

# CV of LUCA MARTINAZZI

## Contacts

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## Personal Data

Citizenship Italian  
Spoken languages English, Italian, German, French, Spanish, Portuguese

## Degrees

<b>M.Sc. in Mathematics</b>	<b>Scuola Normale Superiore, Pisa, 05/2004</b>
Grade	110/110 Cum Laude
Title of the Master Thesis	<i>The non-parametric Plateau problem in arbitrary codimension</i>
Advisor	Prof. M. Giaquinta
<b>Ph.D. in Mathematics</b>	<b>ETH Zurich, 03/2009</b>
Title of the Ph.D. Thesis	<i>Concentration-Compactness phenomena in conformal geometry</i>
Advisor	Prof. M. Struwe
Co-Advisor	Prof. T. Rivière

## Education

10/2000 - 09/2004	<b>Scuola Normale Superiore, Pisa</b>	Undergraduate student
09/2004 - 08/2005	<b>Stanford University, CA</b>	Graduate student
10/2005 - 03/2009	<b>ETH Zurich</b>	Graduate student

## Jobs

04/2009 – 09/2009	Postdoc at <b>ETH Zurich</b>
10/2009 – 08/2011	Junior visitor at <b>Centro di Ricerca Matematica De Giorgi, Pisa</b>
09/2011 – 06/2013	Hill assist. professor at <b>Rutgers, The State Univ. of New Jersey</b>
07/2013 – 09/2017	SNF Förderungsprofessor at the <b>University of Basel</b>
10/2017 – 08/2021	Associate Professor at the <b>University of Padua</b>
Since 09/2021	Associate Professor at <b>Sapienza University of Rome</b>
2022 – 2025	Junior Fellow of the <b>Scuola Superiore di Studi Avanzati Sapienza</b>

# Publications

## Monographs

1. *The non-parametric problem of Plateau in arbitrary codimension* - Master thesis (2004).
2. (With M. Giaquinta) *An introduction to the regularity theory for elliptic systems, harmonic maps and minimal graphs*, 2nd Edition, Edizioni della Normale, Pisa 2012 (1st edition 2005).
3. *Concentration-Compactness phenomena in conformal geometry*, Ph.D. Thesis, ETH Zurich (2009).

## Research papers

1. *Classification of solutions to the higher order Liouville's equation on  $\mathbb{R}^{2m}$* , Math. Z. **263** (2009), 307-329.
2. *Conformal metrics on  $\mathbb{R}^{2m}$  with constant  $Q$ -curvature*, Rend. Lincei. Mat. Appl. **19** (2008), 279-292.
3. *Concentration-compactness phenomena in higher order Liouville's equation*, J. Funct. Anal. **256** (2009), 3743-3771.
4. *A threshold phenomenon for embeddings of  $H_0^m$  into Orlicz spaces*, Calc. Var. Partial Differential Equations. **36** (2009), 493-506.
5. (With Mircea Petrache) *Asymptotics and quantization for a mean-field equation of higher order*, Comm. Partial Differential Equations **35** (2010), 1-22.
6. (With M. Struwe) *Quantization for an elliptic equation of order  $2m$  with critical exponential non-linearity*. Math. Z. **270** (2012), 453-487.
7. (with M. Petrache) *Existence of solutions to a higher dimensional mean-field equation on manifolds*, Manuscripta Math. **133** (2010), 115-130.
8. *Quantization for the prescribed  $Q$ -curvature equation on open domains*, Commun. Contemp. Math. **13** (2011), 533-551.
9. (With L. Ambrosio and G. De Philippis) *Gamma-convergence of nonlocal perimeter functionals*, Manuscripta Math. **134** (2011), 377-403.
10. *A note on  $n$ -axially symmetric harmonic maps minimizing the relaxed energy*, J. Funct. Anal. **261** (2011), 3099-3117.
11. (With C. Mantegazza) *A note on quasilinear parabolic equations on manifolds*. Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) Vol **XI** (2012), 1-18.
12. (with A. Malchiodi) *Critical points of the Moser-Trudinger functional on a disk*, J. Eur. Math. Soc. (JEMS) **16** (2014), 893-908.
13. *Conformal metrics on  $\mathbb{R}^{2m}$  with constant  $Q$ -curvature and large volume*, Ann. Inst. Henri Poincaré (C), **30** (2013), 969-982.
14. (with T. Jin, A. Maalaoui, J. Xiong) *Existence and asymptotics for solutions of a non-local  $Q$ -curvature equation in dimension three*, Calc. Var. Partial Differential Equations **52** (2015), 469-488.

