# Curriculum Vitae

Alessandro Ghigi

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## Contents



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## 1 Personal data

- Born in Bologna 18th May 1972.
- Italian citizenship.

## 2 Education

- 2003: PhD received at Scuola Normale Superiore, Pisa, 70/70.
- 1999-2001: visiting student at Massachusetts Institute of Technology, under the supervision of Prof. Gang Tian.
- 1998: start PhD in Mathematics at Scuola Normale Superiore, Pisa.

- 1997: Degree in Mathematics at Università di Firenze, cum laude, advisor: Prof. Paolo de Bartolomeis.

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# 3 Positions

- since 1.6.2019: *professore associato* (i.e. associate professor) at Dipartimento di Matematica "Felice Casorati", Università di Pavia.
- since 1.10.2015: *ricercatore* (i.e. assistant professor, permanent position) at Dipartimento di Matematica "Felice Casorati", Università di Pavia.
- 2004-2015: *ricercatore* (i.e. assistant professor, permanent position) at Dipartimento di Matematica e Applicazioni, Università di Milano Bicocca.
- 2003 - 2004: Postdoc at Università di Pavia.

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# 4 Visiting periods

- In the period 8.2.2016-12.2.2016 I was guest of the Lehrstuhl Mathematik VIII at Universität Bayreuth, invited by Prof. Fabrizio Catanese.
- In the periods 6-11.5.2013, 11-15.6.2012, 3-8.10.2011, 16-21.5.2011, 27.3-3.4.2012 amd 2-8.9.2007 I was a guest of *Arbeitsgruppe Transformationsgruppen* at Ruhr Universität Bochum.
- I participated to the AMS Summer Institute in Algebraic Geometry 2015, first week 13-17 July 2015.
- October - December 2013: *guest* at Max-Planck Institut für Mathematik, Bonn.
- October - December 2012: *guest* at Max-Planck Institut für Mathematik, Bonn.
- July 2008: Park City Mathematics Institute, *Analytic and Algebraic Geometry.*
- March - May 2002: *visiting scholar* at M.I.T., invited by Prof. Gang Tian.

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### 4.1 Other

1. In April 2018 I obtained the Italian habilitation as full professor (*Abilitazione scientifica nazionale, Prima Fascia 01/A2 - GEOMETRIA E ALGEBRA*).

2. In April 2017 I obtained the Italian habilitation as associate professor (*Abilitazione scientifica nazionale, Seconda Fascia 01/A2 - GEOMETRIA E ALGEBRA*).

3. In 2013 I obtained the French qualification as university professor (*Qualification aux fonctions de professeur des universités, section 25-Mathématiques*).

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## 5 Publications

### Preprint

[1] A. Ghigi and C. Tamborini. A topological construction of families of Galois covers of the line. Preprint 2022. ArXiv version: `arXiv:math/2204.07817`.

### Articoli di ricerca

[2] D. Conti and A. Ghigi and R. Pignatelli. Some evidence for the Coleman-Oort conjecture. *RACSAM*, (2022) 116:50.

[3] A. Ghigi and C. Tamborini. Bergman kernel and period map for curves. *Geom. Dedicata* 216, 5 (2022). ArXiv version: `arXiv:math/2102.04825`.

[4] P. Frediani and A. Ghigi and I. Spelta. Infinitely many Shimura varieties in the Jacobian locus for $g \leq 4$. *Ann. Sc. Norm. Super. Pisa Cl. Sci.* (5) Vol. XXII (2021), 1597-1619.

[5] A. Ghigi and G.P. Pirola and S. Torelli. Totally geodesic subvarieties in the moduli space of curves. To appear on *Commun. Contemp. Math.* Vol. 23, No. 03, 2050020 (2021) .

[6] L. Biliotti and A. Ghigi. Meromorphic limits of automorphisms. To appear on *Transformation groups*. arXiv:math/1901.10724.

[7] P. Frediani, A. Ghigi and G.P. Pirola. Fujita decomposition and Hodge loci. Preprint, 2017. *Journal of the Institute of Mathematics of Jussieu* 19 (2020), no. 4, 1389-1408. ArXiv version: `arXiv:math/1710.03531`.

[8] E. Colombo, P. Frediani, A. Ghigi, and M. Penegini. Shimura curves in the Prym locus. on *Commun. Contemp. Math. 21 (2019), no. 2, 1850009.*

[9] L. Biliotti and A. Ghigi. Remarks on the abelian convexity theorem. *Proc. Amer. Math. Soc.* 146 (2018), 5409-5419.

