Davide Lombardo

Curriculum Vitae

Academic career

12/2022–today **Associate professor**, *Università di Pisa*.

12/2019–12/2022 **Ricercatore a tempo determinato "Senior" (tenure track associate professor)**, *Università di Pisa*.

06/2017–12/2019 **Ricercatore a tempo determinato "Junior" (research fellow)**, *Università di Pisa*.

10/2016–04/2017 **Post-doc**, *Leibniz Universität (Hannover)*, Supervisor: Prof. Ulrich Derenthal.

09/2016 **Riemann Fellow**, *Riemann Center for Geometry and Physics (Hannover)*.

Education

10/12/2015 **PhD defense.** PhD thesis "Représentations galoisiennes et groupe de Mumford-Tate associé à une variété abélienne" ("Galois representations and Mumford-Tate groups attached to abelian varieties") prepared under the direction of Nicolas Ratazzi.
PhD defense jury: Daniel Bertrand, Anna Cadoret, Guy Henniart, Pierre Parent, Nicolas Ratazzi, Jean-Pierre Wintenberger (referee). External referee: Kenneth A. Ribet.

11/2013–9/2016 **PhD scholarship**, *University of Paris-Sud*, France.

10/2012–07/2013 **Master 2 "Arithmetic and Algebraic Geometry"**, *University of Paris-Sud*, France, (Fondation Mathématique Jacques Hadamard Advanced Master Scholarship).

10/2008–07/2013 **"Corso Ordinario – Classe di Scienze" (Mathematics)**, *Scuola Normale Superiore*, Pisa (Italy), final mark 70/70.

09/2011–09/2013 **"Laurea Magistrale" course in Mathematics**, *University of Pisa*, Italy, final mark 110 cum laude/110.

09/2008–06/2011 **"Laurea Triennale" course in Mathematics**, *University of Pisa*, Italy, final mark 110 cum laude/110.

Conferences (invited speaker)

09/2025 **Arithmétique en Plat Pays**, *Leuven*.

07/2025 **Workshop on Rational Points**, *Schney*.

06/2025 **Arithmetic, Geometry, Cryptography and Coding Theory**, *CIRM Marseille*.

09/2024 **Eighth Number Theory Meeting**, *Politecnico di Torino*.

06/2024 **Curves, Abelian Varieties and Related Topics**, *Universitat de Barcelona*.

06/2024 **Regulators V**, *Università di Pisa*.

04/2024 **Eighth Mini Symposium of the Roman Number Theory Association**, *Università Roma Tre*.

09/2023 **Rational Points on Modular Curves**, *ICTS Bangalore*.

09/2023 **Italian Mathematical Union quadriennial meeting**, *Pisa (semi-plenary speaker)*.

06/2023 **Representation theory XVIII**, *Dubrovnik*.

04/2023 **British Mathematical Colloquium 2023**, *University of Bath*.

09/2022 **Diophantine Geometry and L-functions: Hindry 65**, *Institut de Mathématiques de Bordeaux*.

06/2021 **Arithmetic, Geometry, Cryptography and Coding Theory**, *CIRM Marseille*.

06/2020 **Workshop on Arithmetic Geometry, Number Theory, and Computation**, *ICERM, Brown University*.

12/2019 **Second Fall Number Theory Workshop**, *Barcelona University*.

06/2019 **Arithmetic of low-dimensional abelian varieties**, *ICERM, Brown University*.

05/2018 **Géométrie diophantienne**, *CIRM Marseille*.

07/2017 **Abelian Varieties & Galois Actions**, *Poznán*.

11/2014 **Workshop on Galois representations**, *University of Luxembourg*.

05/2014 **Hauteurs, modularité, transcendence**, *CIRM Marseille*.

