

Matthew C. B. Zaremsky

CONTACT INFORMATION

Dept. of Mathematics
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EXPERIENCE

University at Albany (SUNY), Albany, NY

Assistant professor, starting August 2017

Cornell University, Ithaca, NY

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

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

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 L. Sabalka) On Belk's classifying space for Thompson's group F . *Forum Math*, Vol. 29, No. 3, 681–691, 2017. arXiv: 1306.6534
2. HNN decompositions of the Lodha–Moore groups, and topological applications. *J. Topol. Anal.* Vol. 8 (2016), No. 4, 627–653. arXiv:1410.8442
3. (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
4. (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)

5. Division algebras and transitivity of group actions on buildings. *Adv. Geom.* Vol. 15 (2015), No. 2, 133–142. arXiv: 1105.1965
6. 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
7. (With R. McEwen) A combinatorial proof of the Degree Theorem in Auter space. *New York J. Math.* Vol. 20 (2014), 217–228. arXiv:0907.4642
8. Representatives of elliptic Weyl group elements in algebraic groups. *J. Group Theory.* Vol. 17 (2014), No. 1, 49–71. arXiv:1109.5487
9. (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
10. (With A. Heald and M. Pearson; undergraduate publication) Waffles: Irreducible Representations of Metacyclic Groups. *Pi Mu Epsilon J.* Issue 13:2 (2010)
11. (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. A user’s guide to cloning systems. To appear, *Topology Proc.* arXiv:1606.08762. (12 pages)
2. Separation in the BNSR-invariants of the pure braid groups. To appear, *Publ. Mat.* arXiv:1507.08597. (21 pages)
3. On the Σ -invariants of generalized Thompson groups and Houghton groups. To appear, *Int. Math. Res. Not. IMRN.* arXiv:1502.02620. (30 pages)
4. (With S. Witzel) The Σ -invariants of Thompson’s group F , via Morse theory. To appear, proceedings of *Topological Methods in Group Theory: A conference in honor of Ross Geoghegan’s 70th birthday, London Math. Soc. Lecture Note Ser.* arXiv:1501.06682. (17 pages)
5. (With S. Witzel) Thompson groups for systems of groups, and their finiteness properties. To appear, *Groups Geom. Dyn.* arXiv:1405.5491. (50 pages)

Submitted

1. (With C. Bleak, M. G. Brin, M. Kassabov and J. T. Moore) Groups of fast homeomorphisms of the interval. arXiv:1701.08321. Submitted, January 2017. (32 pages)
2. Symmetric automorphisms of free groups, BNSR-invariants, and finiteness properties. arXiv:1607.03043. Submitted, July 2016. (25 pages)
3. (With S. Witzel) The Basilica Thompson group is not finitely presented. arXiv:1603.01150. Submitted, March 2016. (14 pages)
4. On normal subgroups of braided Thompson groups. arXiv:1403.8132. Submitted, April 2014. (21 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. Ph.D. Thesis: Strong Transitivity and Weyl Transitivity of Group Actions on Affine Buildings. University of Virginia, 2011

SERVICE AND OUTREACH

- Faculty advisor, Cornell Math Explorer's Club (outreach for grades 8-12), 2016-2017
- Mathematics consultant, Mic.com, 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
- Referee for peer-reviewed journals, including *Forum Math*, *J. Amer. Math. Soc*, *J. Pure Appl. Algebra*, *Q. J. Math*, *Quantum Topol*, *Topology Proc*

INVITED TALKS

- 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 Northeastern 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

- 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

- Oberwolfach Workshop – Cohomological and Metric Properties of Groups of Homeomorphisms of $\mathbb{R}$, Oberwolfach, Germany, June 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)

TEACHING

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

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