Ryan C. Blair

CONTACT INFORMATION	Department of Mathematics California State University, Long Beach 1250 Bellflower Blvd Long Beach, CA 90840	*Voice:* (562) 985-5452 *Fax:* *E-mail:* ryan.blair@csulb.edu *WWW:* http://www.csulb.edu/∼rblair

RESEARCH INTERESTS

Low-Dimensional Topology, Geometry, Knot Theory, and Materials Science

EDUCATION

University of California, Santa Barbara

Ph.D. Mathematics, June 2010

- Dissertation Topic: "Bridge Number and Conway Products"
- Advisor: Martin Scharlemann

M.A., Mathematics, June 2006

University of California, San Diego

B.A., Mathematics, June 2004

EMPLOYMENT

California State University Long Beach

Associate Professor, 2019-Present

Assistant Professor, 2013-2019

University of Pennsylvania

Hans Rademacher Instructor of Mathematics, 2010-2013

GRANTS

- Co-PI for NSF Division of Materials Research PREM Grant 2021–2024
  "PREM: Cal. State Univ. Long Beach and Ohio State University Partnership for Education and Research in Hard and Soft Materials"
  Grant amount: $ 800,000.
- ORSP Multidisciplinary Research Grant 2020
- 2020/2021 PUMP-Undergraduate Research Group Grant 2020
- AIM SQuaREs Grant for "Studying knot concordance via branched covers of S^4" 2019-2021
- PI for NSF Division of Mathematical Sciences CDS&E-MSS Grant 2018–2021
  "CDS&E: RUI: Collaborative Research: Data-driven methods in classical knot theory"
  Grant amount: $ 149,676.
- 2016/2017 PUMP-Undergraduate Research Group Grant 2016
- CSULB RISCA reassigned time award 2016-2018, 2020-2021
- CSULB Proposal Incentive Grant 2016
- 2014/2015 PUMP-Undergraduate Research Group Grant 2014
- AIM SQuaREs Grant for "Applications of Thin Position to Uniqueness Problems" 2011-2013
- NSF-JSPS Fellowship to study at Nara Women's University with T. Kobayashi Summer 2009

<table>
<tr><td>Honors</td><td>• Distinguished Faculty RSCA Mentoring Award, CSULB</td><td>2023</td></tr>
<tr><td></td><td>• Good Teaching Award for Math 240, Penn Math Department</td><td>2012</td></tr>
<tr><td></td><td>• Good Teaching Award for Math 500, Penn Math Department</td><td>2011</td></tr>
<tr><td></td><td>• Graduate Student Teaching Award, UCSB Math Department</td><td>2009</td></tr>
<tr><td></td><td>• UCSB Doctoral Scholars Fellowship</td><td>2004-2008</td></tr>
<tr><td></td><td>• Raymond L. Wilder Award for Outstanding Achievement in Mathematics</td><td>2005</td></tr>
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PUBLICATIONS

1. *Alternating Augmentations of Links.*
   Journal of Knot Theory and its Ramifications, **18**: 67-73, 2009.

2. *Bridge Number and Conway Products.*
   Algebric & Geometric Topology **10**: 789-823 (electronic), 2010.

3. *Companions of the Unknot and Width Additivity.* (with M. Tomova)
   Journal of Knot Theory and its Ramifications, **20**: 497-511, 2011.

4. *A Decomposition Theorem for Higher Rank Coxeter Groups.* (with R. Ottman)
   Communications in Algebra, **20**: 2508–2518, 2013.

5. *Width is Not Additive.* (with M. Tomova)
   Geometry & Topology, **17**: 93-156, 2013.

6. *Bridge Number and Tangle Products*
   Algebric & Geometric Topology **13**: 1125-1141, 2013.

7. *High Distance Bridge Surfaces.* (with M. Tomova and M. Yoshizawa)
   Algebric & Geometric Topology **13**: 2925-2946 (electronic), 2013.

8. *Essential Surfaces in Highly Twisted Link Complements* (with D. Futer and M. Tomova)
   Algebraic & Geometric Topology **15**: 1501-1523 (electronic), 2015.

9. *Knots with Compressible Thin Levels* (with A. Zupan)
   Algebraic & Geometric Topology **15**:1691-1715 (electronic), 2015.

10. *A prime decomposition theorem for the string link monoid* (with R. Koytcheff and J. Burke)
    Journal of Knot Theory and its Ramifications, **24**: 1-24, 2015.

11. *Distance Two Links* (with M. Campisi, J. Johnson, S. Taylor, M. Tomova)
    Geometriae Dedicata, **7**: 1-21, 2015.