15. (with A. Hyder) *Conformal metrics on  $\mathbb{R}^{2m}$  with constant  $Q$ -curvature, prescribed volume and asymptotic behavior*, *Discr. Cont. Dynamical Systems - A* **35** (2015), 283-299.
16. (with F. Da Lio, T. Rivière) *Blow-up analysis of a nonlocal Liouville-type equation*, *Analysis & PDE*. **8** no. 7 (2015), 1757-1805.
17. (with A. Maalaoui, A. Schikorra) *Blow-up behaviour of a fractional Adams-Moser-Trudinger type inequality in odd dimension*, *Comm. Partial Differential Equations* **41** (2016), 1593-1618.
18. (with S. Iula, A. Maalaoui), *A fractional Moser-Trudinger type inequality in one dimension and its critical points*, *Differential and Integral Equations* **29** (2016), 455-492.
19. *Fractional Adams-Moser-Trudinger inequalities*, *Nonlinear Analysis* **127** (2015) 263-278.
20. (with F. Da Lio), *The nonlocal Liouville-type equation in  $\mathbb{R}$  and conformal immersions of the disk with boundary singularities*, *Calc. Var. Partial Differential Equations* (2017), 56:152.
21. (with G. Mancini), *The Moser-Trudinger inequality and its extremals on a disk via energy estimates*, *Calc. Var. Partial Differential Equations* (2017), 56:94.
22. (with A. Hyder, S. Iula) *Large blow-up sets for the prescribed  $Q$ -curvature equation in the Euclidean space*, *Commun. Contemp. Math.* **20** (2018), 1750026 (19 pages).
23. (with A. Hyder) *Gluing metrics with prescribed  $Q$ -curvature and different asymptotic behaviour in dimension 6*, *Annali Sc. Norm. Sup. Pisa* (to appear), preprint (2018).
24. (with A. de la Torre, A. Hyder, Y. Sire), *The non-local mean-field equation on an interval*, *Commun. Contemp. Math.* 1950028 (2019).
25. (with A. Hyder, G. Mancini), *Local and nonlocal singular Liouville equations in Euclidean spaces*, *Intern. Math. Res. Notices* Vol. 2021, No. 15, pp. 11393–11425.
26. (con G. Mancini), *Extremals for fractional Moser-Trudinger inequalities in dimension 1 via harmonic extensions and commutator estimates*, *Adv. Nonlin. Studies* **20** (2020), 599-632.
27. (with A. DelaTorre, M. Gonzalez, A. Hyder), *Concentration phenomena for the fractional  $Q$ -curvature equation in dimension 3 and fractional Poisson formulas*, *J. London Math. Soc.* **104** (2021), 423-451.
28. (with A. Hyder), *Normal conformal metrics on  $\mathbb{R}^4$  with  $Q$ -curvature having power-like growth*, *J. Diff. Equ.*, **301** (2021), 37-72.
29. (with P.-D. Thizy, J. Vétois), *Sign-changing blow-up for the Moser-Trudinger equation in  $\mathbb{R}^2$* , *J. Funct. Anal.* **282** (2022), 109288.
30. (with F. De Marchis, A. Malchiodi, P-D. Thizy), *Critical points of the Moser-Trudinger functional on closed surfaces*, *Invent. Math.* **230** (2022), 1165-1248.
31. (with F. De Marchis, A. Malchiodi, P-D. Thizy), *Critical points of arbitrary energy for the Trudinger-Moser embedding in planar domains*, preprint (2022), [arXiv:2212.10303](https://arxiv.org/abs/2212.10303).
32. (with O. Druet, A. Malchiodi, P-D. Thizy) *Multi-bumps analysis for Trudinger-Moser nonlinearities II-Existence of solutions of high energies*, in preparation.

