

THOMAS MICHAEL KOBERDA

Current as of April 21, 2012

1. PERSONAL DATA

- Born: November 4th, 1984, Evanston, IL, USA.
- Citizenship: USA.
- Email: koberda@math.harvard.edu
- Website: <http://math.harvard.edu/~koberda>

2. EDUCATION

- University of Chicago 2003 – 2007: Bachelor of Science in Mathematics with Honors.
- Harvard University 2007 – 2012: Master of Arts in Mathematics, 2008. Ph.D., 2012.
- Ph.D. Advisor: Curtis T. McMullen.
- Secondary Advisor (unofficial): Benson Farb

3. RESEARCH INTERESTS

- Topology and geometry in two and three dimensions
- Geometric group theory
- Mapping class groups
- Right-angled Artin groups

4. THESIS

- Title: *Mapping class groups, homology and finite covers of surfaces*
- Defense date: April 13, 2012.
- Thesis committee:
 - (1) Curtis T. McMullen
 - (2) Benson Farb
 - (3) Vaibhav Gadre

5. BIBLIOGRAPHY

- (1) Measurable sensitivity. Joint with J. James, K. Lindsey, C.E. Silva and P. Speh. *Proc. Amer. Math. Soc.* 136 (2008), no. 10, 3549–3559.
- (2) On ergodic transformations that are both weakly mixing and uniformly rigid. Joint with J. James, K. Lindsey, C.E. Silva and P. Speh. *New York Journal of Mathematics* 15 (2009) 393–403.
- (3) Asymptotic linearity of the mapping class group and a homological version of the Nielsen–Thurston classification. *Geom. Dedicata* (2012) 156:13–30.
- (4) Effective indices of subgroups in one–relator groups with free quotients. *Comm. Alg.* 39: 1–6, 2011.

- (5) Residual properties of fibered and hyperbolic 3-manifolds. Preprint.
- (6) Right-angled Artin groups and a generalized isomorphism problem for finitely generated subgroups of mapping class groups. Preprint.
- (7) Entropy of automorphisms, homology and the intrinsic polynomial structure of nilpotent groups. To appear in *Proceedings of the 2011 Ahlfors–Bers Colloquium*.
- (8) Faithful actions of automorphisms on the space of orderings of a group. *New York J. Math.* 17 (2011) 783–798.
- (9) Ping-pong lemmas with applications to geometry and topology. To appear in *Proceedings of the Institute for Mathematical Sciences, Singapore*.
- (10) Embedability between right-angled Artin groups. Joint with Sanghyun Kim. Preprint.
- (11) The action of mapping classes on nilpotent covers of surfaces. Preprint.
- (12) Teichmüller polynomials, Alexander polynomials and finite covers of surfaces. Preprint.
- (13) Large 3-manifolds without totally geodesic subsurfaces. Joint with Genevieve Walsh. In preparation.

6. RESEARCH COLLABORATORS

- Cesar E. Silva.
- Kathryn Lindsey.
- Peter Spéh.
- Jennifer James.
- Sang-hyun Kim.
- Genevieve Walsh.

7. OTHER WRITINGS (AVAILABLE ON WEBSITE)

- (1) Class field theory and the MKR dictionary for knots. Minor thesis, April 2008.
- (2) Notes on recent work of Dani Wise. Expository notes + new theorem which appears in newest version of “Residual properties of fibered and hyperbolic 3-manifolds”. December 2009.
- (3) Representations of Galois Groups on the Homology of Surfaces. Joint with A. Silberstein. Available at arXiv:0905.3002.
- (4) On some of the residual properties of finitely generated nilpotent groups. Available at arXiv:1002.3203.

8. AWARDS AND HONORS

- University Scholar, University of Chicago, all quarters.
- Dean’s List, University of Chicago, all quarters.
- Paul R. Cohen Memorial Prize, University of Chicago, 2007.
- NSF Graduate Research Fellowship, 2007.
- de Valpine Fellowship, Harvard University, 2010.
- Bok Center Teaching Award, Spring 2010.

