

Matthew C. B. Zaremsky

CONTACT INFORMATION

Department of Mathematics
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APPOINTMENTS

University at Albany (SUNY), Albany, NY

Assistant professor, September 2017 to present

Cornell University, Ithaca, NY

Visiting assistant professor/visiting scholar, August 2016 to May 2017

Mentor: Justin Moore

Binghamton University, Binghamton, NY

Riley assistant professor (postdoctoral position), August 2013 to May 2016

Mentor: Matthew Brin

University of Münster, Münster, Germany

Visiting scholar, March 2013 to June 2013

Mentor: Linus Kramer

Bielefeld University, Bielefeld, Germany

Postdoctoral researcher, September 2011 to February 2013

Mentor: Kai-Uwe Bux

EDUCATION

University of Virginia, Charlottesville, VA

Ph.D. in Mathematics, May 2011. M.S. in Mathematics, May 2010

Advisor: Peter Abramenko

Kenyon College, Gambier, OH

B.A., *magna cum laude* with distinction in mathematics, May 2007

Majors: Mathematics and Physics. Minor: Philosophy

RESEARCH INTERESTS

Geometric group theory; topological properties of infinite groups

PUBLICATIONS

Published

1. (With R. Skipper and S. Witzel) Simple groups separated by finiteness properties. *Invent. Math.* Vol. 215 (2019), No. 2, 713–740. arXiv:1712.05361
2. (With C. Bleak, M. G. Brin, M. Kassabov and J. T. Moore) Groups of fast homeomorphisms of the interval. *J. Comb. Algebra.* Vol. 3 (2019), No. 1, 1–40. arXiv:1701.08321
3. (With S. Witzel) The Σ -invariants of Thompson's group F , via Morse theory. *Topological Methods in Group Theory*, London Math. Soc. Lecture Note Ser. Vol. 251, 173–194, Cambridge University Press, 2018. arXiv:1501.06682

4. On normal subgroups of braided Thompson groups. *Groups Geom. Dyn.* Vol. 12 (2018), No. 1, 65–92. arXiv:1403.8132
5. (With S. Witzel) Thompson groups for systems of groups, and their finiteness properties. *Groups Geom. Dyn.* Vol. 12 (2018), No. 1, 289–358. arXiv:1405.5491
6. Symmetric automorphisms of free groups, BNSR-invariants, and finiteness properties. *Michigan Math. J.* Vol. 67 (2018), No. 1, 133–158. arXiv:1607.03043
7. A user’s guide to cloning systems. *Topology Proc.* Vol. 52 (2018), 13–33. arXiv:1606.08762
8. On the Σ -invariants of generalized Thompson groups and Houghton groups. *Int. Math. Res. Not. IMRN.* Vol. 2017, Issue 19, 5861–5896. arXiv:1502.02620
9. Separation in the BNSR-invariants of the pure braid groups. *Publ. Mat.* Vol. 61 (2017), No. 2, 337–362. arXiv:1507.08597
10. (With L. Sabalka) On Belk’s classifying space for Thompson’s group F . *Forum Math.* Vol. 29 (2017), No. 3, 681–691. arXiv: 1306.6534
11. HNN decompositions of the Lodha–Moore groups, and topological applications. *J. Topol. Anal.* Vol. 8 (2016), No. 4, 627–653. arXiv:1410.8442
12. (With K.-U. Bux, M. Fluch, M. Marschler and S. Witzel) The braided Thompson’s groups are of type F_∞ . With an appendix by M. C. B. Zaremsky: Higher generation for pure braid groups. *J. Reine Angew. Math. (Crelle’s Journal)* Vol. 2016, Issue 718, 59–101. arXiv:1210.2931
13. (With S. Witzel) A free subgroup in the image of the 4-strand Burau representation. *J. Knot Theory Ramifications* Vol. 24 (2015), No. 12. arXiv: 1304.7923. (16 pages)
14. Division algebras and transitivity of group actions on buildings. *Adv. Geom.* Vol. 15 (2015), No. 2, 133–142. arXiv: 1105.1965
15. Rational homological stability for groups of partially symmetric automorphisms of free groups. *Algebr. Geom. Topol.* Vol. 14, Issue 3 (2014), 1845–1879. arXiv:1203.4845
16. (With R. McEwen) A combinatorial proof of the Degree Theorem in Outer space. *New York J. Math.* Vol. 20 (2014), 217–228. arXiv:0907.4642
17. Representatives of elliptic Weyl group elements in algebraic groups. *J. Group Theory.* Vol. 17 (2014), No. 1, 49–71. arXiv:1109.5487
18. (With M. Fluch, M. Marschler and S. Witzel) The Brin–Thompson groups sV are of type F_∞ . *Pacific J. Math.* Vol. 266 (2013), No. 2, 283–295. arXiv:1207.4832
19. (With A. Heald and M. Pearson; undergraduate publication) Waffles: Irreducible Representations of Metacyclic Groups. *Pi Mu Epsilon J.* Issue 13:2 (2010)
20. (With J. Holdener and L. Kennard; undergraduate publication) Generalized Thue–Morse sequences and the von Koch Curve. *Int. J. Pure Appl. Math.* Volume 47 (2008), No. 3

