

Personal information: born on 18.5.1990 in Milan, Italian citizen. Civil status: married, one daughter (2022).

Work experience

- Sep.2023-Aug.2026 **Università di Bologna**
Ricercatore a tempo determinato senior (assistant professor)
- Apr.2023-Aug.2023 **Humboldt Universität zu Berlin**
Postdoc in the Algebraic Geometry group funded by ERC (Prof. Dr. Gavril Farkas)
- Oct.2022-Mar.2023 **Johann-Wolfgang-Goethe-Universität Frankfurt a.M., CRC 326 - GAUS**
Vertretung der Professur für Algebra und Zahlentheorie (Prof. Dr. Jakob Stix)
- Oct.2019-Sep.2022 **Ruprecht-Karls-Universität Heidelberg, Exzellenzcl. STRUCTURES & Math. Inst**
Postdoc in the Mathematical Physics group (Prof. Dr. Johannes Walcher)
- Oct.2018-Sep. 2019 **Max-Planck-Institut für Mathematik, Bonn**, Post-doctoral fellow
Mentor: JProf. Dr. Georg Oberdieck

Education

- 2014-2018 **Imperial College London & London School of Geometry and Number Theory**,
PhD degree in Pure Mathematics awarded on 1.10.2018
Thesis: Alternative compactifications in low genus Gromov-Witten theory,
Supervisor: Dr. Cristina Manolache.
- 2009-2014 **Scuola Normale Superiore di Pisa, Classe di Scienze (Matematica)**, Studente
ordinario. Diploma di licenza, awarded: 3.6.2015, grade: 70/70 e lode
- 2012-2014 **Università di Pisa, MSc in Mathematics**, awarded: 19.9.2014, grade: 110/110 e lode
Thesis: The moduli stack of pointed stable curves, Supervisor: Prof. Angelo Vistoli.
- 2009-2012 **Università di Pisa, BSc in Mathematics**, awarded: 15.6.2012, grade: 110/110 e lode
Thesis: Chern classes and topological K-theory, Supervisor: Prof. Andrea Maffei.
- 2004-2009 **Liceo Scientifico Statale “G. Marconi”, Milano**, maturità, grade: 100/100 e lode

Grants & Awards

- 2024-2026 **Università di Bologna, Bando Strutture 2024: “New tools and trends in geometry: from curves to higher dimension”**, €20000 for research school organisation, (PI).
- 09.2023- **MIUR, Symplectic varieties: their interplay with Fano manifolds and derived categories**, member (PRIN2022 PEKYBJ - CUP J53D23003840006, PI: G. Mongardi).
- 02.10.2022-2032 **Ministero dell’Istruzione, Università e Ricerca (MIUR), Abilitazione Scientifica Nazionale**, professore di seconda fascia (Italian qualification for associate professor).
- 2022 **European Commission, Seal of Excellence**, project 101064199–LogMod presented in the framework of MSCA Postdoctoral Fellowships 2021 (with Universiteit Leiden)
- 2021 **Heilbronn Small Grants Scheme + Foundation Compositio + LMS**, funding for a school on combinatorial methods in algebraic geometry to be held in Cambridge in September 2022, £3000 + €5000 + £5500 (with N. Nabijou)
- 2019-2021 **STRUCTURES Young Researchers Convent, travel funds**, €1500+2000
- 2017 **LMS Travel Grant for Early Career Researchers**, £500
- 2014-2018 **LSGNT - ICL, EPSRC scholarship**, approx. £15k stipend + £2k travel funds p.a
- 2009-2014 **Scuola Normale Superiore di Pisa, studentship** covering board, lodging and university fees, based on a selective admission procedure (success rate ca. 1/20)

Research visits

11-22.04.2022 **ICMS Edinburgh**, *Research in Groups*, with N. Nabijou and D. Ranganathan
 17.02-04.03.2022 **University of Colorado at Boulder**, on invitation of J. Wise
 8-15.10.2021 **University of Cambridge**, on invitation of D. Ranganathan
 Fall 2020 cancelled due to the pandemic **University of Colorado at Boulder**, *Ulam visiting professor*
 On invitation of Prof. Jonathan Wise
 21.4-4.5.2019 **Math. Forschungsinstitut Oberwolfach**, *Research in Pairs*, with N. Nabijou
 31.1-5.2.2019 **University of Cambridge**, on invitation of D. Ranganathan
 30.4-4.5.2018 **MIT, Boston, MA, USA**, on invitation of D. Ranganathan
 18.1-23.3.2018 **MSRI, Berkeley, CA, USA**, Program Associate, *Enumerative geometry beyond numbers*

