Curriculum Vitae of Igor Belegradek

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Education:

- Ph.D. in Mathematics, University of Maryland, College Park, August 1998.
- M.S. in Mathematics with distinction, Novosibirsk State University (Russia), June 1991.

PhD thesis work:

- Advisor: William M. Goldman.
- Thesis title: Counting negatively curved manifolds.

Research Interests:

Geometry and Topology; global Riemannian geometry and geometric group theory.

Positions:

- Professor at Georgia Institute of Technology, 2013-present.
- Associate Professor at Georgia Institute of Technology, 2008-2013.
- Assistant Professor at Georgia Institute of Technology, 2003-2008.
- Taussky–Todd Instructor at California Institute of Technology, 2000-2003.
- Postdoctoral Fellow at McMaster University, Canada, 1998-2000.
- Visiting at Bar-Ilan University, Israel, May 1999.
- Visiting at University of Bielefeld, SFB 343, Germany, January 1997.

Service:

- School of Mathematics REU coordinator (Fall 2010-2013, 2017).
- member of the Undergraduate Committee (Fall 2006-2008, Fall 2014-present).
- postdoc hiring committee (2016-present).
- Calculus and Linear algebra Revamp subcommitee (2014).
- member of the Graduate Committee (Fall 2013-Fall 2015), served as a secretary in 2013-2014.
- Academic Senate (Fall 2012-2014).
- member of Hiring Committee (Fall 2011-Spring 2012).
- member of junior P&T Committee (Fall 2011-Spring 2013).
- secretary of the Graduate Committee (Fall 2009-Spring 2011).
- member of the Faculty Advisory Committee (Spring 2005-Spring 2006).
- co-organizing (with J. Barnard, D. McReynolds, and I. Mineyev) the Geometric Group Theory on the Gulf Conference (G^3), each Spring 2008-2015, 2017, supported by NSF, \$25,000 per year.
- co-organized (with M. Ghomi) the Riemannian Geometry Special Session at Joint AMS Meeting in Atlanta, January 2005.
- reviewer for NSF and Mathematical Reviews.
- referee for Journal of Topology, Journal of Differential Geometry, Pacific Journal of Mathematics, Topology and Applications, Inventiones Mathematicae, Publications Mathématiques de l'IHÉS, Differential Geometry and Applications, Geometry Dedicata, Acta Mathematica, Groups, Geometry and Dynamics, Geometric and Functional Analysis, Collectanea Mathematica, Transactions of the AMS, Proceedings of the AMS, Advances in Mathematics, Buletin of the London Mathematical Society, Journal of Topology, Communications in Algebra, Indiana University Mathematics Journal, Michigan Mathematical Jornal, Communications in Analysis and Geometry, The Journal of Geometric Analysis, Advances in Geometry, Mathematische Annalen.

Grants and Awards:

- NSF Conference grant DMS-1360048, March 2014-February 2017, $75,000.
- NSF grant # DMS-1105045, August 2011-July 2015.
- NSF Conference grant DMS-1104098, March 2011-February 2014.
- NSF grant # DMS-0804038, August 2008-2011.
- NSF Conference grant DMS-0737851, March 2008-February 2011.
- NSF Grant # DMS-0503864, June 2005-2009.
- NSF Grant # DMS-0203979, June 2002-May 2006.
- University of Maryland Graduate School Fellowship, 1993–95.

Advising and Research mentoring:

- research mentor for Zixin Jiang (2015-2016 academic year).
- mentor for graduate student, Sergio Mayorga (2014-present).
- PhD advisor of Jing Hu (2010-2015, defended May 2015).
- PhD advisor of Eric Choi (Emory, defended November 2012).
- REU with Melanie Stam (Summer 2010).
- mentor for graduate student, Rebecca Wienarski (2008-2010).
- REU with Cindy Phillips (Summer 2008).
- mentor for VIGRE postdoc, Svetlana Krat (2006-2009).