To appear

1. Commensurability invariance for abelian splittings of right-angled Artin groups, braid groups and loop braid groups. To appear, *Algebr. Geom. Topol.* arXiv:1705.07470. (14 pages)
2. (With S. Witzel) The Basilica Thompson group is not finitely presented. To appear, *Groups Geom. Dyn.* arXiv:1603.01150. (14 pages)

Submitted

1. Bestvina-Brady discrete Morse theory and Vietoris-Rips complexes. arXiv:1812.10976. Submitted, January 2019. (21 pages)
2. The BNSR-invariants of the Houghton groups, concluded. arXiv:1808.00634. Submitted, August 2018. (11 pages)
3. Geometric structures related to the braided Thompson groups. arXiv:1803.02717. Submitted, March 2018. (25 pages)
4. (With R. Skipper) Almost-automorphisms of trees, cloning systems and finiteness properties. arXiv:1709.06524. Submitted, November 2017. (44 pages)

Other

1. Rational homological stability for groups of symmetric automorphisms of free groups. arXiv:1111.6506. Subsumed by arXiv:1203.4845
2. (With P. Abramenko.) Some reductive anisotropic groups that admit no non-trivial split spherical BN -pairs. arXiv:1108.4913. Subsumed by independent work of G. Prasad: Weakly-split spherical Tits systems in pseudo-reductive groups. *Amer. J. Math.* Vol. 136 (2014), no.3, 807-832
3. (With P. Abramenko.) Strongly and Weyl transitive group actions on buildings arising from Chevalley groups. arXiv:1101.1113. Unpublished preprint
4. Ph.D. Thesis: Strong Transitivity and Weyl Transitivity of Group Actions on Affine Buildings. University of Virginia, 2011

SERVICE AND OUTREACH

- Steering committee, annual Spring Topology and Dynamics Conference, 2018-2021
- Co-organizer, 52nd annual Spring Topology and Dynamics Conference (chair of geometric group theory special session), Auburn, AL, March 2018
- Co-organizer, Algebra/Topology Seminar, University at Albany, 2018-present
- Department co-webmaster, University at Albany, 2018-present
- Faculty advisor, Cornell Math Explorer's Club (outreach for grades 8-12), 2016-2017
- Mathematics consultant, Mic.com and MEL magazine, 2016-present
- Faculty advisor for Binghamton Undergraduate Math Club, 2015-2016
- Assistant faculty advisor for Binghamton Undergraduate Math Club, 2014-2015
- Curriculum development and editing of departmental course textbook, Math 130 (Mathematics in Action), Binghamton University
- Reviewer for Mathematical Reviews (at least 28 reviews written)
- Referee for peer-reviewed journals, including *Amer. J. Math*, *Comm. Algebra*, *Forum Math*, *J. Amer. Math. Soc*, *J. Combin. Theory Ser. A*, *J. Group Theory*, *J. Pure Appl. Algebra*, *Pacific J. Math*, *Q. J. Math*, *Quantum Topol*, *Topology Proc*

TEACHING

University at Albany (SUNY), Albany, NY (2017–present)

- Instructor for AMAT 640: Introduction to Combinatorial Group Theory, fall 2019
- Instructor for AMAT 327: Elementary Abstract Algebra, fall 2019
- Instructor for AMAT 540B: Topology II, spring 2019
- Instructor for AMAT 220: Linear Algebra, spring 2019
- Instructor for AMAT 540A: Topology I, fall 2018