9. CONFERENCES AND TALKS

- (1) Joint Mathematics Meetings. Presented item 2 from bibliography. New Orleans, LA. January 2007.
- (2) Topics in Teichmüller theory and Kleinian groups. MSRI Workshop. Berkeley, CA. November 2007.
- (3) Trivial Notions graduate student seminar. Invited talk: “Homology 3-spheres and Mapping Class Groups”. Harvard University, Cambridge, MA. May 2008.
- (4) Fifty Years Since Fox and Milnor: A conference on knot concordance in memory of Jerry Levine. Brandeis University, Waltham, MA. June 2008.
- (5) SMALL/Williams 20th anniversary reunion. Invited talk: “Dynamics and the geometrization of Haken manifolds”. Williams College, Williamstown, MA. June 2008.
- (6) Things You Can Do With $SL(2)$. Technion University, Haifa, Israel. September 2008.
- (7) Geometric Group Theory and Topology seminar at Tufts. Invited talk: “Homological representations of mapping classes”. Tufts University, Medford, MA. October 2008.
- (8) Trivial Notions graduate student seminar. Invited talk: “How to Abelianize Groups That Are Difficult to Abelianize”. Harvard University, Cambridge, MA. December 2008.
- (9) University of Michigan Topology Seminar. Invited talk: “Homological representation theory of the mapping class group”. Ann Arbor, MI. April 2009.
- (10) RTG Workshop on geometric group theory. University of Michigan. Ann Arbor, MI. April 2009.
- (11) Informal Dynamics and Geometry Seminar. Invited talk: “Braids and Their Dilatations: The Burau, Gassner and Bigelow Representations.” Harvard University. Cambridge, MA. May 2009.
- (12) Dynamics and Geometry of Teichmüller Space, honoring the 60th birthday of Howard Masur. CIRM, Luminy, France. June 2009.
- (13) Weil-Petersson Geometry. Central Connecticut State University, New Britain, CT. July 2009.
- (14) University of Maryland Geometry/Topology Seminar. Invited talk: “Homological representation theory of the mapping class group”. College Park, MD. September 2009.
- (15) Trivial Notions graduate student seminar. Invited talk: “When can we expect $K(G, 1)$ to be finite dimensional?”. Harvard University, Cambridge, MA. October 2009.
- (16) University of Chicago Geometry/Topology Seminar. Invited talk: “Homological representation theory of the mapping class group and residual properties of 3-manifold groups”. University of Chicago, Chicago, IL. October 2009.
- (17) Columbia University Geometry/Topology Seminar. Invited talk: “Homological representation theory of the mapping class group and residual properties of 3-manifold groups”. New York, NY. October 2009.

- (18) Geometric Group Theory and Topology seminar at Tufts. Invited talk: “Homological representation theory of the mapping class group and residual properties of 3-manifold groups”. Medford, MA. November 2009.
- (19) Wasatch Topology Conference. Invited talk: “Homological representation theory of the mapping class group and residual properties of 3-manifold groups”. Park City, UT. December 2009.
- (20) University of Michigan Topology Seminar. Invited talk: “Residual properties of 3-manifold groups”. Ann Arbor, MI. January 2010.
- (21) Yale University Geometry/Topology Seminar. Invited talk: “Residual properties of 3-manifold groups”. New Haven, CT. February 2010.
- (22) Worldwide Center of Mathematics. Invited talk: “Residual properties of 3-manifold groups”. Cambridge, MA. March 2010.
- (23) Informal Dynamics/Geometry Seminar, Harvard University. Invited talk: “Volumes of hyperbolic surface bundles”. Cambridge, MA. March 2010.
- (24) University of Virginia Algebra Seminar. Invited talk: “Residual properties of 3-manifold groups”. Charlottesville, VA. March 2010.
- (25) Western Sectional Meeting of the American Mathematical Society. Invited talk. Albuquerque, NM. April 2010.
- (26) Virtual properties of 3-manifolds. Montreal, QC, Canada. April 2010.
- (27) Workshop on pseudo-Anosovs with small dilatation. Invited talk. Madison, WI. April 2010.
- (28) Teichmüller Dynamics and Geometry Trimester Program Conference. Invited talk. Hausdorff Institute of Mathematics, Bonn, Germany. June 2010.
- (29) Geometry, Topology and Dynamics of Character Varieties. Invited talk. Institute for Mathematical Sciences, Singapore. July 2010.
- (30) Workshop on Geometric Group Theory, Satellite of the International Congress of Mathematicians. Invited talk. Goa, India. August 2010.
- (31) Tufts University Geometric Group Theory and Topology Seminar. Invited talk. Medford, MA. September 2010.
- (32) Scottfest: Scott Wolpert’s 60th birthday conference. College Park, MD. September, 2010.
- (33) Brown University Geometry/Topology Seminar. Invited talk. Providence, RI. October 2010.
- (34) Brandeis University Geometry/Topology Seminar. Invited talk. Waltham, MA. November 2010.
- (35) Joint Mathematics Meeting. Submitted paper session. New Orleans, LA. January 2011.
- (36) Southeastern Sectional Meeting of the American Mathematical Society. Invited talk. Statesboro, GA. March 2011.
- (37) Spring Topology and Dynamics Conference. Invited talk. Tyler, TX. March 2011.
- (38) Ahlfors–Bers Colloquium. Invited seminar talk. Houston, TX. March 2011.