Preprints (all submitted, and available at arXiv):

39. (with Zixin Jiang) Smoothness of Minkowski sum and generic rotations, 20 pages, to appear in J. Math. Anal. Appl,, DOI: 10.1016/j.jmaa.2017.01.088, 2016.

38. (with Taras Banakh) Spaces of nonnegatively curved surfaces, 26 pages, *to appear in J. Math. Soc. Japan*, 2015.

37. (with F. Thomas Farrell and Vitali Kapovitch) Space of nonnegatively curved metrics and pseudoisotopies, 29 pages, to appear in *J. Differential Geom.*, 2015.

36. Topology of open nonpositively curved manifolds, 50 pages, to appear in the proceedings of the ICM satellite conference (Bangalore, 2010) Geometry, Topology and Dynamics in Negative Curvature, London Math Society Lecture Notes series.

35. Degenerations of Riemannian manifolds (expository note containing two articles written for *Modern Encyclopedia of Mathematical Physics*), accepted, 11 pages, written in 2007.

Publications (all available at arXiv except #1, 2, 5):

34. (with T. Nguyen Phan) Non-aspherical ends and nonpositive curvature, 14 pages, *Transactions of the Amer. Math. Soc.*, **368** (2016), no. 8, 5363–5376

33. Open aspherical manifolds not covered by the Euclidean space, *Proceedings of the Amer. Math. Soc.*, **143** (2015), No. 8, 3641–3643.

32. (with S. Kwasik and R. Schultz) Codimension two souls and cancellation phenomena, *Advances in Math.* **275** (2015), 1–46.

31. (with Jing Hu) Connectedness properties of the space of complete nonnegatively curved planes, 16 pages, *Math. Annalen*, (2014), DOI 10.1007/s00208-014-1159-7.

30. Obstructions to nonpositive curvature for open manifolds, *Proc. Lond. Math. Soc.* **109** (2014), no. 3, 763–784.

29. An assortment of negatively curved ends, *J. Topol. Anal.* **5** (2013), no. 4, 439–449.

28. (with C. Hruska) Hyperplane arrangements in negatively curved manifolds and relative hyperbolicity, *Groups, Geom., Dyn.*, **7** (2013), 13–38.

27. (unrefereed) The space of complete nonnegatively curved metrics on the plane, *Obewolfach Report No.*, 01/2012, pp 18-19.

26. (with E. Choi and N. Innami) Rays and souls in von Mongoldt planes, *Pacific J. Math.*, **259** (2012), no 2, 279-306.

25. (with S. Kwasik and R. Schultz) Moduli spaces of nonnegative sectional curvature and non-unique souls, *J. Differential Geom.*, **89**(2011), no 1, 49-86.

24. Complex hyperbolic hyperplane complements, 35 pages, *Math. Annalen*, **353** (2012), no. 2, 545-579.

23. Rigidity and relative hyperbolicity of real hyperbolic hyperplane complements, *Pure Appl. Math. Q.* **8**(2012), no. 1, 15-52, Special Issue: In honor of Farrell-Jones.

22. Aspherical manifolds with relatively hyperbolic fundamental groups, *Geom. Dedicata* **129** (2007) no. 1, 119-144.

21. (with D. Osin) Rips construction and Kazhdan property (T), *Groups Geom. Dyn.* **2** (2008) no. 1, 1-12.

20. (with A. Szczepanski, and with appendix by O. V. Belegradek) Endomorphisms of relatively hyperbolic groups, *Internat. J. Algebra Comput.* **18** (2008) no. 1, 97-110.

19. Aspherical manifolds, relative hyperbolicity, simplicial volume, and assembly maps, *Algebr. Geom. Topol.* **6** (2006) 1341-1354.

18. (with V. Kapovitch) Classification of negatively pinched manifolds with amenable fundamental groups, *Acta Math.* **196** (2006), no. 2 , 229-260.

