University of Pennsylvania
David Rittenhouse Lab.
Department of Mathematics
209 South 33rd St
Philadelphia, PA, 19104-6395 USA
https://www.math.upenn.edu/∼rbettiol
✉ rbettiol@math.upenn.edu

Renato Ghini Bettiol

Curriculum vitae

Employment

2015 – present Hans Rademacher Instructor of Mathematics, University of Pennsylvania, Philadelphia, PA, USA
Fall 2016 Postdoctoral fellow, Max Planck Institute for Mathematics, Bonn, Germany

Education

2015 Doctor of Philosophy (Ph.D.) in Mathematics, University of Notre Dame, USA
2012 Master of Science (M.Sc.) in Mathematics, University of Notre Dame, USA
2010 Master of Science (M.Sc.) in Mathematics, University of São Paulo, Brazil
2008 Bachelor of Science (B.Sc.) in Mathematics (with honors), University of São Paulo, Brazil

Research interests

Differential Geometry, Geometric Analysis, Partial Differential Equations

Grants and fellowships

2016 – 2018 AMS-Simons Travel Grant ($4,000)
Aug 2016 NSF Geometric Analysis: Smoky Great Plains Geometry Conference 2016 (DMS-1630367, $39,812)
Fall 2014 NSF/ORAU support as a member of the American Delegation to the 2nd Heidelberg Laureate Forum
April 2013 NSF Geometric Analysis: Graduate Student Topology/Geometry Conference 2013 (DMS-1307681, $61,562)
2011 & 2012 Marilyn Jane Navari Fellowship, University of Notre Dame

Awards and honors

2016 Good Teaching Award, Department of Mathematics, University of Pennsylvania
2014 Member of the American Delegation to the 2nd Heidelberg Laureate Forum
2009 Graduation Prize for Excellence at Undergraduate Courses, University of São Paulo

Publications and Preprints

20. *Sectional curvature and Weitzenböck formulae* (with R. Mendes)
submitted, arXiv:1708.09033
19. *Teichmüller theory and collapse of flat manifolds* (with P. Piccione and A. Derdzinski)
Ann. Mat. Pura Appl., to appear, arXiv:1705.08431
18. *Infinitely many solutions to the Yamabe problem on noncompact manifolds* (with P. Piccione)
Ann. Inst. Fourier (Grenoble), to appear, arXiv:1603.07788
17. *Four-dimensional cohomogeneity one Ricci flow and nonnegative sectional curvature* (with A. Krishnan)
Comm. Anal. Geom., to appear, arXiv:1606.00778
16. *Three-manifolds with many flat planes* (with B. Schmidt)
Trans. Amer. Math. Soc. 370 (2018), no. 1, 669-693. arXiv:1407.4165
15. *Strongly positive curvature* (with R. Mendes)
Ann. Global Anal. Geom., to appear, arXiv:1403.2117
14. *Deformations of free boundary CMC hypersurfaces* (with P. Piccione and B. Santoro)
J. Geom. Anal. 27 (2017), no. 4, 3254-3284. MR 3708014, arXiv:1411.0354
13. *Strongly nonnegative curvature* (with R. Mendes)
Math. Ann. 368 (2017), no. 3-4, 971-986. MR 3673642, arXiv:1511.07899

12. *Four-dimensional manifolds with positive biorthogonal curvature*
Asian J. Math 21 (2017), no. 2, 391-396. MR 3672264, arXiv:1502.02270

11. *Delaunay-type hypersurfaces in cohomogeneity one manifolds* (with P. Piccione)
Int. Math. Res. Not. IMRN, 2016, no. 10, 3124-3162. MR 3551832, arXiv:1306.6043

10. *Bifurcation of periodic solutions to the singular Yamabe problem on spheres* (with P. Piccione and B. Santoro)
J. Differential Geom. 103 (2016), no. 2, 191-205. MR 3504948, arXiv:1401.7071

9. *Flag manifolds with strongly positive curvature* (with R. Mendes)
Math. Z. 280 (2015), no. 3-4, 1031-1046. MR 3369365, arXiv:1412.0039

