

# Curriculum Vitae of Reto Buzano

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## Personal Information

Birth: 1980 in Switzerland as Reto Müller. Swiss Nationality.  
Civil Status: Married to Maria Buzano. Name change to Reto Buzano in 2015.  
Languages: Fluent in Swiss German, German, English and Italian.

## Expertise

Research: Nonlinear geometric partial differential equations, geometric analysis and the calculus of variations with main focus on geometric heat flows, minimal surfaces, and conformal geometry in higher dimensions.

Teaching: Lecture courses, tutorials, reading classes and seminars at all levels (for Bachelor, Master, and Ph.D. students, as well as postdocs) in mathematics and other sciences. Experience in teaching courses in English, Italian, and German.

## Education

May 05 – Apr 09 Ph.D. in Mathematics, ETH Zürich  
Thesis: Ricci flow coupled with harmonic map heat flow  
Advisor: Prof. Michael Struwe

Oct 00 – Apr 05 Diploma in Mathematics with distinction, ETH Zürich  
Thesis: Differential Harnack inequalities for parabolic equations  
Advisor: Prof. Michael Struwe

Aug 95 – Jan 00 Swiss Matura Type C (Mathematics and Natural Sciences), KZO  
Filiale Glattal, Dübendorf (as the best student of my year)

## Academic Employment

Apr 19 – Oct 19 Associate Professor in Geometry, Università degli studi di Torino  
Reader in Pure Mathematics, Queen Mary University of London

Oct 17 – Sep 19 Senior Lecturer in Pure Mathematics, Queen Mary University of London  
Sep 13 – Sep 17 Lecturer in Pure Mathematics, Queen Mary University of London  
Nov 11 – Aug 13 Junior Research Fellow, Imperial College London  
Aug 09 – Oct 11 Postdoctoral Research Fellow, Scuola Normale Superiore, Pisa  
Jan 10 – Mar 10 Postdoctoral Research Fellow, University of Warwick  
May 09 – Jul 09 Postdoctoral Assistant, ETH Zürich  
Apr 05 – Apr 09 Teaching Assistant, ETH Zürich  
Oct 02 – Mar 05 Tutor and Junior Assistant, ETH Zürich

## Grants (as Principal Investigator) and Awards

Sep 19 – Jul 21	UniTo Local Research Projects 2019, Linea A & B (EUR 2,898).
Sep 19 – Aug 22	QMUL Faculty of Science and Engineering Research Support Fund (GBP 60,000).
Jan 19 – Dec 21	EPSRC Standard Grant EP/S012907/1 (GBP 613,223).
March 2017	Fellow of the UK Higher Education Academy (FHEA).
Feb 15 – Feb 17	EPSRC First Grant EP/M011224/1 (GBP 100,521).
Nov 14 – Dec 14	Research in Pairs Grant from the London Mathematical Society (GBP 1,200).
Nov 11 – Oct 14	Imperial College Junior Research Fellowship (GBP 124,650).
November 2005	ETH Medal for outstanding Diploma Thesis <sup>1</sup> .