Conferences and summer schools (organiser)

09/2018 UMI-SIMAI-PTM joint meeting, Wrocław (arithmetic geometry session)

09/2024 MINT – a Modern Introduction to Number Theory (summer school), Pisa

09/2025 Algebraic and geometric methods for Diophantine problems, Pisa

12/2025 December workshop in Number Theory, Pisa

Publications

2015 Bounds for Serre's open image theorem for elliptic curves over number fields (*Algebra & Number Theory* 9-10 (2015), 2347–2395. DOI 10.2140/ant.2015.9.2347)

2016 On the ℓ-adic Galois representations attached to nonsimple abelian varieties (*Annales de l'Institut Fourier* no. 3 (2016), 1217–1245)

2016 Explicit surjectivity of Galois representations for abelian surfaces and GL_2-varieties. (*Journal of Algebra* Volume 460, 15 August 2016, 26–59)

2016 Roots of unity and torsion points of abelian varieties (*Ramanujan Journal* 2016, 1–21)

2016 An explicit open image theorem for products of elliptic curves (*Journal of Number Theory* Volume 168, November 2016, 386–412)

2017 On the analytic bijections of the rationals in $[0, 1]$ (*Rendiconti Lincei – Matematica e Applicazioni*, Volume 28, Issue 1, 2017, p. 65–83)

2017 Galois representations attached to abelian varieties of CM type (*Bulletin de la Société Mathématique de France*, 145, fascicule 3, 2017, 469–501)

2017 Pink-type results for general subgroups of $\mathrm{SL}_2(\mathbb{Z}_\ell)^n$ (*Journal de Théorie des Nombres de Bordeaux*, 29, no. 1, 2017, p. 85–127)

2017 The 1-eigenspace for matrices in $\mathrm{GL}_2(\mathbb{Z}_\ell)$ (with A. Perucca. *New York Journal of Mathematics*, 23:897–925, 2017)

2018 On the uniform Rasmussen-Tamagawa conjecture in the CM case (*Mathematical Research Letters*, Volume 25, No. 6, 2018, pp. 1893–1910)

2018 The twisting Sato-Tate group of the curve $y^2 = x^8 + 14x^4 + 1$ (with S. Arora, A. Landesman, V. Cantoral–Farfán, J. S. Morrow. *Mathematische Zeitschrift*, Volume 290, Issue 3–4, 2018)

2018 Abelian varieties as automorphism groups of smooth projective varieties (with A. Maffei. *International Mathematics Research Notices*, Volume 2020, Issue 7, April 2020, pp. 1942–1956)

2019 Computing twists of hyperelliptic curves (with E. Lorenzo-García. *Journal of Algebra*, Volume 519, 1 February 2019, 474–490)

2019 Computing the geometric endomorphism ring of a genus-2 Jacobian (*Mathematics of Computation* 88, 2019, 889–929)

2019 Appendix to "Surjectivity of Galois representations in rational families of abelian varieties" (A. Landesman, A. A. Swaminathan, J. Tao, Y. Xu. *Algebra & Number Theory* 13 (2019), 995–1038)

2021 Reductions of points on commutative algebraic groups (with A. Perucca. *Journal de l'Institut de Mathématiques de Jussieu*, Volume 20, Issue 5. September 2021, pp. 1637-1669)

2021 Identifying central endomorphisms of an abelian variety via Frobenius endomorphisms (with E. Costa and J. Voight. *Research in Number Theory*, 2021, 7:46)

2021 Decomposing Jacobians via Galois covers (with E. Lorenzo García, C. Ritzenthaler, and J. Sijsling. *Experimental Mathematics*, 2021)

2022 Effective Kummer theory for elliptic curves (with S. Tronto. *International Mathematics Research Notes*, Volume 2022, Issue 22, November 2022, Pages 17662–17712)

2022 How far is an extension of p-adic fields from having a normal integral basis? (with I. Del Corso and F. Ferri. *Journal of Number Theory* Volume 233, April 2022, Pages 158-197)

2022 Local opers with two singularities: the case of $\mathfrak{sl}(2)$ (with G. Fortuna, A. Maffei and V. Melani. *Communications in Mathematical Physics*, 2022)

2022 On the distribution of rational points on ramified covers of abelian varieties (with P. Corvaja, J. Demejo, A. Javanpeykar, U. Zannier. *Compositio Mathematica* 2022;158(11):2109–2155.)

