

(last updated November 2017)

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## Personal Information

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## Education

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- Ph.D. in Mathematics      Brown University (advisor: Tom Goodwillie)      2003
  - B.A. in Mathematics      Boston University      1998
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## Positions Held

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- Professor      Wellesley College      2017–present
  - Theresa Mall Mullarkey Chair      Wellesley College      2015–2017
  - Associate Professor      Wellesley College      2011–2017
  - Assistant Professor      Wellesley College      2006–2011
  - Whyburn Research Instructor      University of Virginia      2003–2006
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## Visiting Positions

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- Visiting Researcher      University of Sarajevo      January–May 2018
  - Visiting Researcher      University of Virginia      January–May 2011
  - February–March 2010
  - Visiting Assistant Professor      MIT      July 2009–July 2010
  - Postdoctoral Researcher      Louvain-la-Neuve University, Belgium      June–August 2003
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## Publications

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### Papers:

1. *Graph complexes for braids, formality, and configuration space integrals*, with R. Komendarczyk and R. Koytcheff, in preparation.
2. *A streamlined proof of the convergence of the Taylor tower for embeddings in  $\mathbb{R}^n$* , with F. Šarčević, submitted.
3. *Low stages of the Taylor tower for  $r$ -immersions*, with B. Schreiner and F. Šarčević, submitted.
4. *Functors between Reedy model categories of diagrams*, with P. Hirschhorn, submitted.
5. *Milnor invariants of string links, trivalent trees, and configuration space integrals*, with R. Koytcheff, submitted.
6. *Configuration space integrals: bridging physics, geometry, and topology of knots and links*, to appear in Raoul Bott: collected papers. Vol. 5. Edited by Loring Tu, to be published by Springer.
7. *On volume-preserving vector fields and finite type invariants of knots*, with R. Komendarczyk, Ergodic Theory Dyn. Syst. 36 (2016), no. 3, 832–859.
8. *Cosimplicial models for spaces of links*, with B. Munson, J. Homotopy Relat. Struct. 9 (2014), no. 2, 419–454.

9. *Formality of the little  $N$ -discs operad*, with P. Lambrechts, Mem. Amer. Math. Soc. 239 (2014), no. 1079, 116 pp.
10. *Configuration space integrals and the cohomology of knot and link spaces*, Morfismos 17 (2013), no. 2, 1–56.
11. *Configuration space integrals and the cohomology of the space of homotopy string links*, with R. Koytcheff and B. Munson, J. Knot Theor. Ramif. 22 (2013), no. 11, 1–73.
12. *Multivariable manifold calculus of functors*, with B. Munson, Forum Math. Vol. 24 (2012), no. 5, 1023–1066.
13. *Real homotopy theory of semi-algebraic sets*, with R. Hardt, P. Lambrechts, and V. Turchin, Algebr. Geom. Topol. (11) (2011), 2477–2545.
14. *On the cohomology of spaces of links and braids via configuration space integrals*, Sarajevo J. Math., Vol. 6 (19) (2010), 241–263.
15. *The rational homology of spaces of long knots in codimension  $>2$* , with P. Lambrechts and V. Turchin, Geom. Topol. 14 (2010), 2151–2187.
16. *Associahedron, cyclohedron, and permutahedron as compactifications of configuration spaces*, with P. Lambrechts and V. Turchin, Bull. Belg. Math. Soc. Simon Stevin 17 (2010), 303–332.
17. *Coformality and rational homotopy groups of spaces of long knots*, with G. Arone, P. Lambrechts, and V. Turchin, Math. Res. Lett., 15 (2008), no. 1, 1–14.
18. *Calculus of functors, operad formality, and rational homology of embedding spaces*, with G. Arone and P. Lambrechts, Acta Math., 199 (2007), no. 2, 153–198.
19. *A survey of Bott-Taubes integration*, J. Knot Theor. Ramif., 16 (2007), no. 1, 1–43.
20. *Configuration space integrals and Taylor towers for spaces of knots*, Topology Appl., 153 (2006), no. 15, 2893–2904.
21. *Finite type knot invariants and calculus of functors*, Compos. Math., 142 (2006), 222–250.

#### **Books and Proceedings:**

1. *Group Actions*, in preparation.
2. *Calculus of Functors*, with G. Arone and M. Ching, in preparation.
3. *Manifolds,  $K$ -theory, and related topics. Proceedings of the conference held in Dubrovnik, Croatia, June 23–27, 2014*. Editor, joint with G. Arone, B. Johnson, P. Lambrechts, and B. Munson. To be published in January 2017 by Contemporary Mathematics.
4. *Cubical Homotopy Theory*, with B. Munson, New Mathematical Monographs, 25. Cambridge University Press, Cambridge, 2015, 625 pp.