## Publications

- Articles and preprints<sup>2</sup>
- R. Buzano and L. Yudowitz, *Gaussian upper bounds for the heat kernel on evolving manifolds*, preprint 2020 (pp. 20, submitted), ArXiv:2007.07112.
  - R. Buzano and G. Di Matteo, *A local singularity analysis for the Ricci flow and its applications to Ricci flows with bounded scalar curvature*, preprint 2020 (pp. 36, submitted), ArXiv:2006.16227.
  - L. Ambrozio, R. Buzano, A. Carlotto, and B. Sharp, *Bubbling analysis and geometric convergence results for free boundary minimal surfaces*, **J. Éc. Polytech. Math.** 6 (2019), 621–664.
  - L. Ambrozio, R. Buzano, A. Carlotto, and B. Sharp, *Geometric convergence results for closed minimal surfaces via bubbling analysis*, preprint 2018 (pp. 16, submitted), ArXiv:1803.04956.
  - R. Buzano, R. Haslhofer, and O. Hershkovits, *The moduli space of two-convex embedded tori*, **Int. Math. Res. Not. IMRN** 2019, No. 2 (2019), 392–406.
  - R. Buzano and H. Nguyen, *The higher-dimensional Chern-Gauss-Bonnet formula for singular conformally flat manifolds*, **J. Geom. Anal.** 29, No. 2 (2019), 1043–1074.
  - R. Buzano, R. Haslhofer, and O. Hershkovits, *The moduli space of two-convex embedded spheres*, **J. Differential Geom.** (pp. 29, to appear), ArXiv:1607.05604.
  - R. Buzano and B. Sharp, *Qualitative and quantitative estimates for minimal hypersurfaces with bounded index and area*, **Trans. Amer. Math. Soc.** 370 (2018), 4373–4399.
  - R. Buzano and M. Rupflin, *Smooth long-time existence of Harmonic Ricci Flow on surfaces*, **J. Lon. Math. Soc.** 95 (2017), 277–304.
  - R. Buzano and H. Nguyen, *The Chern-Gauss-Bonnet formula for singular non-compact four-dimensional manifolds*, **Commun. Anal. Geom.** 27, No. 8 (2019), 1697–1736.
  - R. Haslhofer and R. Müller, *A note on the compactness theorem for 4d Ricci shrinkers*, **Proc. Amer. Math. Soc.** 143, No. 10 (2015), 4433–4437.
  - R. Haslhofer and R. Müller, *Dynamical stability and instability of Ricci-flat metrics*, **Math. Ann.** 360 (2014), 547–553.
  - C. Mantegazza and R. Müller, *Perelman’s entropy functional at Type I singularities of the Ricci flow*, **J. Reine Ang. Math. (Crelle)** 703 (2015), 173–199.
  - R. Haslhofer and R. Müller, *A compactness theorem for complete Ricci shrinkers*, **Geom. Funct. Anal.** 21 (2011), 1091–1116.
  - J. Enders, R. Müller, and P. Topping, *On Type I singularities in Ricci flow*, **Commun. Anal. Geom.** 19 No. 5 (2011), 905–922.
  - R. Müller, *Ricci flow coupled with harmonic map flow*, **Ann. Sci. Ec. Norm. Sup.** 45:1 (2012), 101–142.
  - R. Müller, *Monotone volume formulas for geometric flows*, **J. Reine Ang. Math. (Crelle)** 643 (2010), 39–57.
- Book
- R. Müller, *Differential Harnack inequalities and the Ricci flow*, **EMS Series Lect. Math.** (2006).

<sup>1</sup>Published in slightly revised and extended version as a book in the EMS Series of Lectures in Mathematics.

<sup>2</sup>Preprints of all my articles are available on the ArXiv.

## Invited Talks (Selection)

**Over 90 invited talks** in seminars, workshops and colloquia, at universities in Europe, North America, Australia, India, Korea, and Japan and major conference centres including BIRS (Banff), Centro De Giorgi (Pisa), Fields Institute (Toronto), Hausdorff Institute (Bonn), KIAS (Seoul), ICMS (Edinburgh), Institut Fourier (Grenoble), MFO (Oberwolfach), MSRI (Berkeley). The following is a list of **talks since 2017**:

- AG Geometrische Analysis, Karlsruher Institut für Technologie, Germany (Aug 11, 2020, *held online due to Covid-19*).
- 8<sup>th</sup> European Congress of Mathematics (8ECM), Portorož, Slovenia (Jul 5–11, 2020, *postponed due to Covid-19*).
- Workshop *Differential Geometry and Geometric Analysis*, Università degli studi di Firenze, Italy (Jun 29 – Jul 3, 2020, *postponed due to Covid-19*).
- Workshop *Contraintes de Courbure et Espaces des Métriques*, Université d'Avignon, France (Apr 22–24, 2020, *postponed due to Covid-19*).
- Workshop *Varietà reali e complesse: geometria, topologia e analisi armonica*, Scuola Normale Superiore di Pisa, Italy (Feb 27–29, 2020, *postponed due to Covid-19*).
- Workshop *Contraintes de Courbure et Espaces des Métriques*, Université Paul Sabatier Toulouse, France (Nov 27–29, 2019).
- Oberseminar Differentialgeometrie, Universität Münster, Germany (Oct 28, 2019).
- Giornata di conferenze introduttive, Università degli studi di Torino, Italy (Sep 19, 2019).
- Workshop *Geometric Analysis, Submanifolds and Geometry of PDE's*, Politecnico di Torino, Italy (Sep 9–13, 2019).
- Workshop *Geometric evolution problems and related topics*, University of Newcastle, Australia (Jan 14–18, 2019).
- Analysis Seminar, ETH Zürich, Switzerland (Dec 18, 2018).
- Seminar on Geometric Analysis and PDE, University of Cambridge, UK (Nov 26, 2018).
- Workshop *Ricci flow, mean curvature flow and related flows*, Universität Hamburg, Germany (Sep 3–6, 2018).
- Workshop *Geometric Analysis*, ICMS Edinburgh, UK (May 28–Jun 1, 2018).
- Geometry and Analysis Seminar, University of Oxford, UK (Jan 29, 2018).
- Journée De Géométrie, Université Paris-Est Créteil, France (Dec 11, 2017).
- Geometry Seminar, Université Libre de Bruxelles, Belgium (Dec 5, 2017).
- Workshop *Mean curvature flow and Ricci flow*, Fields Institute Toronto, Canada (Nov 6–10, 2017).
- AG Geometrische Analysis, Karlsruher Institut für Technologie, Germany (Jun 27, 2017).
- Seminar on Differential Geometry and Analysis, Universität Magdeburg, Germany (Apr 27, 2017).
- Workshop *Differential Geometry Days*, Università degli studi di Torino, Italy (Apr 5–7, 2017).
- Geometry Seminar, University of Leeds, UK (Mar 15, 2017).