[10] L. Biliotti and A. Ghigi. Stability of measures on Kähler manifolds. *Advances in Mathematics*, Volume 307, 5 February 2017, Pages 1108-1150.

[11] L. Biliotti, A. Ghigi, and P. Heinzner. Invariant convex sets in polar representations. *Israel Journal of Mathematics*, June 2016, Volume 213, Issue 1, 423-441.

[12] P. Frediani, A. Ghigi and M. Penegini. Shimura varieties in the Torelli locus and non-abelian coverings. *International Mathematics Research Notices*, vol. 20, p. 10595-10623, 2015.

[13] E. Colombo, P. Frediani, and A. Ghigi. On totally geodesic submanifolds in the Jacobian locus. *International Journal of Mathematics*, Volume 26, Issue 01, January 2015, 1550005 (2015) [21 pages].

[14] L. Biliotti, A. Ghigi, and P. Heinzner. A remark on the gradient map. *Documenta Mathematica*, Vol. 19 (2014), 1017-1023.

[15] L. Biliotti, A. Ghigi, and P. Heinzner. Polar orbitopes. *Comm. Anal. Geom.*, 21(3):579–606, 2013.

[16] L. Biliotti, A. Ghigi, and P. Heinzner. Coadjoint orbitopes. *Osaka J. Math.*, 51(4):935–968, 2014.

[17] A. Ghigi. On the approximation of functions on a Hodge manifold. *Annales de la faculté des sciences de Toulouse Sér. 6*, 21(4):769–781, 2012.

[18] L. Biliotti and A. Ghigi. Satake-Furstenberg compactifications, the moment map and $\lambda_1$. *Amer. J. Math.*, 135(1):237–274, 2013.

[19] L. Biliotti and A. Ghigi. Homogeneous bundles and the first eigenvalue of symmetric spaces. *Ann. Inst. Fourier (Grenoble)*, 58(7):2315–2331, 2008.

[20] C. Arezzo, A. Ghigi, and A. Loi. Stable bundles and the first eigenvalue of the Laplacian. *J. Geom. Anal.*, 17(3):375–386, 2007.

[21] A. Ghigi and J. Kollár. Kähler-Einstein metrics on orbifolds and Einstein metrics on spheres. *Comment. Math. Helv.*, 82(4):877–902, 2007.

[22] C. Arezzo, A. Ghigi, and G. P. Pirola. Symmetries, quotients and Kähler-Einstein metrics. *J. Reine Angew. Math.*, 591:177–200, 2006.

[23] A. Ghigi. On the Moser-Onofri and Prékopa-Leindler inequalities. *Collect. Math.*, 56(2):143–156, 2005.

[24] A. Ghigi. A generalization of Cayley submanifolds. *Internat. Math. Res. Notices*, 15:787–800, 2000.

### Survey papers

[24] A. Ghigi. On some differential-geometric aspects of the Torelli map. To appear on *Bollettino U.M.I., special volume in memory of Paolo de Bartolomeis*. ArXiv version: `arXiv:math/1809.06315`.

[25] C. Arezzo and A. Ghigi. Symmetries and Kähler-Einstein metrics. *Boll. Unione Mat. Ital. Sez. B Artic. Ric. Mat. (8)*, 8(3):605–613, 2005.

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## 6 Talks at conferences

- 7/9/2018, 50 minutes talk on *Compactifying automorphism groups of Kähler manifolds* at the conference *Differential, Algebraic and Topological Methods in Complex Algebraic Geometry*, 6-15/9/2018 at Cetraro (CS), Italy.
- 7/2/2018, 1 hour talk on *Some differential-geometric aspects of the Torelli map* at the *Workshop on Complex Algebraic Geometry – Pirola 60th*, 5-9/2/2018, University of Barcelona.
- 9/10/2017, 1 hour talk on *Fujita decomposition and Hodge loci* at the miniworkshop *Fibrations and second Fujita decomposition.* at Università di Milano.
- 1/6/2017, 1 hour talk at the Workshop *Lie groups, Invariant theory and Complex geometry*, Universität Duisburg-Essen, 1-2/6/2017.
- 9/2/2016, 1 hour talk on *The construction by Mostow and Siu* at the miniworkshop *Variations of Hodge structures, Shimura varieties and Torelli locus, surfaces uniformization*, at the University of Bayreuth, 8-9/2/2016.
- 11/1/2013, *A Geometry Day in Como*, at Università dell'Insubria University, one hour talk on *The first eigenvalue on compact Hermitian symmetric spaces.*
- March 2006, *Recenti sviluppi della geometria complessa, differenziale, simplettica*, Centro De Giorgi, Pisa. 30 minutes talk *Metriche di Kähler-Einstein sugli orbifold di Fano e metriche di Einstein sulle sfere esotiche.*
- june 2004, *Giornate di Geometria Algebrica VII*, Rimini. *Metriche di Kähler-Einstein sui rivestimenti*;
- 22-27/5/2000, *Perspective in Gauge Theory, Calibrated Geometry, and related topics.* 20 minutes talk on *Cayley submanifolds of Calabi-Yau 4-folds.*