12. *Exceptional and cosmetic surgeries on knots* (with M. Campisi, J. Johnson, S. Taylor, M. Tomova)
    Mathematische Annalen, **367**: 581-622, 2017.

13. *Neighbors of knots in the Gordian graph* (with M. Campisi, J. Johnson, S. Taylor, M. Tomova)
    American Mathematical Monthly, **124**: 4-23, 2017.

14. *Dynamics of Embedded Curves by Doubly-Nonlocal Reaction-Diffusion Systems* (with James von Brecht)
    Journal of Physics A: Mathematical and Theoretical, **50**: 1-57, 2017.

15. *Twist Number and the Alternating Volume of Knots* (with H. Furlong and L. Rodriguez)
    Journal of Knot Theory and its Ramifications, **28**: 1950016, 2019.

16. *Idempotents in Tangle Categories Split* (with J. Sack)
    Journal of Knot Theory and its Ramifications, **28**: 1950025, 2019.

17. *Height, trunk and representativity of knots* (with M. Ozawa)
    Journal of the Mathematical Society of Japan, **71**: 1105-1121, 2019.

18. *The incompatibility of crossing number and bridge number for knot diagrams* (with A. Kjuchukova and M. Ozawa)
    Discrete Mathematics, **342**: 1966-1978, 2019.

19. *Wirtinger Systems of Generators of Knot Groups* (with A. Kjuchukova, R. Velazquez and P. Villanueva)
   Communications in Analysis and Geometry, **28**: 243-262, 2020.

20. *Distortion and Bridge Distance of Knots* (with M. Campisi, S. Taylor, M. Tomova)
   Journal of Topology,**13**: 669-682, 2020.

21. *Knots with Exactly 10 Sticks* (with T. Eddy, N. Morrison and C. Shonkwiler)
   Journal of Knot Theory and its Ramifications, **29**: 2050011, 2020.

22. *Coxeter groups and meridional rank of links* (with S. Baader and A. Kjuchukova)
   Mathematische Annalen, **379**: 1533-1551, 2021.

23. *The bridge number of arborescent links with many twigs* (with S. Baader, A. Kjuchukova and F. Misev)
   Accepted to Algebraic & Geometric Topology.

24. *A note on three-fold branched covers of S^4* (with P. Cahn, A. Kjuchukova and J. Meier)
   Accepted to Annales l'Institut Fourier.

25. *Kirby-Thompson distance for trisections of knotted surfaces* (with M. Campisi, S. Taylor, M. Tomova)
   J. London Math. Soc., **105**: 765-793, 2022.

26. *Three-dimensional Rep-tiles* (with Z. Marley, I. Richards)
   Accepted to Proceedings of the American Mathematical Society

27. *Self-replicating 3-manifolds* (with R. Lee)
   Accepted to Topology and its Applications

28. *Percolation and Dissolution of Borromean Networks* (with D. Ferschweiler and A. Klotz)
   Accepted to Physical Review E

SUBMITTED PAPERS

1. *Coxeter quotients of knot groups through 16 crossings* (with A. Kjuchukova and N. Morrison)
   Submitted

2. *Linear Polycatenanes from Kinetoplast Edge Loops* (with J. Ragotskie, N. Morrison, C. Stackhouse and A. Klotz)
   Submitted

TEACHING
EXPERIENCE

California State University Long Beach, *Assistant Professor*

- Honors Calculus I   F23
- Introduction to Mathematical Analysis I   S23
- Honors Calculus III   S21, S22, S23
- Honors Calculus II   F20, F21, F22
- Graduate independant study course in 3-manifold topology   Fall 2019
- Fundamental Concepts for Advanced Mathematics   Spring 2019
- Knot Theory [graduate]   S19, S21
- The Power of Mathematics   Fall 2018
- 3-Manifold Topology [graduate]   Spring 2017
- Knot Theory [graduate]   Fall 2016
- Differential Topology [graduate]   Spring 2016
- Algebraic Topology [graduate]   F14, S18, S22

- Graduate Research Seminar in Knot Theory   Fall 2014
- Undergraduate Research Seminar in Knot Theory   Fall 2014
- Point-set Topology [graduate]   S14, F17, F18, F20, F21, F23
- Knot Theory [undergraduate]   Spring 2014
- Algebraic Topology [graduate independent study]   Fall 2013
- Calculus II   F13, S15, S16, F16 and F17