- (39) Western Sectional Meeting of the American Mathematical Society. Invited talk. Las Vegas, NV. April 2011.
- (40) Workshop on Geometric Group Theory, Part II. Invited Talk. Louisiana State University, Baton Rouge, LA. July 2011.
- (41) Series of invited talks. KAIST, Daejeon, Korea. July and September 2011.
- (42) Series of invited talks. Chiang Mai University, Chiang Mai, Thailand. August 2011.
- (43) Invited talk, Suzhou University, Suzhou, China. August 2011.
- (44) Geometric topology and group theory seminar at Tufts. Invited talk. Medford, MA. November 2011.
- (45) University of Chicago Geometry/Topology Seminar. Invited talk. Chicago, IL. November 2011.
- (46) University of Illinois Urbana–Champaign Group Theory Seminar. Invited talk. Urbana, IL. November 2011.
- (47) Cornell University Dynamics Seminar. Invited talk. Ithaca, NY. December 2011.
- (48) Brown University Geometry/Topology Seminar. Invited talk. Providence, RI. December 2011.
- (49) Ohio State University Geometric Group Theory Seminar. Invited talk. Columbus, Ohio. December 2011.
- (50) Joint Mathematics Meeting. Special Session Invited talk. Boston, MA. January 2012.
- (51) Young Geometric Group Theory Meeting. Invited talk. Bedlewo, Poland. January 2012.
- (52) MPI Topology Seminar. Invited talk. Bonn, Germany. January 2012.
- (53) Informal Geometry and Dynamics Seminar, Harvard University. Invited talk. Cambridge, MA. February 2012.
- (54) UBC Topology Seminar. Invited talk. Vancouver, BC, Canada. February 2012.
- (55) Ordered Groups and Topology at BIRS. Banff, AB, Canada. February 2012.
- (56) Temple University Topology Seminar. Invited talk. Philadelphia, PA. February 2012.
- (57) Boston College Geometry and Topology Seminar. Invited talk. Boston, MA. April 2012.
- (58) Bloomington Geometry Workshop. Invited talk. Bloomington, IN. April 2012.
- (59) RTG Conference: Progress in Hyperbolic 3–manifolds. Invited talk. Ann Arbor, MI. May 2012.
- (60) Stanford Geometry and Topology Seminar. Invited talk. Palo Alto, CA. May 2012.

10. TEACHING EXPERIENCE

- Teaching Assistant, University of Chicago, Calculus, 2004 – 2005.
- Counselor, University of Chicago, Young Scholar’s Program, 2003 – 2005, 2006 – 2007.

- Grader, University of Chicago, honors calculus, elementary number theory, basic analysis, complex analysis, point-set topology, topics in geometry, set theory, 2005 – 2007.
- Course Assistant, Harvard University, Algebraic topology, 2008, 2009, 2011.
- Teaching Apprentice, Harvard University, Multivariable calculus, 2008.
- Tutorial, Harvard University, Combinatorial and Geometric Group Theory, spring 2010.
- Course Assistant, Harvard University, Algebraic Geometry, 2010.
- Multivariable Calculus Instructor, Harvard University, Fall 2010.