17. (with V. Kapovitch) Pinching estimates for negatively curved manifolds with nilpotent fundamental groups, *Geom. Funct. Anal.*, **15** (2005) no. 5, 929-938.

16. Nonnegative curvature, symmetry, and fundamental group, *Geom. Dedicata.* **106** (2004), no. 1, 169–184.

15. (with G. Wei) Metrics of positive Ricci curvature on bundles, *Int. Math. Res. Not.* (2004) no. 57, 3079–3096.

14. On co-Hopfian nilpotent groups, *Bull. London. Math. Soc..* **35** (2003), no. 6, 805–811.

13. Vector bundles with infinitely many souls, *Proc. Amer. Math. Soc.* **131** (2003), no. 7, 2217-2221.

12. Pinching surface groups in complex hyperbolic plane, *Geom. Dedicata.* **97** (2003), no. 1, 45–54

11. (with V. Kapovitch) Obstructions to nonnegative curvature and rational homotopy theory, *J. Amer. Math. Soc.* **16** (2003), 259-284.

10. (with G. Wei) Metrics of positive Ricci curvature on vector bundles over nilmanifolds, *Geom. Funct. Anal.* **12** (2002), no. 1, 56–72.

 9. On Mostow Rigidity for variable negative curvature, *Topology* **41** (2002), no. 2, 341–361.

8. (with V. Kapovitch) Topological obstructions to nonnegative curvature, *Math. Ann.* **320** (2001), 167–190.

7. (with V. Kapovitch) Finiteness theorems for nonnegatively curved vector bundles, *Duke Math. J.* **108** (2001), 109–134.

6. Pinching, Pontrjagin classes, and negatively curved vector bundles, *Invent. Math.* **144** (2001), no. 2, 353–379.

5. Lipschitz precompactness for closed negatively curved manifolds, *Proc. Amer. Math. Soc.* **127** (1999), 1201–1208.

4. Counting open negatively curved manifolds up to tangential homotopy equivalence, *J. Differential Geom.*, **50** (1998) 59–88.

3. Intersections in hyperbolic manifolds, *Geom. Topol.*, **2** (1998), 117–144.

2. Some curious Kleinian groups and hyperbolic 5-manifolds, *Transform. Groups*, **2** (1997), no. 1, 3–29.

1. Conformally flat Seifert manifolds, *Siberian Adv. Math.*, **3** no. 1 (1993), 1–18.

Teaching at Georgia Institute of Technology:

- Differential geometry I, Math 6455 (12 students, Spring 2017)
- Linear algebra, Math 1554 (189 students, Fall 2016)
- Algebraic Topology I, Math 6441 (9 students, Spring 2016)
- Differential geometry I Math 6455 (13 students, Spring 2015)
- Curves and surfaces Math 4441 (19 students, Fall 2014)
- Honors calculus Math 1512 (25 students, Fall 2014)
- Analysis II Math 4318 (22 students, Spring 2014)
- Analysis I Math 4317 (22 students, Fall 2013)
- Honors calculus Math 1512 (17 students, Fall 2013)
- Introduction to Algebraic Topology Math 4432 (3 students, Spring 2013)
- Honors calculus Math 1512 (41 student, Fall 2012),
- Complex Analysis Math 4320 (23 students, Fall 2012)
- Abstract Algebra I Math 4107 (32 students, Spring 2012)
- Calculus II Math 1502 (307 students, Fall 2011)
- Introduction to Geometry and Topology II Math 6458 (9 students, Spring 2011)
- ODE for undergraduates Math 2403 (145 students, Fall 2010)
- Introduction to Geometry and Topology I Math 6457 (16 students, Fall 2010)
- Differential geometry I Math 6455 (10 students, Spring 2010)
- Abstract Algebra I Math 4107 (31 students, Spring 2009)
- Calculus II Math 1502 (280 students, Fall 2008)
- Topology of Euclidean Spaces Math 6021 (3 students, Spring 2008)
- Calculus II Math 1502 (160 students, Fall 2007)
- Algebraic Topology for undergraduates Math 4432 (10 students, Spring 2007)
- ODE for undergraduates Math 2403 (137 students, Fall 2006)
- ODE for undergraduates Math 2403 (239 students, Spring 2006)
- Curves and surfaces Math 4441 (13 students, Fall 2005)
- ODE for undergraduates Math 2403 (35 students, Summer 2005, 2nd half)
- ODE for undergraduates Math 2403 (142 students, Spring 2005)
- ODE for undergraduates Math 2403 (31 students, Fall 2004)