- Instructor for AMAT/TMAT 222: Honors Linear Algebra, fall 2018
- Instructor for AMAT 840: Topics in Topology (Geometric Group Theory), spring 2018
- Instructor for AMAT/TMAT 218: Honors Calculus of Several Variables, spring 2018
- Instructor for AMAT/TMAT 119: Honors Calculus II, fall 2017

Cornell University, Ithaca, NY (2016)

- Instructor for Math 1110: Calculus I (two sections), fall 2016

Binghamton University, Binghamton, NY (2013–2016)

- Independent study with undergraduate Eidan Maimoni, summer 2016
- Instructor for Math 603: Topics in Algebra (geometric group theory), spring 2016
- Instructor for Math 461: Topology I, fall 2015
- Instructor for Math 222: Calculus II, fall 2015
- Instructor for Math 404: Advanced Linear Algebra, spring 2015
- Instructor for Math 130: Mathematics in Action, spring 2014, fall 2014, spring 2015
- Instructor for Math 304: Linear Algebra, fall 2013
- Instructor for Math 371: Ordinary Differential Equations, fall 2013

Bielefeld University, Bielefeld, Germany (2011–2013)

- Instructor for graduate level course, “Linear Algebraic Groups,” winter 2012/2013
- Instructor for graduate level topics course, “Introduction to Buildings II,” spring/summer 2012
- Instructor for graduate level topics course, “Introduction to Buildings,” winter 2011/2012

University of Virginia, Charlottesville, VA (2007–2011)

- Instructor for Math 2310: Calculus III, summer 2011
- Instructor for Math 1320: Calculus II, spring 2010, spring 2011 and summer 2011
- Instructor for Math 1310: Calculus I, fall 2009
- Instructor for Math 121: Applied Calculus I, spring 2009
- Instructor for Math 122: Applied Calculus II, fall 2008
- Teaching Assistant for Math 117: The Art of Mathematical Thinking (fall 2007) and Math 132: Calculus II (spring 2008)

Kenyon College, Gambier, OH (2003–2007)

- Tutor for general math, physics, and computer science classes, 2005–2007

Other

- Tutor for high school math and physics, Champion Tutoring, Charlottesville, VA, 2009–2010
- Tutor for high school math, Charlottesville High School, Charlottesville, VA, 2008–2009
- Tutor for linear/abstract algebra, freelance, Charlottesville, VA, 2007–2011

INVITED TALKS

- Geometry and Topology Seminar, Binghamton University, August 30, 2018: “The Bieri-Neumann-Strebel-Renz invariants of the Houghton groups”
- Special Session on Topological Methods in Geometric Group Theory, 33rd Summer Conference on Topology and its Applications, Bowling Green, KY, July 17, 2018: “Simple groups separated by finiteness properties”
- Oberwolfach Workshop – Cohomological and Metric Properties of Groups of Homeomorphisms of \mathbb{R} , Oberwolfach, Germany, June 5, 2018: “Simple groups separated by finiteness properties”
- Mladen Bestvina’s Workshop on PL-Morse Theory, 52nd Annual Spring Topology and