## Conference proceedings

1. *An application of  $Q$ -curvature to an embedding of critical type*, Oberwolfach Reports **6** (2009). 1997-2000.
2. *Recent results and open problems on conformal metrics on  $\mathbb{R}^n$  with constant  $Q$ -curvature*, Extended Conference Abstracts, Spring 2013, CRM Barcelona.
3. (with F. Da Lio, T. Rivière), *The fractional Liouville equation in dimension 1 Geometry, Compactness and quantization*, RIMS Kokyuroku **2082** (2018), 168-176.

## Fellowships and Research Grants

10/2000 - 09/2004	Scuola Normale Superiore Fellowship, by National contest (ranked 6th in the Science section)
10/2000 - 09/2004	INdAM Fellowship for undergraduate students in mathematics, by National contest (ranked 2nd).
09/2004 - 08/2007	Stanford Graduate Fellowship (dropped when moving to ETH Zurich).
10/2005 - 09/2006	Scholarship of the Graduate School of Mathematics of Zürich (25'000 CHF).
04/2008 - 09/2009	ETH Research Grant "TH" no. ETH-02 08-2 (90'000 CHF).
02/2010 - 01/2011	Swiss National Foundation fellowship for prospective researchers no. PBEZP2-129520 (42'000 CHF).
07/2013 - 06/2017	Swiss National Foundation Professorship (1'411'031 CHF).
07/2017 - 06/2019	Swiss National Foundation Professorship (546'387 CHF).
02/2022	Obtained score <b>A</b> in the 2nd step of evaluation of ERC Consolidator Grant.
01/2023 - 06/2024	Research Grand of APRE Foundation (30'000 EUR)

## Organized activities

- June 10-14 2014: Conference "*Recent advances in non-local and non-linear analysis: theory and applications*", organized with Francesca Da Lio, Rafe Mazzeo, Tristan Rivière at FIM, ETH Zurich.
- June 22-26 2014 and July 14-18 2014: Summer school on Geometric Measure Theory and Geometric Analysis, organized with Camillo De Lellis and Gianluca Crippa at the University of Basel.
- December 15-17 2014: Workshop "*Nonlocal days*" on non-local equations, organized with Enno Lenzmann and Tristan Rivière at the University of Basel.
- November 25-28 2019: Workshop *Recent trends in Geometric analysis and applications*, organized with Andrea Malchiodi and Luciano Mari at CRM E. De Giorgi, SNS, Pisa.

## Invited speaker

### Speaker to selected international conferences

- 2009 – Workshop "Geometric flows and Geometric operators", **CRM De Giorgi, SNS Pisa**.

- 2009 – Workshop “Partielle Differentialgleichungen”, **MFO Oberwolfach**.
- 2009 – Workshop “Variational problems of higher order in geometry”, **Freie Universität Berlin**.
- 2011 – Conference “Higher order operators in geometry and physics”, **SISSA Trieste**.
- 2013 – Conference “Geometric analysis”, **CRM Barcelona**.
- 2016 – Conference “Qualitative Aspects of the Theory of Nonlocal Equations”, **Fields institute, Toronto**.
- 2016 – Conference “Geometric and Physical aspects of Trudinger-Moser type inequalities”, **Mittag-Leffler Institute**.
- 2017 – Workshop “Analysis on Shapes of Solutions to Partial Differential Equations”, **RIMS, Kyoto**.
- 2018 – Birs workshop “Physical, Geometrical and Analytical Aspects of Mean Field Systems Type”, **Banff, Canada**.
- 2018 – Copenhagen-Lund Lectures, **University of Copenhagen**.
- 2019 – Birs workshop “Nonlinear geometric PDEs”, **Banff, Canada**.
- 2019 – Workshop on Sharp Geometric Inequalities and applications to PDEs and Geometry, **TSIMF, Sanya, China**
- 2019 – Symposium “Recent advances in nonlinear problems”, **CUNY, City University of New York**.
- 2020 – Workshop “Variational analysis on critical problems of non-linear partial differential equations”, **Osaka City University**.
- 2021 – Online Workshop “Geometric PDE and applications to problems in conformal and CR geometry”, **Birs, Institute for Advanced Study in Mathematics (IASM), China**.
- 2022 – Summer School on Variational Problems and Functional Inequalities, **Osaka Metropolitan University (OCAMI)**.
- 2022 – Workshop on Non-compact Variational Problems and Related Topics, **RIMS, Kyoto**

