometric Topology **14** (2014), 3281–3303.

13. (with **J. Metcalf-Burton**, **T. Richard**, and **L. Solus**) *Borromean rays and hyperplanes*, Journal of Knot Theory and Its Applications **23** (2014), 46 pp.

12. (with R. Gompf) *Orbit spaces of gradient vector fields*, Ergodic Theory and Dynamical Systems **33** (2013), 1732–1747.

11. (with H. King and L. Siebenmann) *Connected sum at infinity and Cantrell-Stallings hyperplane unknotting*, Rocky Mountain Journal of Mathematics **42** (2012), 1803–1862.

10. (with R. Gompf and J. McCarthy) *On fundamental groups of quotient spaces*, Topology and Its Applications **159** (2012), 322–330.

9. *Grade school triangles*, American Mathematical Monthly **117** (2010), 673–685.

8. (with J. McCarthy) *Discreteness and homogeneity of the topological fundamental group*, Topology Proceedings **34** (2009), 339–349.

7. *Gaussian integers and arctangent identities for π*, American Mathematical Monthly **116** (2009), 515–530.

6. *Torelli actions and smooth structures on 4-manifolds*, Journal of Knot Theory and Its Applications **17** (2008), 171–190.

5. *Artin presentations from an algebraic viewpoint*, Journal of Algebra and Its Applications **6** (2007), 355–367.

4. *Knot theory and the Casson invariant in Artin presentation theory*, Fundamentalnaya i Prikladnaya Matematika (Fundamental and Applied Mathematics) **11**, no. 4, L. V. Keldysh Memorial Proceedings, Moscow (2005) 119–126 (Russian); English translation in Journal of Mathematical Sciences (New York) **44** (2007), 4446–4450.

3. (with H.E. Winkelnkemper) *Artin presentations of complex surfaces*, Boletín de la Sociedad Matemática Mexicana **10**, Special Issue in honor of F. González-Acuña (2004), 63–87.

2. (with H. King) *Noncompact codimension-1 real algebraic manifolds*, Michigan Mathematical Journal **52** (2004), 361–373.

1. *Single rational arctangent identities for pi*, Pi Mu Epsilon Journal **11** (1999), 1–6.

In Preparation (Oberlin students in bold burgundy)

- (with **A. Du**) *Mazur and Jester 4-manifolds* (2024).
- (with **W. Bass**) *Ends and end-cohomology* (2024).
- (with C. Guilbault) *End-cohomology modules and end-sum* (2024).

Honors Students at Oberlin College

- William Bass, Reduced end cohomology (2022–23).
- Alexandra Du, Mazur and Jester 4-manifolds (2021–22).
- Liam Axon, End-spaces and end-sum of surfaces (2020–21).
- Tao Hong, The Dehn invariant of polyhedra (2019–20).
- James Cumberbatch, The Kakeya conjecture (2017–18).
- Jun Li, Artin presentations and closed 4-manifolds (2016–17).
- David Myers, Category theory (2015–16).
- Jules Metcalf-Burton, Double branched covers of theta-curves (2014–15).
- Taylor Richard, Geometric topology (2013–14).
- Patrick Haggerty, Connected sum at infinity and 4-manifolds (2012–13).
- Madhav Kaushish, Algebraic number theory (2010–11).

Selected Honors and Awards

- Co-principal investigator (with F. Ancel, G. Friedman, C. Guilbault, M. Moran, N. Sunukjian, F. Tinsley, and G. Venema) on NSF grant DMS-2350374 to partially fund *Workshops in Geometric Topology* (duration 5/01/2024–4/30/2027).
- Excellence in Teaching Award, Oberlin College (2014–15).
- Teaching Grant, Oberlin College (2011).
- VIGRE/NSF Dissertation Fellowship, University of Maryland (2004).
- Distinguished Teaching Assistant, University of Maryland (2000–01).
- Andree Award for article *Single rational arctangent identities for pi* from Pi Mu Epsilon Journal (1999).
- L.C. Plant Award for undergraduate research, Michigan State University (1999).

