

# Andrea Di Lorenzo

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## Personal information

Date of birth 22 November 1991  
Place of birth Rome  
Nationality Italian

## Present and past positions

2021– now **Wissenschaftlicher Mitarbeiter**, *Humboldt University*, Berlin, Germany.  
2019–2021 **Postdoc**, *Aarhus University*, Aarhus, Denmark.  
Spring 2019 **Program associate for the semester on Birational Geometry and Moduli Spaces**, *MSRI*, Berkeley, CA.

## Education

2015–2019 **Ph.D. in Mathematics**, *Scuola Normale Superiore*, Thesis title: "Integral Chow ring and cohomological invariants of stacks of hyperelliptic curves". Advisor: Angelo Vistoli, *cum laude*.  
2013–2015 **Master degree in Mathematics**, *Sapienza University of Rome*, Thesis title: "The Schottky problem and minimal cohomology classes". Advisor: Enrico Arbarello, 110/110 *cum laude*.  
2010–2013 **Bachelor degree in Mathematics**, *Sapienza University of Rome*, Thesis title: "The geometry of the moment map". Advisor: Paolo Piazza, 110/110 *cum laude*.  
2005–2010 **High school diploma**, *Liceo classico "Orazio"*, Rome, 100/100 *cum laude*.

## Long term visits

Sep. 2021 **Junior fellow**, Institute Mittag-Leffler, Stockholm.  
Dec. 2019 **Research guest** (invited by A. Kresch), *University of Zürich*, Zürich.  
Spring 2017 **Ph.D. visiting student** (invited by A.J. de Jong), *Columbia University*, New York.

## Short term visits

Apr 2022 University of Washington, *Seattle*.  
Feb 2020 Scuola Normale Superiore, *Pisa*.  
Nov 2019 KTH, *Stockholm*.  
Aug 2019 Scuola Normale Superiore, *Pisa*.

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## Research interests

Moduli stacks of curves, K3 surfaces, elliptic surfaces  
Integral Chow rings and Picard groups  
Equivariant intersection theory  
Cohomological invariants and unramified cohomology  
Brauer Groups  
Chow-Witt groups

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## Publications and preprints

**Cohomological invariants and Brauer groups of algebraic stacks in positive characteristic**, joint with Roberto Pirisi, *arXiv:2207.08792*, (submitted), 2022.

**The integral Chow rings of moduli of Weierstrass fibrations**, joint with Samir Canning and Giovanni Inchiostro, *arXiv:2204.05524*, (submitted), 2022.

**Intersection theory on moduli of smooth complete intersections**, *arXiv:2201.06024*, (submitted), 2022.

**Stable cuspidal curves and the integral Chow ring of  $\overline{\mathcal{M}}_{2,1}$** , joint with Michele Pernice and Angelo Vistoli, *arxiv:2108.03680*, (submitted), 2021.

**Equivariant Chow-Witt groups and moduli stacks of elliptic curves**, joint with Lorenzo Mantovani, *arxiv:2107.02305*, (submitted), 2021.

**Polarized twisted conics and moduli of stable curves of genus two**, joint with Angelo Vistoli, *arXiv:2103.13204*, (submitted), 2021.

**Cohomological invariants of root stacks and admissible double coverings**, joint with Roberto Pirisi, *Canadian Journal of Mathematics*, <https://doi.org/10.4153/S0008414X21000602>, 2021.

**Integral Chow ring of the stack of smooth non-hyperelliptic curves of genus three**, joint with Damiano Fulghesu and Angelo Vistoli, *Transactions of the AMS*, <https://doi.org/10.1090/tran/8354>, 2020.

**Brauer groups of moduli of hyperelliptic curves via cohomological invariants**, joint with Roberto Pirisi, *Forum of Mathematics, Sigma*, <https://doi.org/10.1017/fms.2021.55>, 2021.

**A complete description of cohomological invariants of even genus hyperelliptic curves**, joint with Roberto Pirisi, *Documenta Mathematica*, <https://doi.org/10.25537/dm.2021v26.199-230>, 2021.

**Integral Picard group of the stack of quasi-polarized K3 surfaces of low degree**, *arXiv:1910.08758*, (submitted), 2019.

**Picard group of moduli of curves of low genus in positive characteristic**, *Manuscripta Mathematica*, <https://doi.org/10.1007/s00229-020-01212-3>, 2020.

**Cohomological invariants of the stack of hyperelliptic curves of odd genus**, *Transformation Groups*, <https://doi.org/10.1007/s00031-020-09598-w>, 2019.

**The Chow ring of the stack of hyperelliptic curves of odd genus**, *International Mathematics Research Notices*, <https://doi.org/10.1093/imrn/rnz101>, 2020.