- Dynamical Systems Conference, Auburn, AL, March 15, 2018:
 “PL-Morse theory and Thompson’s group F ”
- Geometric Group Theory and Topology Seminar, Tufts University, February 13, 2018:
 “Simple groups of type F_{n-1} but not F_n ”
 - Upstate Descriptive Set Theory and Group Theory Day, Binghamton University, November 28, 2017:
 “Almost-automorphisms of trees, self-similarity and finiteness properties of groups”
 - Geometric group theory seminar, McGill University, November 8, 2017:
 “Finiteness properties in the extended family of Thompson’s groups”
 - Mathematics, Computer Science and Statistics Department Seminar, SUNY Oneonta, October 6, 2017:
 “These are a few of my favorite groups”
 - Special Session on Geometric Group Theory, 2017 Fall Eastern Section AMS meeting, Buffalo, NY, September 16, 2017:
 “Virtual splittings of RAAGs over abelian subgroups, and abstract commensurability”
 - Special Session on Geometric Topology, 51st Annual Spring Topology and Dynamics Conference, Jersey City, NJ, March 8, 2017:
 “Bieri–Neumann–Strebel–Renz invariants of symmetric automorphism groups”
 - Algebra Seminar, University of Virginia, October 10, 2016:
 “Symmetric automorphisms of free groups and finiteness properties of certain subgroups”
 - Special Session on Geometric Group Theory, 2016 Fall Eastern Section AMS meeting, Brunswick, ME, September 24, 2016:
 “Symmetric automorphisms of free groups and finiteness properties of certain subgroups”
 - Topology & Geometric Group Theory Seminar, Cornell University, April 26, 2016:
 “Finiteness properties of some subgroups of the pure braid groups”
 - AMS Special Session on “What’s New in Group Theory?”, Joint Mathematics Meeting, Seattle, WA, January 6, 2016:
 “Finiteness properties of infinite groups, and examples in pure braid groups”
 - Special Session on Geometric Group Theory, 49th Annual Spring Topology and Dynamics Conference, Bowling Green, OH, May 15, 2015:
 “Sigma-invariants of generalized Thompson groups”
 - Geometry & Topology Seminar, Yale University, December 2, 2014:
 “HNN decompositions of Lodha–Moore groups, and topological applications”
 - Algebra/Topology Seminar, University at Albany, September 18, 2014:
 “Families of groups encoded into Thompson-esque limits”
 - Topological Methods in Group Theory (Ross Geoghegan 70th birthday conference), The Ohio State University, June 19, 2014:
 “Thompson groups for systems of groups, and their finiteness properties”
 - Zassenhaus Group Theory Conference, The Ohio State University, May 10, 2014:
 “Normal subgroups of braided Thompson groups”
 - Math Colloquium, Kenyon College, April 14, 2014:
 “These are a few of my favorite groups”
 - Special Session on Geometric Group Theory, 48th Annual Spring Topology and Dynamics Conference, Richmond, VA, March 13, 2014:
 “Connectivity properties of matching complexes of arcs on surfaces”
 - Algebra Seminar, University of Virginia, October 11, 2013:
 “Playing ping-pong on a euclidean building, and an application to the Burau representation”

- Topology & Geometric Group Theory Seminar, Cornell University, September 24, 2013: “Finiteness properties of Thompson-like groups”
- Seminar on groups and geometry, Bielefeld University, May 22, 2013: “Classifying spaces and cohomology rings for Thompson’s groups F and braided F ”
- Geometric group theory block seminar, Karlsruhe-Münster-Regensburg, September 27, 2012: “Borel density and CAT(0) lattices”
- Geometric group theory and model theory seminar, University of Münster, May 10, 2012: “Partially symmetric automorphisms of free groups”
- Topology & Geometric Group Theory Seminar, Cornell University, November 9, 2010: “Weyl transitive but not strongly transitive group actions on buildings”
- Special Session on Geometric Group Theory and Geometric Topology, 44th Annual Spring Topology and Dynamics Conference, Starkville, MS, March 18, 2010: “Weyl group representatives in Chevalley groups, and an application to buildings”
- Special Session on Lattices, Coxeter Groups, and Buildings, 2009 Fall Southeastern Section AMS meeting, Boca Raton, FL, November 1, 2009: “Chevalley groups and Weyl group representatives”

OTHER TALKS

- Colloquium, University at Albany, March 29, 2019: “Discrete Morse theory on Vietoris–Rips complexes”
- Algebra/Topology Seminar, University at Albany, September 13, 2018: “Finiteness properties of infinite simple groups”
- MAA Session on “The Creation and Implementation of Effective Homework Assignments”, Joint Mathematics Meeting, Atlanta, GA, January 7, 2017: “Grading more than just the final answer with an automated grading system: Benefits and pitfalls”
- Working seminar in geometric topology, Binghamton University: “Finiteness properties of groups and discrete Morse theory, Parts I and II” April 14-15, 2015
- Geometry and Topology Seminar, Binghamton University: “Finiteness properties of some subgroups of the pure braid groups” April 14, 2016
“The Σ -invariants of the generalized Thompson’s groups F_n ” March 26, 2015
“The Σ -invariants of Thompson’s group F , via Morse theory” March 19, 2015
“HNN decompositions of Lodha–Moore groups, and topological applications” November 13, 2014
“Finiteness properties of Thompson-like groups” October 3, 2013
- Math Club, Binghamton University, February 25, 2014: “Elementary matrix row reduction: When it works, when it doesn’t, and when nobody knows”
- Tea seminar for Kramer’s research group, University of Münster, April 23, 2013: “Playing ping-pong on a euclidean building”
- Buildings 2012 conference, University of Münster, October 1, 2012: “Higher generation for braid groups”
- Seminar on groups and geometry, Bielefeld University: “An approach of Bux and Wortman to non-finite presentability of the group $SL_2(\mathbb{Z}[t, t^{-1}])$ ” October 26, 2012