## Other seminars

- 23/10/2007 – ETH Zurich, weekly seminar of the Analysis group.
- 25/05/2009 – Cergy-Pontoise, conference “Geometric and nonlinear analysis”.
- 11/06/2009 – Centro De Giorgi, Scuola Normale Superiore di Pisa, research period “Geometric Flows and Geometric Operators”.
- 04/11/2009 – Pisa, weekly seminar of Calculus of Variations.
- 05/05/2010 – SISSA, weekly seminar of the Functional Analysis group.
- 15/12/2010 – Pisa, weekly seminar of Calculus of Variations.

- 09/02/2011 – MIT (Boston), weekly geometry seminar.
- 11/02/2011 – MIT (Boston), mini-course on concentration-compactness.
- 16/02/2011 – Rutgers University (New Jersey), weekly non-linear analysis seminar.
- 18/02/2011 – Princeton University (New Jersey), weekly geometry seminar.
- 24/02/2011 – Columbia University (New York), weekly geometry seminar.
- 19-20/05/2011 – Rencontre de Mathématique, Université de Lyon, 4-hour mini-course.
- 29/11/2011 – Rutgers University (NJ), weekly non-linear analysis seminar.
- 23/05/2012 – Universität Basel, weekly analysis seminar.
- 25/05/2012 – EPF Lausanne, weekly analysis seminar.
- 29/05/2012 – ETH Zürich, weekly analysis seminar.
- 14/06/2012 – Hausdorff Center, Bonn, weekly analysis seminar.
- 18/10/2012 – City University of New York, weekly analysis seminar.
- 05/02/2013 – University of Pennsylvania, weekly analysis seminar.
- 15/04/2013 – John Hopkins Univeristy, Baltimore, weekly analysis seminar.
- 30/04/2013 – Rutgers University, weekly nonlinear analysis seminar.
- 08/10/2013 – University of Rome - Tor Vergata.
- 03/02/2014 – University of Tübingen, colloquium.
- 13/01/2015 – TIFR Bangalore, colloquium.
- 24/02/2015 – University of Lyon, analysis seminar.
- 27/04/2015 – University of Bern, colloquium.
- 14/07/2015 – Scuola Normale Superiore di Pisa.
- 13/08/2015 – PUC-Rio (Rio de Janeiro).
- 10/11/2015 – University of Nancy, weekly analysis seminar.
- 01/12/2015 – ETH Zurich, weekly analysis seminar.
- 23/06/2016 – University of Konstanz, Oberseminar.
- 20/12/2016 – Università di Milano.
- 17/01/2017 – University of Frankfurt, weekly analysis seminar
- 18/01/2017 – University of Giessen, weekly analysis seminar
- 23/01/2017 – University of Salzburg, weekly analysis seminar
- 16/02/2017 – Scuola Normale Superiore di Pisa, weekly analysis seminar