- Atiyah-Singer index theorem, reading course, (1 student, Summer 2004)
- Morse theory Math 6453, (5 students, Spring 2004).
- General Topology Math 4431, (3 students, Fall 2003)

Teaching at California Institute of Technology:

- Characteristic Classes, (6 students, Spring 2003).
- Introduction to Topology, (20-25 undergrad students, Fall 2000, Fall 2001).
- Algebraic Topology, (10-15 students, Fall 2001, Winter 2001, Fall 2002).
- Differential Geometry, (20 undergrad students, Winter 2001).
- Supervision in a research project (SURF) (1 freshman, Summer 2002).

Teaching at McMaster University:

- Engineering Calculus (140 students, Spring 2000).
- Proof-oriented Linear algebra (65 students, Fall 1998).
- Calculus II, (100 students, Spring 1999).
- Introduction to Linear Algebra, (20 students, Fall 1999).

Teaching at the University of Maryland:

- Instructor for Precalculus (30 students, Fall 1995).
- TA for Calculus I (100 students, Spring 1995, Fall 1996).
- Instructor for Calculus II (30 students, Summer 1996, Summer 1997).
- TA for Calculus II (100 students, Fall 1997, Spring 1998).

Conference Talks:

- Minicourse, "Nonpositively curved groups and spaces" at University of Regensburg, September 2017.
- Oberwolfach Mini-Workshop: Spaces and Moduli Spaces of Riemannian Metrics, January 2017.
- AMS Joint meeting, Special Session "Group actions and geometric structures", Atlanta, January 2017.
- participant in "Reflections on Global Riemannian Geometry" in honor of Karsten Grove's 70th birthday, Townsend, August 2016.
- "Geometric Analysis, Metric Geometry and Topology" at Institut Fourier, Grenoble, June 2016.
- participant in MSRI Geometric flows and in Riemannian and Complex Geometry workshop, May 2016.
- plenary talk at 50th Spring Topology and Dynamical Systems Conference, Waco, TX, March 2016.
- participant in MSRI Modern Riemannian Geometry workshop, January 2016.
- Dubrovnik VIII, Geometric Topology, Geometric Group Theory and Dynamical Systems, June 2015.
- Bloomington Geometry Workshop, April 2014.
- Smoky-Cascade Geometry Conference March, 2014.
- Banff workshop, Metric Geometry, Geometric Topology and Groups, August 2013.
- Tuscon AMS meeting, Hyperbolic Geometry session, October, 2012.
- Geometry and Topology in Samos, in honor of Farrell, June 2012.
- Oberwolfach Mini-Workshop: Manifolds with Lower Curvature Bounds, January 2012.
- Special Session on Geometric Group Theory, Statesboro AMS meeting, March 2011.
- Geometry, Topology, and Dynamics in Negative Curvature, Bangalore, India, August 2010.
- Geometric Group Theory, Banach Center, Poland, June 2009.
- Curvature and Global Shape, Münster, Germany, June 2009.
- Workshop in Global Riemannian Geometry, Cuernavaca, Mexico, May 2008
- Metric geometry in Guangzhou, China, November 2007
- Workshop in Nonnegative Curvature, American Institute of Mathematics, September 2007
- Topological and Geometric Rigidity, Bunff, July 2007
- Topology, Geometry, and their interactions, Morelia January 2007.
- Combinatorial and geometric group theory, Nashville, May 2006
- Nanjing Workshop on Geometry and Analysis, Nanjing, June 2005