11. MEMBERSHIPS

- American Mathematical Society

12. PROFESSIONAL SERVICE

- Organizer of Trivial Notions graduate student seminar, Harvard University, 2008 – 2009.
- Refereed papers for: *Geometriae Dedicata*, *Journal of Pure and Applied Algebra*, *New York Journal of Mathematics*.
- Reviewer for *Mathematical Reviews*. Papers reviewed (reviews available on website):
 - (1) Richard Hain. Relative weight filtrations on completions of mapping class groups.
 - (2) Koji Fujiwara. Subgroups generated by two pseudo-Anosov elements in a mapping class group. I. Uniform exponential growth.
 - (3) R.B.J.T. Allenby, Goansu Kim, C.Y. Tang. Conjugacy separability of Seifert 3-manifold groups over non-orientable surfaces.
 - (4) Andrés Navas and Cristobál Rivas. Describing all bi-orderings on Thompson’s group F .
 - (5) Katija Lonza. Profinite completions and continuous extensions of morphisms between free groups and their profinite completions.
 - (6) Takao Satoh. On the fourth Johnson homomorphism of the automorphism group of a free group.
 - (7) Ilya Kapovich and Martin Lustig. Ping-pong and outer space.
 - (8) T. Banakh, J. Higes and I. Zarichnyi. The coarse classification of countable abelian groups.
 - (9) Louis Funar and Daniele Ettore Otera. On the wgs and qsf tameness conditions for finitely presented groups.
 - (10) Henry Wilton and Pavel Zalesskii. Profinite properties of graph manifolds.
 - (11) Nermin Salpeci. Real elements in the mapping class group of T^2 .
 - (12) Mahan Mj. Cannon–Thurston maps and bounded geometry.
 - (13) Marc Lackenby. Detecting large groups.
 - (14) Mohammad N. Abdulrahim and Madline Al-Tahan. On a class of irreducible representations of the braid group B_n .

- (15) Jon P. Bannon and Nicholas Noble. A note on nonresidually solvable hyperlinear one-relator groups.
- (16) Khalid Bou-Rabee. Parasurface groups.
- (17) Jon P. Bannon. A non-residually solvable hyperlinear one-relator group.
- (18) Tetsuya Ito. On finite Thurston-type orderings of braid groups.
- (19) Tetsuya Ito. A note on geometric constructions of bi-invariant orderings.
- (20) Nigel Boston and Jordan S. Ellenberg. Random pro- p groups, braid groups and random tame Galois groups.
- (21) Darren D. Long and Alan Reid. Grothendieck's problem for 3-manifold groups.
- (22) Jason Behrstock, Cornelia Druțu and Mark Sapir. Median structures on asymptotic cones and homomorphisms into mapping class groups.
- (23) Jason Behrstock, Cornelia Druțu and Mark Sapir. Addendum to Median structures on asymptotic cones and homomorphisms into mapping class groups.
- (24) Saeko Yamagata. The girth of convergence groups and mapping class groups.
- (25) Lior Bary-Soroker, Katherine F. Stevenson and Pavel A. Zalesskii. Subgroups of profinite surface groups.
- (26) Adam Clay. Exotic left-orderings of the free groups from the Dehornoy ordering.
- (27) Andrew Putman. Abelian covers of surfaces and homology of the level L mapping class group.
- (28) Isaac Goldbring. Ends of groups: a nonstandard perspective.
- (29) Martin R. Bridson. The rhombic dodecahedron and semisimple actions of $Aut(F_n)$ on $CAT(0)$ spaces.

13. REFERENCES

- Curtis T. McMullen. ctm@math.harvard.edu.
- Benson Farb. farb@math.uchicago.edu.
- Ursula Hamenstädt. ursula@math.uni-bonn.de.
- Mladen Bestvina. bestvina@math.utah.edu.
- Sang-hyun Kim. shkim@kaist.edu.
- Oliver Knill (Teaching reference). knill@math.harvard.edu.

14. MISCELLANEOUS

- Languages spoken: In decreasing competence: English (native), Polish (native), French, Mandarin.
- Music: Piano: 9 years of private instruction.