2022 A family of quintic Thue equations by Skolem's p-adic method (*Rivista di Matematica dell'Università di Parma* 13, 2022, no. 1, 161–173)

2022 Some uniform bounds for elliptic curves over $\mathbb{Q}$ (with S. Tronto. *Pacific Journal of Mathematics*, Vol. 320 (2022), No. 1, 133–175)

2023 Non-isogenous abelian varieties sharing the same division fields (*Transactions of the AMS* 376, 2023, 2615–2640)

2024 On the local-global principle for isogenies of abelian surfaces (with M. Verzobio. *Selecta Mathematica*, 30, 18)

2024 The semi-infinite cohomology of Weyl modules with two singular points (with G. Fortuna, A. Maffei and V. Melani. *Pure and Applied Mathematics Quarterly*, Special Issue in Honor of Claudio Procesi, pp. 1251-1284)

2025 On the L-polynomials of curves over finite fields (with F. Ballini and M. Verzobio).
Proceedings of the Royal Society of Edinburgh, to appear

2025 Classification of rational angles in plane lattices II (with R. Dvornicich, F. Veneziano and U. Zannier).
Mathematische Annalen, to appear

2025 Serre's uniformity question and proper subgroups of $C_{ns}^{+}(p)$ (with L. Furio).
Algebra & Number Theory, to appear

Books

2025 L-functions: an elementary introduction.
A *UNITEXT Springer Nature* textbook.

PhD students

2021-2025 **Lorenzo Furio**, *Galois Representations Attached to Elliptic Curves: around Serre's Uniformity Question*, thesis defended in February 2025, now postdoc in Paris.

2022-ongoing **Andrea Gallese**, *Monodromy groups and algebgraic cycles on CM abelian varieties*, defense expected in Autumn 2026.

2024-ongoing **Luca Mauri**, *Endomorphism algebras of Jacobians from group actions*, defense expected in early 2028.

2025-ongoing **Veran Stojanovic**, *Real and complex multiplication of K3 surfaces and abelian varieties*, defense expected in 2029.

Postdocs

2021-2022 **Matteo Verzobio**.

2024-2025 **Matthew Bisatt**.

Prepublications

Explicit open image theorems for some abelian varieties with trivial endomorphism ring.
Available at `http://arxiv.org/abs/1508.01293`

Torsion bounds for a fixed abelian variety and varying number field (with S. Le Fourn and D. Zywina).
Available at `https://arxiv.org/abs/2208.02345`

Monodromy groups of Jacobians with definite quaternionic multiplication (with V. Cantoral Farfán and J. Voight).
Available at `https://arxiv.org/abs/2303.00804`

Examples of effectivity for integral points on certain curves of genus 2 (with P. Corvaja and U. Zannier)
Available at `https://arxiv.org/abs/2411.17930`

Monodromy groups and exceptional Hodge classes, I: Fermat Jacobians (with A. Gallese and H. Goodson)
Available at `https://arxiv.org/abs/2405.20394`

Monodromy groups and exceptional Hodge classes, II: Sato-Tate groups (with A. Gallese and H. Goodson)
Available at `https://arxiv.org/abs/2507.02535`

On 7-adic Galois representations for elliptic curves over $\mathbb{Q}$ (with L. Furio)
Available at `https://arxiv.org/abs/2507.17967`

Connected monodromy fields of Jacobians with complex multiplication (with A. Gallese)
Available at `https://arxiv.org/abs/2510.21247`

Articles in preparation

Quadratic Chabauty and injectivity of reduction modulo p (with S. Le Fourn)

Equationless geometric Quadratic Chabauty (with S. Hashimoto, K. Khuri-Makdisi, G. Lido, N. Mascot, and P. Parent)

p-adic Galois representations of elliptic curves (with M. Bisatt and L. Furio)

Cyclotomic points on algebraic varieties (with F. Veneziano)

Finiteness of étale cohomology over solvable extensions (with T. Szamuely)

Certificates and Awards

11/2024 Italian habilitation for full professorship (*Abilitazione Scientifica Nazionale – Prima Fascia*)

07/2023 P.I. for the PRIN *Semiabelian varieties, Galois representations and related Diophantine problems* (two-year Italian national grant)

09/2022 P.I. for the PRA *Moduli spaces, representations and combinatorial structures* (two-year grant from the University of Pisa)

09/2018 Italian habilitation for associate professorship (*Abilitazione Scientifica Nazionale – Seconda fascia*)

03/2018 Premio Baldassarri, honourary mention (Italian Mathematical Union)

02/2016 French habilitation for associate professorship (*Qualification aux fonctions de maître de conférences*) in section 25, pure mathematics

09/2015 *Prix au Mérite en Sciences*, awarded by the Chancellerie des Universités de Paris

06/2015 *Benedetto Sciarra* Prize in Mathematics, awarded once every two years by the Scuola Normale Superiore of Pisa

Languages

Italian **Native speaker**

English **Fluent**

Francese **Advanced**