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### **Research Interests**

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- Calculus of functors, spaces of embeddings and immersions, configuration space integrals, finite type invariants, Milnor invariants, rational homotopy theory

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## Selected Awards and Fellowships

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### External:

- Fulbright U.S. Scholar spring 2018
- Simons Foundation Five-Year Collaboration Grant 2015–2020
- NSF Division of Mathematical Sciences Grant 1205786 for project titled *RUI: Algebraic topology of knot and link spaces* 2012–2015
- NSF Division of Mathematical Sciences and Clay Mathematics Institute grants for the conference *Manifolds, K-theory, and related topics* held in Dubrovnik, Croatia 2014
- Simons Foundation Five-Year Collaboration Grant (declined due to incompatibility with an NSF grant) 2012
- NSF Division of Mathematical Sciences Grant 0805406 for project titled *RUI: Embedding spaces and generalizations of finite type invariants* 2008–2011
- NSF Division of Mathematical Sciences Grant 0504390 for project titled *Calculus of the embedding functor* 2005–2008

### Internal (Wellesley College):

- Brachman-Hoffman Fellowship 2015–17
- Travel grants and grants for inviting speakers 2006–present
- Brachman-Hoffman small grant for collaborative work 2008
- Grant for organizing and running the Wellesley Math Program for Women 2007

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## Graduate Student Advising

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- Franjo Šarčević (at the University of Sarajevo) 2015–present

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## Teaching Experience

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### Lower and mid-level courses:

- Calculus (all levels)
- Ordinary differential equations
- Linear algebra
- Number theory
- Combinatorics and graph theory
- Discrete mathematics
- Probability and statistics
- Real analysis
- Abstract algebra

### Upper level courses:

- Point-set topology
- Algebraic topology
- Galois Theory
- Algebraic geometry
- Advanced linear algebra
- Knot theory
- Cryptography
- Measure Theory and analysis on manifolds
- Group actions (Sylow theory, representation theory, homological algebra, module theory)

### Other teaching experience:

- Cryptography and privacy Created this course for Wellesley's First Year Seminar program. Focus on the mathematics as well as the government regulation of cryptography. A version of the class also taught earlier at UVA's prestigious Honors Program.
- How to think the calculus way Created this pre-college summer course for talented high school students; activities included group projects and research, presentations, essay assignments, film screenings, and guest lectures.
- MIT Splash math program Taught short courses on knot theory and topology for high school students.
- Wellesley Summer Math Program for Women Organized and taught in this program for graduate school-bound Wellesley math students; covered many advanced undergraduate and graduate topics.
- Independent studies, summer research, and senior theses Frobenius algebras and TQFTs, Khovanov homology and functor calculus, Hochschild homology, differential geometry, advanced ordinary differential equations, Markov chains, knot theory, NTRU cryptosystem, Tverberg conjecture, topological data analysis, manifold functor calculus.

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### Selected Seminar/Colloquium/Conference Talks

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| • UMass Geometry and Topology Seminar                        | Amherst, MA      | April 2017<br>October 2009                    |
| • American University (colloquium)                           | Dubai, UAE       | March 2017                                    |
| • MIT Topology Seminar                                       | Cambridge, MA    | December 2016<br>April 2014<br>September 2008 |
| • Amherst College Mathematics Colloquium                     | Amherst, MA      | April 2016                                    |
| • Sarajevo University (colloquium)                           | Sarajevo, Bosnia | March 2016                                    |
| • Universitat Autònoma Barcelona Topology Seminar            | Barcelona, Spain | January 2016                                  |
| • Combinatorial Constructions in Topology Conference         | Regina, Canada   | August 2015                                   |
| • Temple University Algebra Seminar                          | Philadelphia, PA | April 2015                                    |
| • Northeastern University Geometry and Combinatorics Seminar | Boston, MA       | March 2015                                    |
| • International University of Sarajevo BIT Camp              | Sarajevo, Bosnia | March 2015                                    |
| • Sarajevo University (colloquium and research talks)        | Sarajevo, Bosnia | March 2015                                    |
| • Belgrade University (colloquium and research talks)        | Belgrade, Serbia | March 2015<br>April 2014                      |
| • Boston University Geometry Seminar                         | Boston, MA       | October 2014                                  |
| • U.S. Naval Academy Colloquium                              | Annapolis, MD    | February 2014                                 |
| • Applied Topology Conference                                | Bedlewo, Poland  | July 2013                                     |
| • AMS Regional Meeting, Boston College                       | Boston, MA       | April 2013                                    |
| • Northwestern University Topology Seminar                   | Evanston, IL     | February 2013                                 |
| • University of Chicago Topology Seminar                     | Chicago, IL      | February 2013<br>April 2004                   |
| • Brown University Topology/Geometry Seminar                 | Providence, RI   | February 2013<br>November 2006                |
| • Tokyo University Topology Seminar                          | Tokyo, Japan     | December 2012                                 |
| • Shinshu University Topology Seminar                        | Shinshu, Japan   | December 2012                                 |
| • Dartmouth University Geometry and Topology Seminar         | Hanover, NH      | November 2012<br>November 2010                |
| • Operads and Configuration Spaces Conference                | Tunis, Tunisia   | June 2012                                     |