- Wasatch Topology Conference, Park City, June 2005
- Spring Topology Conference, Mt Berry College, March 2005
- Geometric Group Theory on the Gulf Coast Conference, Destin, November 2004.
- Special Session on Hyperbolic Manifolds, Nashville AMS meeting, Octover 2004
- Workshop on collapsing and metric geometry, Münster, August, 2004
- Geometry and Topology of Manifolds, McMaster University, May 2004.
- Special Session on Convergence of Riemannian Manifolds, Lawrenceville AMS meeting, April 2004.
- Pacific Northwest Geometry Seminar, Corvallis, November 2002.
- Russian-German Geometry meeting, St Petersburg, Russia, June 2002.
- Oberwolfach meeting *Differentialgeometrie im Großen*, June 2001.
- Southern California Topology Colloquium, Pasadena, May 2001.
- AMS meeting, session on *Ricci curvature and related topics*, Hoboken, April 2001.
- Ontario Topology seminar, Toronto, April 1999.
- Crystallographic Groups and their Generalizations II, Kortrijk, May 1999.
- Spring Topology Conference, Utah, March 1999.
- Nonpositive Curvature in Group Theory, Topology, and Geometry, Nashville, May 1998.
- AMS meeting, session on *Topology of Manifolds and Singular Spaces.*, Memphis, March 1997.

Seminar and Colloquium Talks:

- University of Pennsylvania, Geometry-Topology Seminar, October 2015.
- Binghamton University Colloquium, November 2012.
- Univerity of Bielefeld, Group theory Seminar, July 2012.
- Emory University, January 2011
- University of Southampton, Group Theory Seminar, June 2006
- Bilgi University, Group theory Seminar, May 2006
- University of Georgia, Geometry-Topology Seminar, April 2006
- University of Toronto, Geometry Seminar, March 2006, December 2008, November 2015.
- University of Notre Dame, Felix Klein Seminar, March 2006, October 2015.
- University of Illinois at Chicago, Geometry-Topology-Dynamics Seminar, November 2005, November 2009.
- University of Illinois at Urbana-Champaign, Group Theory Seminar, November 2005.
- Ohio State, Topology Seminar, October 2005.
- Georgia Tech, Geometry seminar, Fall 2003, Spring 2004, Fall 2005.
- University of Chicago, Geometry-Topology Seminar, April 2004, November 2005, November 2009, October 2015.
- University of California Irvine, Differential Geometry Seminar, April, 2002.
- University of Illinois at Urbana-Champaign, Colloquium, January 2002.
- University of California Davis, Colloquium, January 2002.
- Rutgers Univeristy, Colloquium, January 2002.
- Georgia Institute of Technology, Colloquium, December 2001.
- University of Southerna California, Topology seminar, November 2001.
- University of California Los Angeles, Topology and Geometry Seminar, April 2001, November 2015.
- University of California Riverside, Differential Geometry Seminar, November 2000, November 2015.
- University of California Santa Barbara, Differential Geometry Seminar, October 2000.
- California Institute of Technology, Topology Seminar, Fall-Winter 2000, March, October 2002.
- Novosibirsk Institute of Mathematics, Geometry Seminar, June 2000, June 2002, July 2006, July 2009.
- Courant Institute, Differential Geometry seminar, February 2000.
- Dartmouth College, Colloquim, February, 2000.
- University of Pennsylvania, Analysis-Topology seminar, November 1999.
- Hebrew University, Geometry seminar, May 1999.

- Bar-Ilan University, Colloquium, May 1999.
- McMaster University, Geometry seminar, Fall 1998, 1999
- University of Bonn, Geometry seminar, January 1997.
- University of Bielefeld, Hyperbolic Geometry seminar, January, 1997.
- University of Maryland, Geometry-Topology seminar, Fall 1996, 1997, 2005 (December).