Papers and preprints

A brief description of each item is available on my website

14. **Wall-crossing integral Chow rings of $\overline{\mathcal{M}}_{1,n}$** , with A. Di Lorenzo, <https://arxiv.org/abs/2402.14644>
13. **Logarithmic negative tangency and root stacks**, with N. Nabijou and D. Ranganathan, <https://arxiv.org/abs/2402.08014>
12. **Gorenstein curve singularities of genus three**, <https://arxiv.org/abs/2401.15714>, Ann. Univ. Ferrara (2024)
11. **Hyperelliptic Gorenstein curves and logarithmic differentials**, with S. Bozlee, <https://arxiv.org/abs/2307.03947>, to appear in Forum of Math, Sigma.
10. **Buildings, valuated matroids, and tropical linear spaces**, with K. Kühn, A. Kuhrs, M. Ulirsch, and A. Vargas, <https://arxiv.org/abs/2304.09146>, J. London Math. Soc., 109: e12850
9. **Gromov–Witten theory via roots and logarithms**, with N. Nabijou and D. Ranganathan, <https://arxiv.org/abs/2203.17224>, to appear in Geom. Topol.
8. **The local-orbifold correspondence for simple normal crossings pairs**, with N. Nabijou, H.-H. Tseng and F. You, J. Inst. Math. Jussieu, 22(5), 2515–2531
7. **A geographical study of $\overline{\mathcal{M}}_2(\mathbb{P}^2, 4)^{\text{main}}$** , with F. Carocci, Adv. Geom. 22 (2022), no. 4, 463–480.
6. **A smooth compactification of the space of genus two curves in projective space via logarithmic geometry and Gorenstein curves**, with F. Carocci, Geometry & Topology 27-3 (2023), 1203–1272.
5. **Curve counting in genus one: elliptic singularities and relative geometry**, with N. Nabijou and D. Ranganathan, Algebr. Geom. 8(6): 637–679, 2021
4. **Modular compactifications of $\mathcal{M}_{2,n}$ with Gorenstein curves**, Algebra Number Theory 16 (2022), no. 7, 1547–1587.
3. **Virtual classes for the working mathematician**, with F. Carocci and C. Manolache, SIGMA 16 (2020), 026, 38 pages
2. **Reduced invariants from maps with cusps**, with F. Carocci and C. Manolache, Trans. Amer. Math. Soc. 373 (2020), no. 9, 6713–6756
1. **Relative quasimaps and mirror formulae**, with N. Nabijou, Int. Math. Res. Not. IMRN, Volume 2021, Issue 10, May 2021, Pages 7885–7931

Other publications

2. **Reduced Gromov-Witten invariants in genus one: the absolute and relative theory of smooth hyperplane sections**, joint with N. Nabijou and D. Ranganathan, Oberwolfach report 27 (2019)
1. **Alternative compactifications in low-genus Gromov-Witten theory**, PhD thesis, Imperial College London (2018), <https://spiral.imperial.ac.uk/handle/10044/1/64777>

Teaching experience

- Sep.-Dec.2024 **Geometria e algebra lineare**, Laurea Triennale in Matematica, Bologna
Istituzioni di Matematica P (modulo 2), CdL Ingegneria Meccatronica, Bologna
- Feb.-May 2024 **Geometria Complessa**, Laurea Magistrale in Matematica, Bologna
- Sep.-Dec.2023 **Istituzioni di Matematica P** (modulo 2), CdL Ingegneria Meccatronica, Bologna
- 6.6.2023 Guest lecture: BMS course “Positivity in algebraic geometry” (Dr. S. Mullane), *Castelnuovo–Mumford regularity*, Berlin
- Oct.2022-Feb.2023 Frankfurt, **Algebraic Geometry I**, 4+2 hours p.w. BSc course: varieties, sheaves, projective geometry, introduction to schemes (with A. Kuhrs).
- 28.7.2022 Guest lecture: student seminar “Tropische Geometrie” (Dr. A. Botero), *Tropical intersection theory*, Heidelberg
- Oct.2021-Feb.2022 Heidelberg, Math. Inst. **Complex geometry**, 4+2 hours p.w. MSc course (basic): local and global properties of complex manifolds, Hodge theory, vector bundles, sheaves and cohomology (with Dr. S. Noja).
- Apr.-Jul.2021 Heidelberg, Math. Inst. **Topics in supergeometry**, 2 hours p.w. seminar (for BSc and MSc students in Mathematics and Physics): smooth and algebraic supermanifolds, integration, BV formalism, Clifford algebras (with Dr. S. Noja and Prof. Dr. J. Walcher).
- Apr.-Jul.2020 Heidelberg, Math. Inst. & STRUCTURES Cluster of Excellence. **Introduction to toric geometry**. 2 hours p.w. MSc course (advanced): construction from fans and polytopes, local and global properties of toric varieties, line bundles.
- Oct.2019-Feb.2020 Heidelberg, Math. Inst. & STRUCTURES Cluster of Excellence. **Topics in Algebraic Geometry - Introduction to moduli theory**. 2 hours p.w. MSc/PhD course (advanced): functor of points, Hilbert and Quot schemes, deformation theory.
- 2015-18 IC London. *Teaching Assistant* for M1GLA (Linear Algebra), M1P2 (Algebra I), M2PM2 (Algebra II), M2PM5 (Metric Spaces and Topology), M3P17 (Algebraic Combinatorics).