• International University of Sarajevo (colloquium and research talks)	Sarajevo, Bosnia	May 2012
• Tulane University Topology and Geometry Seminar	New Orleans, LA	April 2012
• Wesleyan University Topology Seminar	Middletown, CT	March 2012
• Configuration Spaces, Braids, and Applications Conference at Tulane U.	New Orleans, LA	January 2012
• California State University Channel Islands Graduate and Undergraduate Seminars	Channel Islands, CA	November 2011
• Claremont Topology Seminar	Claremont, CA	November 2011
• Louvain-la-Neuve University Topology Seminar	Louvain-la-Neuve, Belgium	May 2011 July 2004 June 2003
• University of Virginia Topology Seminar	Charlottesville, VA	February 2011 March 2010 January 2009
• University of Georgia Topology Conference	Athens, GA	May 2010
• Kansas State University (colloquium)	Manhattan, KS	April 2010
• Kansas State University Geometry and Topology Seminar	Manhattan, KS	April 2010
• Wellesley College Science Center Seminar	Wellesley, MA	February 2009
• MAA Regional Meeting	Waltham, MA	November 2008
• MSRI Conference on Diversity in Mathematics (invited panelist)	Berkeley, CA	October 2008
• AMS Regional Meeting at Wesleyan University	Middletown, CT	October 2008
• Third Arolla conference on algebraic topology	Arolla, Switzerland	August 2008
• University of Oregon Basic Notions Seminar	Eugene, OR	January 2008
• Johns Hopkins Topology Seminar	Baltimore, MD	November 2007
• Boston University Geometry Seminar	Boston, MA	April 2007
• VI Short Course in Algebraic Topology: Functor Calculus	Lens, France	June 2006
• Wesleyan University (colloquium)	Middletown, CT	February 2006
• Wake Forest University (colloquium)	Winston-Salem, NC	February 2006
• Purdue University (colloquium)	Lafayette, IN	February 2006
• Vassar College (colloquium)	Poughkeepsie, NY	February 2006
• University of Illinois at Urbana-Champaign (colloquium)	Urbana-Champaign, IL	January 2006
• AIM Workshop on Moduli Spaces of Knots	Palo Alto, CA	January 2006
• Union College Mathematics Conference	Schenectady, NY	December 2005 November 2003
• University of Georgia Topology Seminar	Athens, GA	November 2005
• Workshop in Homotopical Localization	Banff, Canada	April 2005
• Midwest Topology Seminar at Purdue University	Lafayette, IN	October 2004
• AMS Regional Meeting	Houston, TX	May 2004
• AMS Regional Meeting	Lawrenceville, NJ	April 2004
• Notre Dame University Topology Seminar	Notre Dame, IN	March 2004
• University of Rochester Topology Seminar	Rochester, NY	March 2004
• University of Toulouse Topology Seminar	Toulouse, France	June 2003
• Johns Hopkins University Topology Seminar	Baltimore, MD	May 2003
• UC Riverside Topology/Geometry Seminar	Riverside, CA	April 2003
• University of Southern California Topology Seminar	Los Angeles, CA	April 2003
• Claremont Colleges Topology Seminars	Claremont, CA	April 2003
• JAMI Conference on Primes and Knots at Johns Hopkins University	Baltimore, MD	March 2003

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## Professional Service

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- Wellesley mathematics department weekly student seminar founder and coordinator 2008–present, various semesters
- Referee for various journals 2007–present
- Wellesley College Math Department and Honors Committee member and examiner/outside member and examiner for other departments 2007–present
- Wellesley mathematics department colloquium organizer 2007–present, various semesters
- Reviewer for AMS Mathematical Reviews and Zentralblatt 2006–present
- First-year and math major advisor 2005–present
- Coorganizer of the 10th annual Days of Bosnian-Herzegovinian American Academy of Arts and Sciences in Jahorina, Bosnia-Herzegovina June 2018
- Coorganizer of the 10th annual meeting of the Bosnian-Herzegovinian American Academy of Arts and Sciences at Wellesley College October 2016
- Coorganizer of the conference in honor of Tom Goodwillie's 60th birthday in Dubrovnik, Croatia June 2014
- Coorganizer of the Special Session of Calculus of Functors at the 2012 Joint Meetings in Boston January 2012
- Coorganizer of the fall 2008 regional meeting of the MAA at Bentley University November 2008
- Organizer of the Wellesley College Summer Math Program for Women Summer 2007
- Coordinator, practice session leader, and administrator of the Putnam Competition 2003–06
- MAA's Project NExT fellow 2005–06
- Editor of the proceedings for the Oberwolfach functor calculus workshop 2004

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## Membership

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- Bosnian-Herzegovinian American Academy of Arts and Sciences (on the Board of Directors since 2015 and Treasurer since 2016)
- American Mathematical Society
- International Mathematical Union