University of Pennsylvania, *Hans Rademacher Instructor*
- 3-Manifolds and mapping class groups [graduate independent study]   Spring 2013
- 4-Manifolds and branched coverings [graduate independent study]   Spring 2013
- 3-Manifolds and branched coverings [graduate independent study]   Fall 2012
- The Geometry of Knots and 3-Manifolds [graduate independent study]   Spring 2012
- 3-Manifolds [graduate]   Spring 2013
- Calculus I   Spring 2013
- Point-set Topology   Fall 2011
- Calculus III   Spring 2011, Spring 2012, Fall 2012
- Differential Topology [graduate]   Fall 2010
- Introduction to Calculus   Fall 2010, Fall 2011

University of California, Santa Barbara, *Teaching Associate*
- Differential Equations and Linear Algebra, First Course   Summer 2006, Summer 2008
- Summer Transitional Enrichment Program   Summer 2006

INVITED TALKS

Fico Gonzlez-Acua's Low Dimensional Topology Seminar	May 2023
Claremont Topology Seminar	December 2019
AMS Special Session on Invariants of Knots and Spatial Graphs	November 2019
University of Buenos Aires Topology Seminar	July 2018
UCSB Topology Seminar	May 2018
CSULB Physics Colloquium	April 2018
Thursday lunch talk series at Smith College (funded by Center for Women in Mathematics) March 2018	
AMS Special Session on Alg. and Comb. Structures in Knot Theory	November 2017
UNL Groups-Semigroups-Topology Seminar	October 2017
UCSB Topology Seminar	May 2017
AMS Sectional on Decomposing 3-Manifolds, Brunswick, ME	September 2016
Colby College Mathematics Colloquium	September 2016
University of Wisconsin-Madison Topology Seminar	January 2016
Loyola Marymount colloquium	February 2015
Various Aspects of Classical Links II, Nara, Japan	December 2014
UCSB Topology Seminar	November 2014
CSUF Colloquium	September 2014
The Thin Manifold, University of Iowa	August 2014
Newcomb School Math and Science Club	May 2014

UCLA Topology Seminar	April 2014
Pitzer College Topology Seminar	April 2014
Mathematical Congress of the Americas, Guanajuato, Mexico	August 2013
Caltech Topology Seminar	June 2013
AMS Sectional on Topology of 3-Manifolds, Ames, IA	April 2013
CSU Long Beach Colloquium	February 2013
George Mason University Colloquium	February 2013
Washington and Lee University Colloquium	February 2013
Sam Houston State University Colloquium	February 2013
University of Iowa Colloquium	January 2013
University of Iowa Graduate Student Talk	January 2013
Williams College Colloquium	December 2012
Knots in Washington XXXV	December 2012
Five Part Lecture Series in the Philadelphia Area Contact / Topology Seminar	November 2012
UT Austin, Topology Seminar	April 2012
Brown University, Topology Seminar	April 2012
Columbia University, Geometric Topology Seminar	March 2012
UPenn, NSO Preceptorial on "The Mathematics of Shoelaces" September 2011,	September 2012
Penn Undergraduate Mathematics Society Lecture Series	April 2011
AMS Sectional on Geometry and Applications of 3-Manifolds, Worcester, MA	April 2011
Temple University, Geometry-Topology Seminar	March 2011
AMS Sectional Meeting on Thin Position, University of Iowa, Iowa City, IA	March 2011
CUNY Graduate Center, Geometry and Topology Seminar	March 2011
Knots in Washington XXXI	December 2010
Haverford, Colloquium	September 2010
University of Pennsylvania, Geometry and Topology Seminar	September 2010
University of Arkansas, Colloquium	November 2009
University of Arkansas, Topology Seminar	November 2009
CSU Channel Islands, Colloquium	October 2009.
JSPS Summer Program Closing Ceremonies, Tokyo, Japan	August 2009
Nara Women's University, Topology Seminar	August 2009
Nara Women's University, Five Part Lecture Series	June-July 2009
Bradley University, Colloquium	Novermber 2008
University of Iowa, Topology Seminar	November 2008
Mathematics Research Communities on *Teichmuller Theory*	June 2008
Claremont Colleges, Topology Seminar	March 2008
CSU Channel Islands, Colloquium	November 2006

SELECTED TALKS	The Summer Topology and its Applications Conference, Mankato, MN	July 2012
	UPenn Graduate Student Pizza Seminar	January 2012
	Temple University, Topology and Geometry Seminar	October 2011
	Nara Women's University, Topology Seminar	July 2009
	Informal Session of the International Georgia Topology Conference	May 2009

California Student Opportunity Program *I am going to college* lecture series	April 2008
UCSB, Topology Seminar	March 2007
UCSB, Topology Seminar	October 2006
UCSD, Quantum Topology in Dimension Four Seminar	June 2004