8. *On the equivariant implicit function theorem with low regularity and applications to geometric variational problems* (with P. Piccione and G. Siciliano)
Proc. Edinb. Math. Soc. (2) 58 (2015), no. 1, 53-80. MR 3333978, arXiv:1009.5721

7. *Equivariant deformations of Hamiltonian stationary Lagrangian submanifolds* (with P. Piccione, B. Santoro)
Mat. Contemp. 43 (2014), 61-88. MR 3426257, arXiv:1302.6970

6. *Equivariant bifurcation in geometric variational problems* (with P. Piccione and G. Siciliano)
Progress in Nonlinear Differential Equations and Their Applications, Vol. 85 (2014), 103-133, Springer. MR 3330725, arXiv:1308.3268

5. *Deforming solutions of geometric variational problems with varying symmetry groups* (with P. Piccione and G. Siciliano)
Transform. Groups 19 (2014), no. 4, 941-968. MR 3278856, arXiv:1403.4275

4. *Positive biorthogonal curvature on* $S^2 \times S^2$
Proc. Amer. Math. Soc. 142 (2014), no. 12, 4341-4353. MR 3267002, arXiv:1210.0043

3. *Multiplicity of solutions to the Yamabe problem on collapsing Riemannian submersions* (with P. Piccione)
Pacific J. Math. 266 (2013), no. 1, 1-21. MR 3105774, arXiv:1304.5510

2. *Bifurcation and local rigidity of homogeneous solutions to the Yamabe problem on spheres* (with P. Piccione)
Calc. of Var. and PDEs 47 (2013), no. 3-4, 789-807. MR 3070564, arXiv:1107.5335

1. *Genericity of nondegenerate geodesics with general boundary conditions* (with R. Giambò)
Topol. Methods in Nonlinear Anal. 35 (2010), no. 2, 339-365. MR 2676821, arXiv:0910.4175

In preparation

1. *Multiplicity of constant Q-curvature metrics* (with P. Piccione and Y. Sire)

Book

1. *Lie Groups and Geometric Aspects of Isometric Actions* (with M. Alexandrino), Springer, 2015. MR 3362465

Invited talks

Dec 2017 Journée de Géométrie, Université Paris-Est Créteil, Paris, France. *Non-uniqueness of conformal metrics with constant Q-curvature*

Nov 2017 CUNY (Graduate Center), New York, USA, Geometric Analysis Seminar. *Sectional curvature and Weitzenböck formulae*

Oct 2017 University of Chicago, USA, Geometric Analysis Seminar. *Non-uniqueness of conformal metrics with constant Q-curvature*

Aug 2017 XXVII Southeast Geometry Seminar, Vanderbilt University. *Cohomogeneity one Ricci Flow and* $\sec \geq 0$

Aug 2017 Pacific Rim Mathematical Association Congress (Differential Geometry Session), Oaxaca, Mexico. *Non-uniqueness of solutions to the Yamabe problem*

Jul 2017 University of Münster, Germany, Workshop on Curvature and Global Shape. *Non-negative sectional curvature and Weitzenböck formulae*

Jun 2017 Dartmouth College, USA, Conference on Lie Group Actions in Riemannian Geometry. *Cohomogeneity one Ricci flow and nonnegative sectional curvature*

Jun 2017 Temple University, Philadelphia, USA, Graduate Student Conference in Algebra, Geometry, and Topology (Plenary Talk). *Deforming flat manifolds and flat orbifolds*

May 2017 Brown University, Providence, USA, Geometric Analysis Seminar. *Bifurcation of CMC Hypersurfaces*

Apr 2017 Temple University, Philadelphia, USA, Geometry Seminar. *Weitzenböck formulae and sectional curvature*

Apr 2017 Michigan State University, East Lansing, USA, 15th Graduate Student Topology and Geometry Conference (Young Faculty Session). *Weitzenböck formulae and sectional curvature*

Apr 2017 Dartmouth College, USA, Mathematics Colloquium. *Deforming flat manifolds and flat orbifolds*

Apr 2017 Dartmouth College, USA, Geometry and Topology Seminar. *Non-uniqueness results for the Yamabe and Q-curvature problems*

