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Last updated: September 2023

EDUCATION

2010 Ph.D., Mathematics, Stanford University, Stanford, CA
2005 B.S., Applied Mathematics, summa cum laude, Columbia University, New York, NY

EMPLOYMENT

2023 - present Associate Professor, University of Louisiana at Lafayette, Lafayette, LA
2017 - 2023 Assistant Professor, University of Louisiana at Lafayette, Lafayette, LA
2015 - 2017 Visiting Assistant Professor, University of Massachusetts Amherst, Amherst, MA
2013 - 2015 PIMS Postdoctoral Fellow, University of Victoria, Victoria, BC, Canada
2010 - 2013 NSF Postdoctoral Fellow, Brown University, Providence, RI

PUBLICATIONS

Published and accepted papers

15. Diagrams for primitive cycles in spaces of pure braids and string links. (With R. Komendarczyk and I. Volić.)
Accepted for publication in *Ann. Inst. Fourier*.
[arXiv:2106.11441](https://arxiv.org/abs/2106.11441)
14. Spaces of knots in the solid torus, knots in the thickened torus, and links in the 3-sphere. (With A. Havens.)
Geom. Dedicata 214 (2021), 671–737.
[arXiv:2008.03192](https://arxiv.org/abs/2008.03192)
13. Diagram complexes, formality, and configuration space integrals for spaces of braids. (With R. Komendarczyk and I. Volić.)
Q. J. Math. 71 (2020), no. 2, 729–779.
[arXiv:1805.09242](https://arxiv.org/abs/1805.09242)
12. Bott–Taubes–Vassiliev cohomology classes by cut-and-paste topology.
Internat. J. Math. 30 (2019), no. 10, 1950047, 64 pp.
[arXiv:1512.06654](https://arxiv.org/abs/1512.06654)
11. Milnor invariants of string links, trivalent trees, and configuration space integrals. (With I. Volić.)
Topology Appl., vol. 251 (2019), 47–69.
[arXiv:1511.02768](https://arxiv.org/abs/1511.02768)
10. Embedding calculus knot invariants are of finite type. (With R. Budney, J. Conant, and D. Sinha.)
Algebr. Geom. Topol., vol. 17, no. 3, 1701–1742 (2017).
[arXiv:1411.1832](https://arxiv.org/abs/1411.1832)

9. Homotopy string links and the κ -invariant. (With F. Cohen, R. Komendarczyk, and C. Shonkwiler.)
Bull. Lond. Math. Soc., vol. 49, no. 2, 246–260 (2017).
[arXiv:1504.03233](#)
8. Homotopy Bott–Taubes integrals and the Taylor tower for spaces of knots and links.
J. Homotopy Relat. Struct., vol. 11, no. 3, 443–467 (2016).
[arXiv:1102.2270](#)
7. A colored operad for string link infection. (With J. Burke.)
Algebr. Geom. Topol., vol. 15, no. 6, 3371–3408 (2015).
[arXiv:1311.4217](#)
6. A prime decomposition theorem for the 2-string link monoid. (With R. Blair and J. Burke.)
J. Knot Theory Ramif., vol. 24, no. 2, 24 pp. (2015).
[arXiv:1308.1594](#)
5. The Milnor triple linking number for string links by cut-and-paste topology.
Algebr. Geom. Topol., vol. 14, no. 2, 1205–1247 (2014).
[arXiv:1209.6381](#)
4. Configuration space integrals and the cohomology of the space of homotopy string links. (With B. Munson and I. Volić.)
J. Knot Theory Ramif., vol. 22, no. 11, 73 pp. (2013).
[arXiv:1109.0056](#)
3. A homotopy-theoretic view of Bott–Taubes integrals and knot spaces.
Algebr. Geom. Topol. vol. 9, no. 3, 1467–1501 (2009).
[arXiv:0810.1785](#)
2. Systematic identification of statistically significant network measures. (With E. Ziv, M. Middendorf, and C. Wiggins.)
Phys. Rev. E 71, 016110 (2005).
[arXiv:cond-mat/0306610](#)
1. Discriminative topological features reveal biological network mechanisms. (With M. Middendorf, E. Ziv, C. Adams, J. Hom, C. Levovitz, G. Woods, L. Chen, and C. Wiggins.)
BMC Bioinformatics 5:181 (2004).
[arXiv:q-bio/0402017](#)

Submitted preprints

2. Cacti, cubes, and framed long knots. (With Y. Zhang.)
[arXiv:2301.08858](#)
1. Graphing, homotopy groups of spheres, and spaces of links and knots.
[arXiv:2205.00635](#)

Works in preparation

2. Embedding thickness and configuration space integrals. (With R. Komendarczyk.)
1. Morse decompositions of spaces of unlinks. (With R. Kusner.)