Student supervision

- Dec.2023- P.Taddia, *Mnëv universality for matroid realisation spaces*, Bachelor’s thesis.
- Dec.2023-Mar.2024 A.Diviggiano, *Il teorema di Bézout*, Bachelor’s thesis (with F. Meazzini).
- Nov.2023-Jul.2024 A.Cappelletti, *Hurwitz Theory: From Representations to Tropical Geometry*, BSc thesis.
- Apr.2021-Jan.2022 A.Kuhrs, $\overline{M}_{0,n}$ as a tropical compactification, Master’s thesis (with Prof. Dr. A. Schmidt).

Service to the profession

- Referee for Adv. Math., ANT, Compositio, Crelle, EPIGA, IMRN, J. Differential Geom., JLMS, Math. Proc. Cambridge Philos. Soc, Math Rev., Moduli, Selecta Math.
- 22-24.02.2023 Co-organiser, *Logarithmic geometry and moduli theory*: 2-day workshop in Frankfurt, Germany (with Prof. Dr. M. Ulirsch).
- Oct.2022-Feb.2023 Co-organiser, *GAUS-AG Buildings*: weekly working group within the CRC326-GAUS (with Prof. Dr. M. Ulirsch).
- 5-9.9.2022 Co-organiser, *COMB in CAMB*: research school on combinatorial methods in algebraic geometry in Cambridge, United Kingdom (with Dr. N. Nabijou).
- Apr.2021-Jul.2022 Co-organiser, bi-weekly seminar of the STRUCTURES Comprehensive Project 7 *Quantum Geometry and Topological Methods in Physics*, Heidelberg (with Dr. A. Randecker).
- 12.7.2021 External examiner for the Master’s thesis of Shahverdi Vahid (EPFL, Switzerland)
- Oct.2019-Feb.2020 Co-organiser, research seminar of the Mathematical Physics group in Heidelberg, Germany (with Dr. I. Saberi and Prof. Dr. J. Walcher).

Conference talks

- 31.7.2024 *Logarithmic linear series*

- Workshop “Logarithmic moduli theory: curves, sheaves, and beyond”, Cambridge
- 29.2.2024 *The integral Chow ring of $\overline{\mathcal{M}}_{1,4}$ via alternative compactifications*
- Conference “A Panorama of Moduli Spaces”, Frankfurt
- 3.3.2023 *Curves of genus two in projective space*
- Workshop Mgn + admcycles, Les Diablerets
- 6.2.2023 *Logarithmic and orbifold Gromov–Witten invariants*
- Workshop: Invariants and Curve Counting, Frankfurt
- 23-27.1.2023 *Alternative compactifications of the moduli space of curves* (3-hour minicourse)
- Structures in Enumerative Geometry, Sheffield
- 15.12.2022 *Alternative compactifications of the moduli space of curves*
- Weihnachtsworkshop, Saarbrücken
- 10.5.2022 *Logarithmic and orbifold Gromov–Witten invariants*
- Workshop: curves and K3 surfaces, Hausdorff Center, Bonn
- 30.4.2021 *Compattificazioni alternative dello spazio di moduli di curve puntate di genere due*
- Giornate di Geometria Algebrica e argomenti correlati XV, Gragnano
- 26.6.2020 *A natural smooth compactification of the space of genus two curves in projective space*
- Tropical Geometry in Frankfurt Zoom
- 18.6.2019 *Reduced Gromov-Witten invariants in genus one:
the absolute and relative theory of smooth hyperplane sections*
- Workshop: Logarithmic Enumerative Geometry and Mirror Symmetry, Oberwolfach
- 2.8.2018 *Applications of Gathmann’s algorithm for relative invariants and quantum Lefschetz*
- Workshop on Degenerate Contributions to Enumerative Invariants, Imperial College
- 3-7.7.2017 Exercise sessions, *Boundary contributions to enumerative invariants* (C. Manolache)
- Summer School in Enumerative Geometry, SISSA, Trieste

