# Curriculum Vitae of Reto Buzano

Dipartimento di Matematica "Giuseppe Peano", Università degli Studi di Torino
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## Personal Information

Born as Reto Müller in Switzerland. Name change to Reto Buzano in 2015 due to marriage.
Fluent in Swiss German, German, English and Italian.

## Expertise

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| 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

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| May 05 – Apr 09 | Ph.D. in Mathematics, ETH Zürich<br>Thesis: Ricci flow coupled with harmonic map heat flow<br>Advisor: Prof. Michael Struwe |
| Oct 00 – Apr 05 | Diploma in Mathematics with distinction, ETH Zürich<br>Thesis: Differential Harnack inequalities for parabolic equations<br>Advisor: Prof. Michael Struwe |
| Aug 95 – Jan 00 | Swiss Matura Type C (Mathematics and Natural Sciences), KZO<br>Filiale Glattal, Dübendorf (as the best student of my year) |

## Academic Employment

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| Apr 19 – | Associate Professor in Geometry, Università degli Studi di Torino |
| Oct 19 – Mar 22 | 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 |

## Awards and Recognitions

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| January 2019 | QMUL Faculty of Science and Engineering Research Excellence Award. |
| March 2017 | Fellow of the UK Higher Education Academy (FHEA). |
| November 2005 | ETH Medal for outstanding Diploma Thesis[1]. |

[1] Published in slightly revised and extended version as a book in the EMS Series of Lectures in Mathematics.

## Research Grants as Principal Investigator

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| Sep 19 – Jul 21 | UniTo Local Research Projects 2019 (EUR 2,898). |
| Sep 19 – Aug 22 | QMUL Faculty of Science and Engineering Research Support Fund (GBP 60,000). |
| Jan 19 – Sep 22 | EPSRC Standard Grant EP/S012907/1 (GBP 613,223)[2]. |
| Feb 15 – Apr 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). |

## Publications

Articles and preprints[3]

- R. Buzano, H. Nguyen, and M. Schulz, *Noncompact self-shrinkers for mean curvature flow with arbitrary genus*, preprint 2021 (pp. 18, submitted), ArXiv:2110.06027.
- 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*, **Calc. Var.** 61, 65 (2022).
- 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*, **Calc. Var.** 61, 25 (2022).
- 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.** 118, No. 2 (2021), 189–221.
- 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).

[2]After leaving QMUL in March 2022, Huy Nguyen became PI of this grant for the final 6 months.
[3]Preprints of *all* my articles are available on the ArXiv.

# Invited Talks (Selection)

**Over 100 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 2018**:

- Workshop *Differential Geometry and Geometric Analysis*, Università degli Studi di Firenze, Italy (Jun 20–24, 2022).
- Online workshop *Geometric Analysis: Past, Present and Future, Season 1*, organised at Jeonbuk National University, South Korea (April-May 2022, online).
- Workshop *Variational Aspect of Minimal Surfaces*, Institut Henri Poincaré and University of Paris, France (Jan 4–6, 2022).
- $8^{th}$ *European Congress of Mathematics (8ECM)*, Portorož, Slovenia (Jun 20–26, 2021, online).
- Workshop *Real and Complex Manifolds. The mathematical Heritage of Edoardo Vesentini*, Scuola Normale Superiore di Pisa, Italy (Jun 29 – Jul 02, 2021, online).
- Analysis Seminar, University of Bath, UK (Feb 18, 2021, online).
- Oberseminar Geometrische Analysis, Universität Tübingen, Germany (Dec 17, 2020, online).
- Workshop *An Invitation to Geometric Analysis*, Jeonbuk National University, South Korea (Dec 1–3, 2020, online).
- AG Geometrische Analysis, Karlsruher Institut für Technologie, Germany (Aug 11, 2020, online).
- 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).
- Internal Colloquium of the School of Maths, Queen Mary University of London, UK (Feb 22, 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).

# Organisation of Seminars, Schools and Workshops (Selection)

- International workshop *Mean Curvature Flow and Related Topics*, Queen Mary University of London (Jul 2022 as joint main organiser together with Huy Nguyen).
- International workshop *A Geometric Analysis Meeting at UniTo*, Università degli Studi di Torino (Jun 2022).
- Reading seminar *PDE and Geometric Analysis*, Queen Mary University of London (2017–21).
- International workshop *Geometric Analysis Days II*, Queen Mary University of London (Oct 2018, as joint main organiser together with Shabnam Beheshti).
- International workshop *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* (2013–19, including two events at Queen Mary University of London as main organiser).
- 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).

# Teaching Experience

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

- *Matematica II*, Università di Torino (UniTo), AY 2018/19, 19/20, 20/21, 21/22 (BSc Chemistry).
- *Metodi Geometrici*, UniTo, AY 2019/20, 20/21, 21/22 (BSc Math Finance).
- *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

- Gianmichele Di Matteo (completed). Thesis: *Local Singularity Theory for Ricci and Harmonic Ricci Flows*, Queen Mary University of London (QMUL), Sep 2017 – Jun 2021 (left to postdoc at KIT).
- Louis Yudowitz (ongoing). Current project: *Geometric evolution equations*, QMUL, since Sep 2019.
- Second supervisor of further students: Quintin Luong, Florian Litzinger, Ali Imad Raad, and Edgar Gasperin Garcia, QMUL, 2013–22.

## 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).

## Supervision of Postdoctoral Researchers

- Mario Schulz, QMUL, Sep 2019 – Aug 2021 (left to postdoc at University of Münster).
- Shengwen Wang, QMUL, Sep 2019 – Aug 2021 (left to postdoc at University of Warwick, future Lecturer at QMUL)

## Miscellaneous

- **Director of Postgraduate Research Studies (DPGR)**, Queen Mary University of London (April 2017 – April 2019). Deputy Director of PGR, PGR Recruitment Coordinator, and PGR Admissions Tutor (Sep 2013 – Sep 2015 and again in Sep 2020 – March 2022).
- **Editor** for Geometric Flows (De Gruyter Journal), 2014–20.
- **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), since 2012.
- **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**: Lectio Magistralis "L'affascinante mondo delle sfere" at Campus Invernale di Matematica, Fisica e Astrofisica (Torino, Dec 2020). Taster Day Talk "Spheres", seminar for Year 10 high-school students (QMUL, Jul 2017); Goldsmiths' Company Course "Game Theory", mini-course for high-school teachers (QMUL, Jul 2014); Taster Day Talk "I've Got Proof – Infinite Sums" (QMUL, Apr 2014).