CONFERENCES ATTENDED	AMS Special Session on Invariants of Knots and Spatial Graphs, Riverside, CA	2019
	Topology in Dimensions 3, 3.5 and 4, Berkeley, CA	2018
	Southern California Topology Conference in honor of Jim Hoste, Claremont, CA	2018
	AMS Special Session on Alg. and Comb. Structures in Knot Theory, Riverside, CA	2017
	AMS Special Session on Decomposing 3-Manifolds, Brunswick, ME	2016
	Groups, geometry, and three-manifolds, UC Berkeley	2015
	Various Aspects of Classical Links II, Nara Women's University, Japan	2014
	The Thin Manifold, University of Iowa	2014
	The Mathematical Legacy of Bill Thurston, Cornell University	2014
	Triangulations Day, UCLA	2013
	Mathematical Congress of the Americas, Guanajuato, Mexico	2013
	AMS Special Session on Topology of 3-Manifolds, Ames, IA	2013
	Joint Mathematics Meetings	2013
	Knots in Washington XXXV	2012
	The Summer Topology and its Applications Conference, Mankato, MN	2012
	Redbud Topology Conference, Stillwater, OK	2012
	26th Annual Geometry Festival, Philadelphia, PA	2011
	AMS Special Session on Geometry and Applications of 3-Manifolds, Worcester, MA	2011
	AMS Special Session on Thin Position, Iowa City, Iowa	2011
	Knots in Washington XXXI	2010
	William Jaco 70th Birthday Conference, Stillwater, OK	2010
	Joint Mathematics Meetings	2010
	Simplicial Complexes Arising in Low-Dimensional Topology, Tokyo, Japan	2009
	Georgia International Topology Conference	2009
	Joint Mathematics Meetings	2009
	Mathematics Research Communities program, Snowbird, Utah	2008
	AMS Special Session, Claremont, CA	2008
	Joint Mathematics Meetings	2008
	Geometry and the Imagination (Thurston's 60th Birthday)	2007

SERVICE	CNSM College Council	2022-2024
	CNSM Professional Leave Committee	2022-2023
	Tenure Track Search Committee in applied/pure mathematics at CSULB	2022-2023
	GenExcel Faculty Mentor	2021-2022
	Dept. of Math. and Stat. RTP Committee	2021-2022
	Tenure Track Search Committee in applied mathematics/statistics at CSULB	2021-2022
	Dept. of Math. and Stat. Executive Committee	2020-2023

Dept. of Math. and Stat. RTP Committee	2020-2021
Mentor for a MAA Project NExT participant	2019-2020
Temporary chair of the Graduate Committee	Sp 2018
CNSM College Council	2017-2019
Pure Mathematics Graduate Advisor.	Sp 2018
Chair of Pure Math Committee	Sp 2018
Graduate Committee	2017-2022
Applied Math Committee at CSULB.	2016
Pure Math Committee at CSULB.	2016 - 2022
Pure math representative to the Undergraduate Committee at CSULB.	2016
Secretary of the Graduate Committee at CSULB.	2016

Served as Referee for: Mathematical Proceedings of the Cambridge Philosophical Society, Advances in Mathematics, Algebraic and Geometric Topology, Communications in Analysis and Geometry, Topology and its Applications, Pacific Journal of Mathematics, The American Mathematical Monthly, and Journal of Knot Theory and Its Ramifications.

Tenure Track Search Committee in applied mathematics at CSULB	2015
Served as reviewer for the U.S.-Israel Binational Science Foundation	2015
Juror for the CSULB Student Research Competition	2015
CNSM Scholarship Committee CSULB	2015
CNSM Grade Appeals Committee CSULB	2014
Chair of the Colloquium Committee at CSULB	2014
Outside member of the Math Education Committee at CSULB	2014
Secretary of the Pure Math Committee at CSULB	2014
Tenure Track Search Committee in pure mathematics at CSULB	2014
Math Day at the Beach Committee at CSULB	2014
Chair of the Colloquium Committee at CSULB	2013
Secretary of the Pure Math Committee at CSULB	2013-2016
Coorganizer of the Summer Topology and its Applications Conference, Mankato, MN	2012
Calculus III Curriculum Committee at UPenn	2012
Putnam Exam Committee at UPenn	2011
1880 Prize Exam Committee at UPenn	2011
Coorganizer of the Temple University Topology and Geometry Seminar	2011
Coorganizer of the 26th Annual Geometry Festival at UPenn	2011
Math Major Advising Committee at UPenn	2010, 2011, 2012
Graduate Advising Committee at UPenn	2010, 2011, 2012
Organizer of the Graduate Student Topology Seminar at UCSB	2007