- “Higher generation for pure braid groups” October 19, 2012
- “Homological stability and partially symmetric automorphisms of free groups, parts I and II,” March 19-21, 2012
- Buildings 2011 conference, University of Münster, October 5, 2011:
 - “Some highly non-weakly transitive actions on buildings”
- Algebra Seminar, University of Virginia:
 - “Anisotropic groups and split BN-pairs,” February 23, 2011
 - “Weyl transitive but not strongly transitive group actions on buildings,” November 3, 2010
 - “Torsion properties of representatives of Weyl group elements in Chevalley groups,” February 24, 2010
- Binghamton University Graduate Conference in Algebra and Topology, Binghamton, NY:
 - “Finiteness properties of groups,” November 9, 2013
 - “Never hire a division algebra to work on a building,” November 6, 2010
 - “VRGD systems and affine buildings,” November 14, 2009
- Graduate Seminar, University of Virginia:
 - “Cramming fields into quaternion phone booths,” October 29, 2010
 - “The Chevalley Group: The Chevrolet of groups,” September 18, 2009
 - “Irreducible representations of metacyclic groups: The Waffle Method,” November 16, 2007
- Graduate Student Topology and Geometry Conference, Madison, WI, April 19, 2009:
 - “Buildings, from the ground up”
- Ohio Section MAA Fall Meeting, Muskingum, OH, October 27, 2006:
 - “Irreducible representations of metacyclic groups: The Waffle Method”

OTHER CONFERENCES ATTENDED

- (Upcoming) 54th Annual Spring Topology and Dynamics Conference, Murray, KY, March 2020
- (Upcoming) 53rd Annual Spring Topology and Dynamics Conference, Birmingham, AL, March 2019
- UNYTS – Upstate New York Topology Seminar, Albany, NY, November 2018
- Cornell Topology Festival, Ithaca, NY, May 2016
- Binghamton University Graduate Conference in Algebra and Topology, Binghamton, NY, November 2015
- Zassenhaus Group Theory Conference, Binghamton, NY, May 2015
- Binghamton University Graduate Conference in Algebra and Topology, Binghamton, NY, October 2014
- Joint Mathematics Meeting, Baltimore, MD, January 2014
- Locally compact groups beyond Lie theory, Spa, Belgium, April 2013
- Geometric Group Theory Summer School, Park City, UT, July 2012
- Topology and Groups, Berlin, Germany, June 2012
- Groups 2012 – A conference in honour of the 75th birthday of Bernd Fischer, Bielefeld, March 2012
- Young Geometric Group Theory Meeting, Bedlewo, Poland, January 2012
- Workshop on Arithmetic Groups and their Applications in Combinatorics, Geometry and Topology, Charlottesville, VA, April 2010
- Graduate Student Topology and Geometry Conference, Ann Arbor, MI, April 2010

- Joint Mathematics Meeting, New Orleans, LA, January 2007 (presented poster)

FELLOWSHIPS AND GRANTS

- Dissertation Fellowship - University of Virginia Math Department, Fall 2010
- Society of Fellows travel award, for travel to Spring Topology and Dynamics Conference, March 2010
- Government Assistance in Areas of National Need (GAANN) Fellowship, University of Virginia, 2007–2011
- National Merit Scholar; Distinguished Merit Scholarship; Ohio Academic Scholarship, 2003–2007

AWARDS AND HONORS

- GTA Teaching Award, Honorable Mention, University of Virginia, spring 2011
- GTA Teaching Award, Honorable Mention, University of Virginia, spring 2010
- Phi Beta Kappa, inducted May 2007
- Franklin Miller award for excellence in extracurricular research, Kenyon College, May 2007
- Reginald B. Allen award for excellence in mathematics, Kenyon College, April 2007

MEMBERSHIPS

- American Mathematical Society