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# 7 Talks not at conferences

1. 29.04.2022, Università di Trieste, *Famiglie di rivestimenti di Galois della retta.*

2. 15.12.2021, Università di Genova, *Famiglie di rivestimenti di Galois della retta.*

3. 28.11.2019, Università di Firenze, *Alcuni aspetti Riemanniani dell'immersione di Torelli.*

4. 23.5.2019, Institut für Algebraische Geometrie, Hannover. *Totally geodesic subvarieties generically contained in the Jacobian locus.*

5. 14.11.2018, Università di Torino. *Scomposizione di Fujita e luoghi di Hodge.*

6. 10/5/2018, University of Liverpool. *Differential-geometric aspects of the Torelli map.*

7. 8/5/2018, Instituto Superior Tecnico, Lisbon. *Compactifying automorphism groups of Kaehler manifolds.*

8. 2/3/2017, Università di Roma 3. *On the second fundamental form of the period mapping.*

9. 1/3/2017, Università di Roma 1. *Stability of measures on Kähler manifolds.*

10. 23/11/2015, Università di Pisa. *Totally geodesic subvarieties of the jacobian locus, I.*

11. 27/4/2015, Università di Pavia, *Second fundamental form of the Torelli embedding.*

12. 28/2/2015, Università di Bologna. *Stability of measures on Kähler manifolds.*

13. 29/11/2013: Ruhr Universität Bochum. *Momentum maps and measures on Kähler manifolds.*

14. 14/12/2012: Universität Bayreuth, *The first eigenvalue of the Laplacian on compact Hermitian symmetric spaces.*

15. 8/11/2012: Max-Planck Institut für Mathematik, *Metrics with large first eigenvalue.*

16. 28/4/2010: Ruhr Universität Bochum, *Satake compactifications and the moment map.*

17. 9/4/2010: Universitat de Barcelona, *Satake compactifications, moment map and first eigenvalue of teh Laplacian* (Seminari de Geometria Algebraica).

18. 16/3/2010: Politecnico di Torino, *Compattificazioni di Satake, applicazione momento e primo autovalore del Laplaciano.*

19. 11/12/2009: Imperial College (UK), *Satake compactifications, moment map and first eigenvalue of the Laplacian* (London topology and geometry seminar).

20. 10/12/2009: Università di Leicester (UK), *Satake compactifications, moment map and first eigenvalue of the Laplacian* (Leicester Pure Mathematics Seminar).

21. April 2009: Università di Perugia, *Primo autovalore sugli spazi simmetrici.*

22. March 2009: Università di Roma II, *Primo autovalore sugli spazi simmetrici.*

23. January 2008: Università di Pisa, *Primo autovalore del Laplaciano e fibrati omogenei sugli spazi simmetrici.*

24. October 2007: Università di Pavia, *Primo autovalore del Laplaciano e fibrati omogenei sugli spazi simmetrici*;

25. September 2007: Ruhr Universität Bochum, *Gieseker point of homogenenous bundles*;

26. November 2007: Università di Parma, *Curvatura di Ricci di spazi singolari*;

27. February 2007: Università dell'Insubria, *Trasporto di massa e curvatura di Ricci (secondo Sturm, Lott-Villani*;

28. December 2006: Università Politecnica delle Marche, Ancona, *Primo autovalore del Laplaciano e metriche bilanciate*;

29. October 2005: Università di Milano, *Metriche di Einstein sulle sfere esotiche e metriche di Kähler-Einstein sugli orbifold di Fano*;

30. May 2005: Università di Firenze, *Metriche di Kähler-Einstein sugli orbifold di Fano*;

31. April 2005: Università di Roma 1, *Metriche di Kähler-Einstein su rivestimenti*;

32. October 2003: Università di Roma 2, *Metriche di Kähler-Einstein e quozienti*;

33. May 2003: Università di Milano Bicocca, *Metriche di Kähler-Einstein e rivestimenti*;

34. April 2003: Università di Milano, *Metriche di Kähler-Einstein e rivestimenti*;

35. March 2003: Università di Bologna, *Metriche di Kähler-Einstein sull'intersezione di due quadriche*;

36. October 2002: Università di Parma, *Nucleo di Szegö e metriche bilanciate*;

37. May 2000: Università di Parma, *Sottovarietà di Cayley di Calabi-Yau 4-dimensionali*;

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# 8 Teaching

**Undergraduate level classes:**

1. *Algebra 2* (for mathematics students) in 2021-2022.