Teaching Service

- Ran study sessions for the GRE Mathematics Subject Exam at Oberlin College (2017–23).
- Coached elementary and middle school students (grades 5–8) for local GCCTM mathematics contest (2015–20).
- Honors Coordinator for Mathematics at Oberlin College (2017–19, 2020–23).
- Invited to write the *Four Colleges Mathematics Contest*—founded in 1976—for Denison University, Kenyon College, Ohio Wesleyan University, and Wittenberg University (2018–19). There were 11 teams of three students.
- Organized STEM activities for middle school students (2016).
- Organized STEM activities at Oberlin College for elementary school students (2016).
- Taught Discrete Mathematics at Lake Ridge Academy high school (2015).
- Honors examiner at Kenyon College (2015).

Selected Talks

- *Visual Proofs*, University of Puerto Rico Mayaguez Campus (virtual), Mathematics Colloquium, October 3, 2023.
- *Forty years of end sum*, University of Cincinnati, AMS Special Session on Ends and Boundaries of Groups: On the Occasion of Mike Mihalik's 70th Birthday, April 16, 2023.
- *Mazur and Jester 4-Manifolds*, Vanderbilt University, Geometry Seminar, March 2, 2023.
- *Mazur and Jester 4-Manifolds*, University of Maryland, Geometry-Topology Seminar, February 6, 2023.
- *Contractible 4-Manifolds and Knots in $S^1 \times S^2$*, George Washington University, Topology Seminar, November 3, 2022.
- *Mazur and Jester 4-Manifolds and Knots in $S^1 \times S^2$*, University of Wisconsin-Milwaukee, Topology Seminar, October 19, 2022.
- *Mazur and Jester 4-Manifolds*, Texas Christian University (virtual), 39th Annual Workshop on Geometric Topology, June 7, 2022.
- *Extreme Nonuniqueness of Connected Sum at Infinity*, University of Alabama at Birmingham, 53rd Annual Spring Topology and Dynamical Systems Conference, March 14, 2019.
- *End-sums of Manifolds*, University of Wisconsin-Milwaukee, Topology Seminar, October 22, 2018.
- *Visual Proofs*, Colby College, Mathematics Colloquium, February 29, 2016.
- *Connected Sum at Infinity*, The Ohio State University, December 9, 2014.
- *Connected Sum at Infinity and Nonuniqueness*, University of Wisconsin-Milwaukee, 31st Annual Workshop on Geometric Topology, June 13, 2014.
- *Connected Sum at Infinity*, University of Tennessee, Knoxville, Sectional Meeting of the American Mathematical Society, Special Session on Geometric Topology, March 21–23, 2014.
- (co-speaker with Margot Calcut) *Special Triangles from Ailles Rectangle and the Golden Triangle*, National Council of Teachers in Mathematics, Annual Meeting, Philadelphia, PA, April 27, 2012.
- *Artin Presentations*, University of South Florida, Sectional Meeting of the American Mathematical Society, March 11, 2012.
- *The Torelli Group, Donaldson's Theorem, and the Casson Invariant in Artin Presentation Theory*, The Ohio State University, November 18, 2010.
- *The Pullback Functor and Covering Spaces*, Dartmouth College, Colloquium, March 11, 2010.
- *Noncompact Codimension-1 Real Algebraic Manifolds*, Michigan State University, Topology Seminar, September 15, 2008.
- *Open Books and Smooth 4-manifolds*, Georgia Institute of Technology, Geometry-Topology Seminar, January 29, 2007.
- *Open Books and Manifolds of Dimension 3 and 4*, Kansas State University, Colloquium, January 11, 2007.
- *Connected Sum at Infinity and Hyperplane Unknotting*, University of Texas at Austin, Topology Seminar, April 3, 2006.
- *Relativity: Understanding Some Physical Principles, Mathematics, and Geometry*, University of Texas at Austin, Saturday Morning Math Group, October 8, 2005.
- *Artin Presentations*, Moscow State University, Russia, August 24–28, 2004.

Additional Items

- Co-organizer of the annual Workshop in Geometric Topology (founded in 1984), July 2023–present.
- Life Member of the Mathematical Association of America since 2003.
- Member of the American Mathematical Society, 2003–2019 and 2022–present.
- Associate Editor for The American Mathematical Monthly, 2018–2021.

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