Research seminars

- Hyperelliptic curves and differentials*
- 30.1.2024 Roma Tor Vergata
- 26.10.2023 Imperial College London, MAGIC seminar
- Degenerating linear series on curves*
- 17.10.2023 Bologna, Seminario di Algebra e Geometria
- Logarithmic and orbifold Gromov–Witten invariants*
- 22.3.2022 EPFL Lausanne, Arithmetic & Algebraic Geometry seminar
- 3.3.2022 Colorado State University, Fort Collins, FRAGMENT seminar
- Curve singularities, linear series, and stable maps: genus two and beyond*
- 19.01.2022 Humboldt Universität Berlin, Algebraic Geometry seminar
- Some modular compactifications of the space of pointed curves of genus two*
- 13.10.2021 University of Cambridge, Algebraic Geometry seminar
- A smooth modular compactification of the space of genus two curves in projective space*
- 24.5.2021 Universität Bonn, Seminar on Enumerative Geometry
- 25.3.2021 Boston College, Algebraic Geometry/Number Theory Seminar
- 9.12.2020 Imperial College London, Fanosearch meeting
- 3.12.2020 KIAS, Seoul, South Korea
- Reduced relative Gromov-Witten theory in genus one and singular curves*
- 24.9.2019 University of Edinburgh, United Kingdom, EDGE seminar
- 4.7.2019 Universität Tübingen, Germany, Seminar Algebraische Geometrie,

- 16.5.2019 Freie Universität Berlin, Germany, Seminar Algebraische Geometrie
- 18.3.2019 Universität Heidelberg, Germany, Seminar Physikalische Mathematik
Genus zero relative quasimaps á la Gathmann
- 31.5.2018 Università di Pisa, Italy, Seminario di Algebra e Geometria
Reduced genus one invariants of the quintic threefold from maps with cusps
- 8.5.2018 Warwick University, United Kingdom, Algebraic Geometry Seminar
- 6.3.2018 University of Colorado at Boulder, USA, Algebraic Geometry Seminar

Other presentations (young, learning, contributed...)

- 8.11.2022 GAUS-AG “Buildings”, *Buildings as W-metric spaces*, Frankfurt
- 9.12.2021 GAUS-AG “Hodge theory of matroids”, *Toric intersection theory*
Guided meditations in logarithmic Gromov-Witten theory (org. Nabijou):
- 4.10.2021 *Genus one Gorenstein singularities and logarithmic geometry*
- 8.7.2021 GAUS-AG “ $P = W$ conjecture”, $P = W$ for $GL(2, \mathbb{C})$
Darmstadt–Frankfurt–Heidelberg–Mainz
- 18.1.2021 Study seminar on “Quadratic differentials as stability conditions”, *Bridgeland stability conditions, algebraic curves, and quivers*, Heidelberg Math. Inst.
Working seminar on contraction of logarithmic subcurves (org. Wise):
- (ii) 2.10.2020 *From genus two curves to maps*,
- (i) 25.9.2020 *Compactifications of $\mathcal{M}_{2,n}$* .
Group meeting of the research unit on Mathematical Physics, Heidelberg
- (iii) 14.1.2021 *Genus two curves in projective space*,
- (ii) 30.4.2020 *The DRC and b-Chow rings*,
- (i) 30.1.2020 *Tautological rings for curves and maps*.
- 15.11.2018 Three-speaker Oberseminar, MPIM Bonn
- 13.3.2018 Young People’s seminar, MSRI, *Genus zero relative quasimaps á la Gathmann*
Junior Geometry Seminar, Imperial College London:
- (iii) 28.1.2017 *Linear series on singular curves and applications*,
- (ii) 20.11.2015 *Moduli of curves*,
- (i) 15.5.2015 *Virtual fundamental classes*, with Francesca Carocci.
4th year colloquium, Scuola Normale Superiore di Pisa:
- 15.5.2013 *Springer’s correspondence for $\mathfrak{S}_n$* , Advisor: Prof. Andrea Maffei.

Posters

- 13-17.1.2020 K-theory, algebraic cycles and motivic homotopy theory, INI Cambridge
Modular compactifications of $\mathcal{M}_{2,n}$ with Gorenstein curves
- 20.3.2018 Structures in Enumerative Geometry, MSRI Berkeley
 - *Relative quasimaps and a Lefschetz theorem*, with Navid Nabijou
 - *Reduced vs Cuspidal invariants*, with Francesca Carocci
- available at <https://sites.google.com/view/luca-battistella>

Languages

Italian (native), English (proficient), German (intermediate).

Computer Skills

L^AT_EX, git, Macaulay2, sage, polymake, C/C++, HTML (basic).

Bologna - August 8, 2024

A handwritten signature in black ink, reading "Luca Battistella". The signature is written in a cursive style with a long, sweeping underline.

Luca Battistella