2. *Geometry 2* (for mathematics students) in 2019-2021.

3. *Linear algebra* (for engineering students) in 2015-2022.

4. *Basic algebra* (for mathematics students) in 2018.

5. *Homology* (for mathematics students) in 2015-2018.

6. *Differentiable manifolds* (for mathematics students) in 2014-2015.

7. *Fundamental group and covering theory* (for mathematics students) in 2006-2014.

8. *Curves and surfaces* (for mathematics students) in 2006-2009.

9. *Discrete mathematics* (for computer science students) in 2004-2006.

10. Various homework sessions (on *Linear algebra, General topology, Affine and projective geometry, Differential topology, Algebraic geometry*) within courses given by other people.

**PhD courses:**

1. 28 hourse course *Introduction to Hodge theory of projective manifolds* for the PhD program in Mathematics Milano Bicocca - Pavia - INdAM.

2. 20 hours course on *Mean curvature flow* for PhD program in Mathematics at Università di Pavia (2008), together with Francesco Bonsante.

3. 30 hours course on *Riemannian geometry* for the PhD program in Mathematics at Università di Pavia (2006).

4. 20 hours course on *Geometric stability, symplectic reduction and Kähler-Einstein metrics* for the PhD program in Mathematics at Università di Milano Bicocca (2004).

**Work as PhD adviser**

1. I was the PhD adviser of Carolina Tamborini, who was a student of the Joint PhD Program in Mathematics Milano Bicocca - Pavia - INDAM and who defended her thesis *On totally geodesic subvarieties in the Torelli locus and their uniformizing symmetric spaces* in April 2022.

2. Together with Cristiano Spotti I was the PhD adviser of Salvatore Tambasco, who was a student of the Joint PhD Program in Mathematics Milano Bicocca - Pavia - INDAM and who defended his thesis *On the volume of Fano K-moduli spaces* in December 2020.

**I was adviser of the following undergraduate and master theses.**

1. Claudia Nocita, *Superfici di Riemann: azioni di gruppi* (undergraduate), 2021.

2. Lorenzo Cosci, *Rappresentazioni di gruppi finiti* (undergraduate), 2021.

3. Ervin Hadžiosmanović, *Lo spazio dei moduli delle curve ellittiche* (undergraduate), 2021.

4. Samuele Traviganti, *Varietà Riemanniane e spazi simmetrici* (master) 2020.

5. Tania Bossio, *Metodi variazionali e teoria di Hodge su varietà di Riemann compatte* (master), 2019.

6. Carolina Tamborini, *Spazi simmetrici e sottovarietà totalmente geodetiche dello spazio di Siegel* (master),
Federico Canale, *Il problema del logaritmo discreto sulle curve ellittiche* (master; together with Prof. F. Dalla Volta), 2018.

7. Nicole Cardili, *Singular cohomology*, 2018 (undergraduate).

8. Tania Bossio, *Homotopy groups*, 2017 (undergraduate).

9. Carolina Tamborini, *The theorem of Hadamard*, 2016 (undergraduate).

10. Gian Paolo Grosselli, *Cohomology and Poincaré duality*, 2016 (undergraduate).

11. Danilo Guastoni, *Fundamental group of graphs*, 2014, (undergraduate).

12. Matteo Bonfanti, *Riemann surfaces and dessins d'enfants*, 2012, (master), together with Prof. E. Girondo Sirvent.

13. Ilaria Mondello, *Riemann surfaces*, 2010, (undergraduate).

14. Matteo Bonfanti, *Bonnet-Myers theorem*, 2010, (undergraduate).

15. Martino Cantadore, *Riemann surfaces and covering spaces*, 2009, (undergraduate).

16. Vanni Rovera, *Higher homotopy groups*, 2009, (undergraduate).

17. Carlo Orrieri, *Morse theory*, 2009, (undergraduate).

18. Ilaria Santangeletta *Brody curves*, 2008, (master).

19. Alberto Cazzaniga *Meromorphic functions on Riemann surfaces*, 2008 (undergraduate).

20. Isaia Nisoli. *Simply-connectedness of Fano manifolds*, 2006. (Master.)

21. Jacopo Stoppa, *Futaki invariants of hyperplane sections of Grassmannians*, 2005, (together with Prof. Pirola, master).

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