Expository papers

1. An introduction to the mathematics of knots and links.
Pi in the Sky (Pacific Institute for Mathematical Sciences), Issue 18, Dec. 2014, pp. 11-15.
[Pi in the Sky Issue 18](#)

GRANTS, ACCEPTED PROPOSALS, FELLOWSHIPS, AWARDS

Louisiana Board of Regents Research Support Fund (BORSF), Research Competitiveness Subprogram (RCS) award, 2019 - 2022, "Algebraic structures and geometric phenomena in spaces of embeddings," \$137,644 total funding.

Co-author (with D. Sinha, R. Budney, and I. Volić) of accepted BIRS Proposal for a 21-participant workshop in Oct. 2019, "Spaces of embeddings: connections and applications."

PIMS Postdoctoral Fellowship, 2013.

NSF Postdoctoral Fellowship, 2010.

Centennial TA Award, Stanford University, 2009.

TEACHING EXPERIENCE**University of Louisiana at Lafayette**

- Real Analysis for undergraduates, Fall 2023
- Number Theory for undergraduates, Spring 2023
- Algebraic Topology I - II for graduate students, Fall 2021 - Spring 2022
- Graph Theory for undergraduates, Fall 2021
- Algebraic Topology reading course for undergraduates, Spring 2021
- Complex Variables for undergraduates, Spring 2020 and Spring 2021
- Topology for undergraduates, Fall 2020
- Linear Algebra for undergraduate math majors, Fall 2019 and Fall 2020
- Graduate reading courses on Vassiliev invariants, braids, configuration spaces, and the Jones polynomial, Fall 2019, Spring 2020, and Fall 2020
- Differential Topology I - II for graduate students, Fall 2018 - Spring 2019
- Topology I - II for graduate students, Fall 2017 - Spring 2018
- Calculus III, Fall 2019
- Survey of Calculus for business and life sciences, Fall 2017, 2018, 2022, and 2023

University of Massachusetts Amherst

- Junior-Year Writing for math majors, Spring 2016 and Spring 2017
- Linear Algebra for science and engineering, Spring 2016
- Calculus III, Fall 2015
- Calculus I, Fall 2016 (co-course-chair and instructor)

University of Victoria

- Calculus III, Fall 2014
- Calculus I, Fall 2013 and Spring 2015

Brown University

- Graduate reading course on Knot Theory, Fall 2010
- Calculus III, Fall 2011

Stanford University

- Applied Matrix Theory, a second course in linear algebra, Summer 2010
- TA for Honors Ordinary Differential Equations, Spring 2010
- TA for Linear Algebra & Multivariable Differential Calculus, Fall terms 2006 - 2009
- Wrote exercises for parts of a Multivariable Calculus textbook, Summer 2009
- Course Assistant for graduate Algebraic Topology, undergraduate Differential Geometry, undergraduate Theoretical Linear Algebra, and Multivariable Integral Calculus, 2005 - 2010

PRESENTATIONS

Research-related seminar, conference, and colloquium talks

On graphing and homotopy groups of spheres and spaces of links: Tulane U. (Apr. 2023) Notre Dame U. (Nov. 2022) New Developments in Four Dimensions, U. of Victoria (Jun. 2022); Texas Tech (Apr. 2022); Special session on Geometric Topology in the Middle Dimensions at the AMS Sectional Meeting, Purdue U. (Mar. 2022); UL Lafayette (Mar. 2022).

On integrals and diagrams for spaces of pure braids and string links: UL Lafayette (Sep. 2021); Tulane U. (Sep. 2021); South Central Topology Conference, Texas A & M (Sep. 2021)

On spaces of knots in the solid torus and irreducible links in the 3-sphere: Knots in Washington XLIX, George Washington U. (Feb. 2020).

On a Morse-theoretic approach to the space of unlinks: Knots and Braids in Norway, NTNU, Trondheim, Norway (May 2019).