## Organisation of Seminars, Schools and Workshops (Selection)

- Reading seminar *PDE & Geometric Analysis*, Queen Mary University of London (since 2017).
- *Geometric Analysis Days II*, Queen Mary University of London (Oct 2018, as main organiser).
- *Geometric Analysis Day*, Queen Mary University of London (Apr 2017, as main organiser).
- CIMPA Research school *On Geometric Flows*, Jadavpur University, India (Dec 2016).
- International workshop *Geometric Flows & Related Topics*, Queen Mary University of London (Jan 2016, as main organiser).
- Quarterly *Brussels-London Geometry Seminar* (since 2013).
- Research seminar *Geometry and Analysis*, Queen Mary University of London (2014–17).
- Research seminar *Geometry and Analysis*, Imperial College London (2012–13).
- Reading seminar *Topics in Geometric Analysis*, Imperial College London (2012–13).
- International workshop *Ricci Solitons Days*, Centro De Giorgi a Pisa (Apr 2011).
- Graduate reading seminar *Geometric Flows*, ETH Zürich (2007–08, as main organiser).
- Graduate colloquium, ETH Zürich (2005–06).

## Teaching Experience

### Lecture courses, mini-courses and tutorials:

- *Metodi Geometrici*, Università degli studi di Torino (UniTo), AY 2019/20 (BSc Math Finance).
- *Matematica II*, UniTo, AY 2018/19, 19/20 (BSc Chemistry).
- *Metric Spaces and Topology*, Queen Mary University (QMUL), AY 2017/18, 18/19 (BSc Math).
- Tutorials for *Metric Spaces and Topology*, QMUL, AY 2017/18, 18/19 (BSc Math).
- Tutorials for *Numbers, Sets and Functions*, QMUL, AY 2018/19 (BSc Math).
- *Convergence and Continuity*, QMUL, AY 2013/14, 14/15, 15/16, 16/17 (BSc Math).
- Tutorials for *Convergence and Continuity*, QMUL, AY 2013/14, 14/15, 15/16, 16/17 (BSc Math).
- Tutorials for *Differential and Integral Analysis*, QMUL, AY 2016/17 (BSc Math).
- Tutorials for *Mathematical Structures*, QMUL, AY 2013/14, 14/15, 16/17 (BSc Math).
- *The Singularity Formation in Mean Curvature Flow and Ricci Flow*, Research School Mini-Course, Jadavpur University Calcutta, Dec 2016 (PhD Students and Postdocs).
- *Third-Year/MSci Projects* (Lectures & Training Sessions), QMUL, AY 2014/15 (BSc & MSci Math).
- *Research Methods in Mathematical Sciences*, QMUL, AY 2014/15 (MSc/MSci Math).
- Tutorials for *Research Methods in Mathematical Sciences*, QMUL, AY 2014/15 (MSc/MSci Math).
- Tutorials for *Calculus III*, QMUL, AY 2013/14 (BSc Math).
- Tutorials for *Introduction to Algebra*, QMUL, AY 2013/14 (BSc Math).
- *Riemannian Geometry*, Imperial College London, AY 2012/13 (MSc/MSci Math).
- *The Formation of Singularities in the Ricci Flow*, Research School Mini-Course, Korea Institute for Advanced Study, Jan 2013 (PhD Students and Postdocs).
- *Convergence and Collapsing Results in Geometry*, Imperial College London (Oxford based TCC Course), AY 2012/13 (PhD Students and Postdocs).
- *Einstein Manifolds*, Università di Pisa, AY 2010/11 (MSc/MSci Math and PhD Students).
- Tutorials for *Analysis for Engineers*, ETH Zürich, AY 2008/09 (BSc Engineering).
- Tutorials for *Functional Analysis II*, ETH Zürich, AY 2007/08 (BSc Math/Phys).
- Tutorials for *Analysis I & II*, ETH Zürich, AY 2002/03, 03/04, 04/05, 06/07 (BSc Math/Phys).
- Tutorials for *Measure Theory*, ETH Zürich, AY 2005/06 (BSc Math/Phys).
- Tutorials for *Complex Analysis*, ETH Zürich, AY 2004/05 (BSc Math/Phys).