- 06/03/2017 – University of Cergy-Pontoise, analysis seminar
- 09/03/2017 – University of Pau, analysis seminar
- 10/06/2017 – Osaka City University, “37th South Osaka Applied Mathematics Seminar”
- 10/04/2018 – UBC Vancouver.
- 01/05/2018 – Rutgers, Nonlinear analysis seminar.
- 02/05/2018 – CUNY, Nonlinear Analysis and PDEs seminar.
- 03/05/2018 – Princeton, Special seminar in geometric analysis.
- 22/05/2018 – University of Copenhagen, Copenhagen-Lund Lectures.
- 23/05/2018 – University of Pisa.
- 24/09/2018 – University of Cagliari
- 09/10/2018 – University of Lyon
- 31/10/2018 – University of Ferrara
- 06/11/2018 – ETH Zurich, Analysis seminar
- 15/11/2018 – University of Bologna
- 22/11/2018 – University of Rome La Sapienza.
- 03/05/2019 – University of Montreal, Canada.
- 30/05/2019 – Workshop “Partial Differential Equations in Analysis and Mathematical Physics”, Santa Margherita di Pula (CA), Italy.
- 13/06/2019 – University of Granada, Spain.
- 02/08/2019 – XI Brazilian-Italian workshop on Nonlinear Differential Equations, Varese.
- 13/12/2019 – Workshop “6th Weekend on Variational Methods and Differential Equations” University of Catania, Italy.
- 08/01/2020 – University of Turin, Italy.
- 20/02/2020 – Osaka City University, workshop “Variational analysis on critical problems of non-linear partial differential equations”.

## **PhD students and postdocs**

- Ali Hyder, from TIFR Bangalore (PhD student 07/2013-06/2017)
- Stefano Iula, from Università di Roma, La Sapienza (PhD student 07/2013-06/2017)
- Dr. Ali Maalaoui, from Rutgers university (Postdoc 07/2013-06/2014)
- Dr. Armin Schikorra, from MPI Leipzig (Postdoc 07/2014-01/2015)

- Dr. Gabriele Mancini, from SISSA (Postdoc 10/2015-08/2018)
- Dr. Federica Sani, from Università di Milano (Postdoc 08/2016-11/2016)
- Dr. Azahara de la Torre Pedraza, from UPC Barcelona (Postdoc 01/2017-03/2018)
- Dr. Luca Battaglia, from Università di Roma La Sapienza (Postdoc 06/2017-07/2017)
- Dr. Cheikh Ndiaye, from University of Giessen (Postdoc 03/2017-09/2017)
- Chiara Bernardini, from University of Bologna (PhD student since 09/2020, coadvised with Prof. Annalisa Cesaroni)
- Yamin Wang, visiting PhD student from Renmin University, Beijing (11/2021-10/2022)

### **Undergraduate students**

- Giovanni Giacomini (Master thesis defended 02/2021). Now PhD student at the University of Perth (Advisor: E. Valdinoci)
- Simone Masserini (Bachelor thesis defended 09/2021)
- Leonardo Del Grande (Master thesis to be defended in 2022)

### **Institutional activity**

- Member of the “collegio docenti di dottorato” at the University of Padova for the cycles XXXIII, XXXIV, XXXV, XXXVI
- Member of the “Commissione Comunicazione” of the Department of Mathematics, University of Padova
- Head of the 2020 “Commissione Dipartimentale Progetti e Assegni”, Università di Padova.

## **Teaching**

### **Rutgers, The State University of New Jersey**

At Rutgers I taught the following courses:

1. Calculus (Fall 2011)
2. Multivariable Calculus (Fall 2011)
3. Advanced Calculus for Engineering (Spring 2012)
4. Calculus (Fall 2012)
5. Ordinary differential equations (Spring 2013)



## **Universität Basel**

At the university of Basel I taught the following courses

1. Differential geometry (Spring 2015)
2. Probability (Spring 2016)
3. Calculus of Variations (Spring 2017)

## **PUC-Rio**

I visited PUC-Rio in Fall 2016 (September-October), giving an advanced course on elliptic regularity.

## **Università di Padova**

1. Analysis 1 (Fall 2017)
2. Advanced Analysis (with Giovanni Colombo) (Fall 2017)
3. Analysis 1 (Fall 2018)
4. Complements of Analysis – @ Scuola Galileiana (Fall 2018)
5. Calculus of Variations (Spring 2019)
6. Analysis 1 (Fall 2019)
7. Degree Theory (Fall 2019) – PhD course
8. Complements of Analysis – @ Scuola Galileiana (Fall 2019)
9. Analysis 1 (Fall 2020)
10. Calculus of Variations (Spring 2021)

## **Sapienza Università di Roma**

1. Calculus (Fall 2021)
2. Mathematics II (Spring 2022)
3. Analysis I (Fall 2022)
4. Calculus (Fall 2022)