On formality and integrals for spaces of braids: Manifolds, Groups, and Homotopy, Isle of Skye, Scotland (Jun. 2018); Graph Complexes, Configuration Spaces, and Manifold Calculus, UBC (May 2018); Tulane (May 2018); UMass Amherst (Apr. 2018); NC State (Mar. 2018); UL Lafayette (Feb. 2018).

On Bott-Taubes integrals and integer-valued cohomology classes in spaces of knots and links: Fields Institute, Toronto, Canada (Jul. 2019); UL Lafayette (Mar. 2017); UMass Amherst (Feb. 2017).

On homotopy string links, configuration space invariants, and spaces of link maps: AMS Sectional Meeting, special session on Algebraic and Combinatorial Structures in Knot Theory, UC Riverside (Nov. 2017); UL Lafayette (Oct. 2017); LSU (Oct. 2017); Women's Intellectual Network Research Symposium, Brown (Mar. 2017); West Chester U. (Feb. 2017); U. at Albany (Jan. 2017); U. of South Carolina-Upstate (Jun. 2016); NCA&T (May 2016); American U. in Bulgaria (Apr. 2016); Minn. State (Apr. 2016); U. of Maine Colloquium (Apr. 2016); Spring Topology and Dynamics Conference, Geometric Topology session, Baylor U. (Mar. 2016); UVic (Jan. 2016).

On finite-type invariants, the Taylor tower for the space of knots, and additive structures: University of Regina, Topology special session at the meeting of the Canadian Mathematical Society (Jun. 2019); Ohio State U. (Mar. 2019); U. at Albany (Apr. 2016); UMass Amherst (Oct. 2015); Tulane (May 2015); UL Lafayette (Feb. 2015); U. of Rochester (Nov. 2014); Manifolds, K-Theory, and Related Topics, Dubrovnik, Croatia (Jun. 2014); Stanford (Apr. 2014); UVic (Mar. 2014).

On the colored operad for string link infection and prime decomposition of string links: University of Regina, Topology Mini-Conference (Jun. 2019); Tulane (Oct. 2015); George Washington U. (Jan 2014); UBC (Nov. 2013); Cascade Topology Seminar, U. of Washington (Nov. 2013); UVic (Sep. 2013); Brown (Oct. 2012); Young Topologists Meeting, Copenhagen (July 2012); MIT (Apr. 2012); UVA (Mar. 2012); UMass Amherst (Mar. 2012); U. of Western Ontario (Feb. 2012).

On homotopy-theoretic Bott–Taubes integrals and the triple linking number for string links: Tulane (May 2013); Notre Dame (Feb. 2013); U. of Zürich (Jan. 2013); Binghamton U. (Dec. 2012); special session on Calculus of Functors at AMS National Meeting, Boston, MA (Jan. 2012);

On homotopy-theoretic Bott–Taubes integrals: Young Topologists Meeting, ÉPFL, Lausanne, Switzerland, (Jun. 2011); MIT (Nov. 2010); UPenn (Nov. 2010); Dartmouth (Oct. 2010); Northwestern (Oct. 2010); Georgia Topology Conference, UGA (May 2010); U. Oregon (Apr. 2010); UVic (Mar. 2010); Kansas State (Feb. 2010); Copenhagen (Jan. 2010); AMS Sectional Meeting, special session on Homotopy Theory and Higher Algebraic Structures, UC-Riverside (Nov. 2009); Graduate Student Topology Conference, U. Wisconsin (Apr. 2009); Stanford (Apr. 2008).

Expository talks for specialists

“An introduction to factorization homology,” UL Lafayette Topology Seminar (Sep. 2019)

“Spaces of diffeomorphisms and spaces of knots,” UL Lafayette Topology Seminar (Mar. 2019)

“Manifold-theoretic E_n operads,” UL Lafayette Topology Seminar (Oct. 2018)

“The Kontsevich integral and configuration space integrals,” UMass Amherst (Mar. 2016)

“ E_n -algebras and factorization homology,” UMass Amherst (Nov. 2015)

“Rational homology of spaces of long embeddings,” MIT Talbot Workshop, Mt. Hood, OR (Apr. 2015)

“Khovanov homology,” West Coast Algebraic Topology Summer School: Topological Field Theories, UBC (Jul. 2014)