### Supervision of BSc and MSci theses:

- *The  $CAT(\kappa)$  condition is preserved under Gromov-Hausdorff limits*, Amina Assouda Ladjali, QMUL, AY 2017/18 (MSci Math).
- *Birkhoff's Curve Shortening Process*, Shazada Begum, QMUL, AY 2017/18 (MSci Math).
- *On Maximum Principles*, Sania Kibria, QMUL, AY 2016/17 (MSci Math).
- *Closed geodesics on Surfaces*, Maria Beresford, QMUL, AY 2014/15 (MSci Math).
- *Maximum Principles*, Chiagoziem Nwobodo, QMUL, AY 2014/15 (BSc Math).
- *Curve Shortening*, Tanjina Ali, QMUL, AY 2013/14 (MSci Math).
- *Non-collapsing in mean convex mean curvature flow*, Lewis Smith, Imperial College London, AY 2012/13 (MSci Math).

## Supervision of PhD Students

- Louis Yudowitz, Project: *Geometric evolution equations*, Queen Mary University of London (QMUL), since 2019, as main supervisor.
- Gianmichele Di Matteo, Project: *Singularities in geometric flows*, Queen Mary University of London (QMUL), since 2017, as main supervisor.
- Quintin Luong, Project: *Singularities in geometry variational problems of surfaces*, QMUL, since 2017, as co-supervisor (main supervisor: Huy Nguyen).
- Florian Litzinger, Project: *Singularities and geometric partial differential equations*, QMUL, since 2017, as co-supervisor (main supervisor: Huy Nguyen).
- Ali Imad Raad, Project: *Cartan subalgebras in  $C^*$ -algebras*, QMUL, 2017–19, as co-supervisor (main supervisor: Xin Li).
- Edgar Gasperin Garcia, Thesis: *Applications of conformal methods to the analysis of global properties of solutions to the Einstein field equations*, QMUL, 2013–17, as co-supervisor (main supervisor: Juan Valiente Kroon).

## Visiting PhD Students

- Jasmin Hörter, Karlsruher Institut für Technologie, QMUL, Sep – Feb 2019 (6 months).
- Lothar Schiemanowski, Universität zu Kiel, QMUL, Oct 2017 – Feb 2018 (5 months).
- Jason Ledwidge, Universität Tübingen, QMUL, Mar – Apr 2017 (1 month).

## Miscellaneous

- **Director of Postgraduate Research Studies (DPGR)**, Queen Mary University of London (April 2017 – April 2019). Previously Deputy Director of PGR, PGR Recruitment Coordinator, and PGR Admissions Tutor (Sep 2013 – Sep 2015).
- **Editor** for Geometric Flows (De Gruyter Journal).
- **Referee** for over 25 different peer-reviewed mathematical journals, including in particular: Annali SNS, Calc. Var. PDE, Comm. Anal. Geom., Comm. PDE, GAFA, Crelle, J. Diff. Geom., J. Funct. Anal., J. EMS, J. Geom. Anal, Math. Ann., Math. Z., Proc. AMS, and Trans. AMS.
- **Reviewer** for Mathematical Reviews (AMS).
- **Reviewer** for various Grant Proposals from the EPSRC, The Leverhulme Trust, and RCUK’s Future Leadership Grants Scheme.
- **External Examiner for the PhD vivas** of Michael Coffey, University of Warwick (March 2015), Mattia Miglioranza, University College London (December 2019), and Albert Wood, University College London (August 2020). **Independent Examination Chair for the PhD vivas** of Matthew Eric Bassett, Queen Mary University of London (October 2018), and Jarrod Williams, Queen Mary University of London (May 2019).
- **Member** of the London Mathematical Society (since 2014), European Mathematical Society (since 2012), and the American Mathematical Society (since 2007).
- **Member** of the following committees at Queen Mary University of London: Senior Management Team (Sep 2018 – Apr 2019), Research Committee (AY 2013–14, 2017–18, 2018–19), Postgraduate Research Committee (AY 2013–14, 2014–15 and as chair Apr 2017 – Apr 2019), Director of Postgraduate Studies Forum of the Faculty of Science and Engineering (Apr 2017 – Apr 2019), Teaching and Learning Committee (AY 2017–18), Head of School Advisory Group (AY 2016-17, 2017-18), Student Experience Working Group (AY 2016–17), and several hiring committees.
- **Outreach Activities** at Queen Mary University of London: Taster Day Talk “Spheres”, seminar for Year 10 high-school students (Jul 2017); Goldsmiths’ Company Course “Game Theory”, mini-course for high-school teachers (Jul 2014); Taster Day Talk “I’ve Got Proof – Infinite Sums” (Apr 2014).