Mar 2017 Lafayette-Lehigh Geometry-Topology Seminar, Lafayette, USA. *Deforming flat manifolds and flat orbifolds*

Mar 2017 Lehigh University, USA, Geometry Seminar. *Ricci Flow and nonnegative sectional curvature*

Nov 2016 Leibniz Universität Hannover, Germany, Differentialgeometrie Oberseminar. *Ricci Flow and* $\sec \geq 0$

Nov 2016 Max Planck Institute for Mathematics, Bonn, Germany, Differentialgeometrie Oberseminar. *Some nonuniqueness results for the Yamabe problem*

Sep 2016 University of Parma, Italy, Workshop on Riemannian and Complex Geometry (in honor of F. Mercuri's 70th birthday). *Positive curvature and the Bochner technique*

Jul 2016 University of Münster, Germany, Oberseminar Differentialgeometrie. *Bifurcation theory in Geometry*

Apr 2016 Ohio State University, USA, Topology Seminar. *Multiplicity of solutions to the noncompact Yamabe problem*

Mar 2016 Princeton University, USA, Differential Geometry & Geometric Analysis Seminar. *New developments in strongly positive and nonnegative curvature*

Mar 2016 Fordham University, USA, Analysis Seminar. *Multiplicity of solutions to the noncompact Yamabe problem*

Nov 2015 Binghamton University, USA, Geometry-Topology Seminar. *Positive biorthogonal curvature in dimension 4*

Oct 2015 University of Maryland, USA, Geometry-Topology Seminar. *New developments in strongly positive curvature*

Oct 2015 Duke University, Durham, USA, Geometry-Topology Seminar. *Positive biorthogonal curvature in dimension 4*

Oct 2015 Johns Hopkins University, USA, Analysis and PDEs Seminar. *On the Singular Yamabe Problem on Spheres*

Sep 2015 University of São Paulo, Brazil, Geometry Seminar. *Rank rigidity in dimension 3*

Jul 2015 University of Münster, Germany, Workshop on Curvature and Global Shape. *Strongly positive curvature: homogeneous classification and some obstructions*

Apr 2015 University of Pennsylvania, Philadelphia, USA, Geometry-Topology Seminar. *Rank rigidity in dimension 3*

Mar 2015 AMS Sectional Meeting, East Lansing, USA. *On 4-manifolds with positive biorthogonal curvature*

Dec 2014 Stony Brook University, USA, Geometry/Topology Seminar. *Bifurcation of solutions to the Singular Yamabe problem on spheres*

Nov 2014 UT Austin, USA, Geometry Seminar. *Bifurcation of solutions to the Singular Yamabe problem on spheres*

Oct 2014 ICMAT Madrid, Spain, Geometry Seminar. *Strongly positive curvature*

Jun 2014 Karlsruhe Institute of Technology, Germany, Geometry Seminar. *Strongly positive curvature*

Apr 2014 University of Pennsylvania, Philadelphia, USA, Geometry-Topology Seminar. *Strongly positive curvature*

Mar 2014 Michigan State University, East Lansing, USA, Geometry seminar. *Bifurcation of CMC hypersurfaces in cohomogeneity one manifolds*

Oct 2013 CUNY (CCNY), New York, USA, Mathematics Colloquium. *Strongly positive sectional curvature*

Jun 2013 IMPA, Rio de Janeiro, Brazil, Geometry seminar. *On an intermediate condition between* $\mathrm{Ric} > 0$ *and* $\sec > 0$ *on* $S^2 \times S^2$

May 2013 University of São Paulo, Brazil, Geometry seminar. *Modified curvature operators and positive curvature*

Apr 2013 Boston University, USA, Geometry and Physics Seminar. *Bifurcating constant scalar curvature metrics on some Riemannian submersions*

Apr 2013 CUNY (Graduate Center), New York, USA, Differential Geometry Seminar. *On an intermediate condition between* $\mathrm{Ric} > 0$ *and* $\sec > 0$ *on* $S^2 \times S^2$