“Lower K-theory invariants in geometric topology,” West Coast Algebraic Topology Summer School, Stanford (Jul. 2012)

“Morse Field Theory,” Quantum Field Theory Seminar, MIT (Aug. 2011)

“Orthogonal calculus,” Thursday Seminar, Harvard (Mar. - Apr. 2011)

“Cosimplicial models for spaces of knots,” Topology Progress Seminar, Stanford (Jan. 2009)

Talks for undergraduate or graduate students

“Much ado about knotting”: an introductory knot theory talk; presented to scholars in the LS-LAMP (Louis Stokes Louisiana Alliance for Minority Participation) program at UL Lafayette (Jan. 2021); in undergraduate math seminars at UMass Amherst (Apr. 2016); UVic (Jan. 2015); and Brown (Apr. 2011).

“Polyhedra: from Plato to present day”: a talk about Platonic solids in the undergraduate math seminar at UL Lafayette (Nov. 2018).

“Loop spaces, associahedra, and little cubes”: in undergraduate seminars at UMass Amherst (Apr. 2017) and Brown (Apr. 2013).

“An introduction to finite-type knot invariants”: in graduate student seminars at UConn (Nov. 2012); Northwestern (Oct. 2010); Kansas State (Feb. 2010); and Stanford (Sep. 2009).

SERVICE and OUTREACH

Graduate Council appointed member, Academic Year 2023-2024.

Supervising a research project for an undergraduate student (on probability and linking), Fall 2023.

Committee member, committee to review proposals for an internal \$10K grant for undergraduate research through the ADVANCE initiative at UL Lafayette, October 2022.

Extra-departmental consultant for the thesis project of a UL Lafayette graduate student in Architecture, Fall 2022.

Supervised a McNair Scholars Program student's project (on statistics of the PageRank algorithm applied to random networks), UL Lafayette, Spring 2021.

Committee member, Oral Exams for two Ph.D. students, UL Lafayette (Nov. 2020)

Inclusive Excellence Committee member, UL Lafayette (2020-present).

AWM (Association for Women in Mathematics) Committee member, UL Lafayette (2018 - present).

Undergraduate Curriculum Committee member, UL Lafayette (2020 - present).

Math Colloquium Committee member, UL Lafayette (2018 - 2021).

Volunteer, Louisiana/Mississippi MAA Sectional Meeting at UL Lafayette (Mar. 2018).

Organizer, Topology Seminar, UL Lafayette (Spring 2018, Spring 2019).

Co-organizer, Lloyd Roeling Topology Conference, UL Lafayette (Nov. 2017).

Diversity group member, UMass Amherst (2016 - 2017). Helped curate and edit student-designed biography posters of mathematicians, now on display to promote inclusiveness.

Participant, Western Massachusetts Mathematics Partnership (WMMP) Institute (Oct. 2016), attended by both K-12 and higher education professionals.

Faculty sponsor for the UMass Undergraduate Research Conference (Spring 2016).

Guest Editor for *Crux Mathematicorum* (2015). Selected and edited submitted solutions to nine problems over three issues.

Volunteer, two PIMS Math Mania events at local elementary schools, Victoria, BC, (2014 - 2015).

Referee (2012 - present) for *Algebraic & Geometric Topology* (5 papers), *The American Mathematical Monthly*, *Bulletin of the Belgian Mathematical Society*, *Geometry & Topology*, *Involve*, *Journal of Knot Theory and its Ramifications*, *Journal of Physics A: Mathematical and Theoretical*, *Journal of Topology & Analysis*, *Mathematische Zeitschrift*, *Pacific Journal of Mathematics*, and *The Royal Society of Edinburgh: Proceedings A*.

Co-organizer, Geometry/Topology Seminar, Brown University (2011 - 2013).

Undergraduate Academic Advisor, Brown University (2011 - 2013).

Committee Member, Topics Exam for a graduate student, Brown University (Feb. 2011).

TA Mentor, Stanford University (2009 - 2010).

Organizer, Graduate Student Colloquium, Stanford University (2006 - 2007).

SKILLS, LANGUAGES, and CERTIFICATIONS

ULearn Certified Online Teacher (UL Lafayette), earned during summer 2020.

Comfortable with MATLAB, Mathematica, and Python; some experience with C and Java.

Working knowledge of French and German.