Nov 2010 University of Notre Dame, USA, Topology, Analysis and Geometry Seminar. *Geometric applications of an equivariant implicit function theorem*

May 2010 UFSCar, São Carlos, Brazil, Colloquium. *A few generic properties of semi-Riemannian geodesic flows*

Oct 2009 UFRGS, Porto Alegre, Brazil, Geometric Analysis Seminar. *Generic nondegeneracy properties of the semi-Riemannian geodesic flow*

Contributed talks

Aug 2017 Oberwolfach, Germany, Analysis, Geometry and Topology of Positive Scalar Curvature Metrics. *Non-uniqueness of solutions to the Yamabe problem on compact and noncompact manifolds*

Jun 2016 Oberwolfach, Germany, Geometrie Workshop. *Cohomogeneity one Ricci flow and nonnegative curvature*

Apr 2014 UT Austin, USA, 12th Graduate Student Geometry and Topology Conference. *Strongly positive curvature*

Nov 2013 Purdue University, USA, 72nd Midwest PDE Seminar. *Equivariant bifurcation in geometric variational PDEs*

Sep 2013 Notre Dame, USA, Graduate Student Seminar. *Basic bifurcation theory and geometric variational problems*

Aug 2013 MIT-RTG Workshop on Optimal Transport and Applications to Differential Geometry, Lake Tahoe, USA. *Optimal transport in Riemannian manifolds (following R. McCann)*

Apr 2013 MIT, Boston, USA, Workshop on Minimal Surfaces, 3-Manifold Topology and Related Topics. *Generalized Delaunay hypersurfaces*

Dec 2011 10th Pacific Rim Geometry Conference, Fukuoka, Japan. *Bifurcation and local rigidity of homogeneous solutions to the Yamabe problem on spheres*

Teaching experience

University of Pennsylvania, USA (Instructor)

Spring 2018 Calculus II, Differential Geometry

Fall 2017 Calculus II

Spring 2017 Calculus III, Topics in Riemannian Geometry (Graduate course)

Spring 2016 Linear Algebra II, Calculus I for the Wharton Business School - active learning format ("flipped classroom")

Fall 2015 Introduction to PDEs/Calculus IV

University of Notre Dame, USA (Teaching assistant, Grader)

Spring 2015 Riemannian geometry (Graduate course)

Fall 2014 Calculus I

Fall 2013 Calculus I (Instructor)

Fall 2012 Calculus II

Spring 2012 Calculus B for Life Sciences

University of São Paulo, Brazil (Teaching assistant)

Fall 2009 Calculus II

Spring 2008 Calculus I

Fall 2007 Calculus IV

Training and Certification

- *Good Teaching Award 2016*, Department of Mathematics, University of Pennsylvania
- *Striving for Excellence in College and University Teaching Certificate*, Kaneb Center for Teaching and Learning, University of Notre Dame, USA
- *Mathematics Teaching Seminar* (semester-long training program), University of Notre Dame, USA

Committee work and department service

2017-2018 Teaching Assistant Recruitment and Training Committees

2015-2017 Organizer of the Penn Graduate Student Geometry and Topology Seminar

2016-2017 Graduate Preliminary Exam Committee and Penn Math Club Committee

2015-2016 Penn Math Club Committee

Academic service

Referee service

- Arch. Math., Bull. Lond. Math. Soc., Calc. Var. PDEs, Comm. Anal. Geom., Differential Geom. Appl., J. Math. Phys., Michigan Math. J., Nonlinear Anal., Oxford University Press, Tohoku Math. J., Trans. Amer. Math. Soc.

Reviewer service

- Mathematical Reviews (MathSciNet), reviewer since 2015
- Zentralblatt Math (zbMATH), reviewer since 2011

Organization of events

- Co-organizer of the 3rd Smoky Great Plains Geometry Conference, "Reflections on Global Riemannian Geometry" (2016), in honor of Karsten Grove's 70th birthday
- Co-organizer of the 11th Graduate Student Geometry and Topology Conference (GSGTC 2013)

Memberships

- American Mathematical Society (AMS), member since 2010
- Brazilian Mathematical Society (SBM), member since 2007