**On quantum and relativistic analogues in Mean-Field Spin models**, *Proc. Royal Soc. A*, **470**:20140589, with A. Barra, F. Guerra, A. Moro, 2015.

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## Conference talks

**Invariants of moduli stacks**, *DMV annual meeting 2022, Berlin*, September 2022 (upcoming).

**Quadratic invariants of moduli of elliptic curves**, *Invariants in Algebraic Geometry, Dijon*, May 2022 (upcoming).

**Intersection theory with quadratic forms and moduli of elliptic curves**, *Giornate di Geometria Algebrica e Argomenti Correlati XV, Gargnano*, June 2021.

**The integral Chow ring of the stack of hyperelliptic curves of odd genus**, *GAeL XXVI, Strasbourg*, June 2018.

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## Seminar talks

**Brauer groups of moduli of hyperelliptic curves and their compactifications**, *University of Washington, Seattle*, 5 April 2022.

**Quadratic invariants of moduli of elliptic curves**, *University of Bologna*, 18 March 2022.

**The integral Chow ring of the stack of stable 1-pointed curves of genus two**, *University of Roma 3*, 10 March 2022.

**Quadratic invariants of moduli of elliptic curves**, *University of Pisa*, 2 March 2022.

**Integral Chow ring of moduli of stable 1-pointed curves of genus two**, *University of Bordeaux*, 28 January 2022.

**Brauer groups of moduli of hyperelliptic curves and their compactifications**, *University of Amsterdam*, 8 December 2021.

**The integral Chow ring of the stack of stable 1-pointed curves of genus two**, *Institute Mittag-Leffler*, 14 September 2021.

**The integral Chow ring of the stack of stable 1-pointed curves of genus two**, *Humboldt University, Berlin*, 9 June 2021.

**Mixed Tate motives and Brown's theorem**, *STAGOSAUR online seminar*, 7 August 2020.

**The Chow ring of the stack of stable curves of genus 2**, *KTH, Stockholm*, 30 October 2019.

**Picard group of moduli of curves and K3 surfaces**, *Aarhus University*, 9 October 2019.

**Picard group of moduli of curves and K3 surfaces**, *University of Ferrara*, 4 October 2019.

**The integral Chow ring of stacks of hyperelliptic curves**, *MSRI, Berkeley*, 28 February 2019.

**The integral Chow ring of moduli stacks of curves**, *MAGIC seminar, Imperial College, London*, 28 January 2019.

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## Conferences and workshops attended

- May 2022 **Invariants in Algebraic Geometry**, *University of Bourgogne, Dijon*.
- Oct. 2021 **Motives and Hodge theory**, *Institute Mittag-Leffler, Djursholm*.
- June 2021 **Classical Algebraic Geometry**, *MFO, Oberwolfach*.
- May 2019 **Recent Progress in Moduli Theory**, *MSRI, Berkeley, CA*.
- Mar. 2019 **Derived algebraic geometry and its applications**, *MSRI, Berkeley, CA*.
- Sept. 2018 **CATS5**, *University of Lisbon, Lisbon*.
- July 2018 **The arithmetic of derived categories**, *University of Trento, Trento*,  
(presented the poster "*The Chow ring and cohomological invariants of moduli stack of hyperelliptic curves of odd genus*").
- June 2018 **GAeL XXVI**, *University of Strasbourg, Strasbourg*.
- June 2018 **A tale of Algebra and Geometry-a conference to celebrate Angelo Vistoli's 60th birthday**, *University of Pisa, Pisa*.
- March 2018 **School on birational geometry of hypersurfaces**, *Palazzo Feltrinelli, Gargnano sul Garda*, (presented the poster "*The Chow ring and cohomological invariants of moduli stack of hyperelliptic curves of odd genus*").

- Sept. 2017 **Modern Moduli Theory 2017**, *University of Oxford*, Oxford.
- Sept. 2017 **Vector Bundles on Algebraic Curves 2017**, *University of Duisburg-Essen*, Essen.
- July 2017 **School on Deformation Theory**, *Università di Torino*, Torino.
- June 2017 **GAeL XXV**, *University of Bath*, Bath.
- June 2017 **Derived algebraic geometry and interactions**, *Université Toulouse III-Paul Sabatier*, Toulouse.
- Sept. 2016 **School on Higgs bundles and fundamental groups of algebraic varieties**, *University of Duisburg-Essen*, Essen.
- Jan. 2016 **Torsors in algebraic and arithmetic geometry**, *University of Nice-Sophia Antipolis*, Nice.

## Services

Referee for Algebraic Geometry, Annali della Scuola Normale Superiore di Pisa, Crelle, International Mathematics Research Notices, Mathematische Zeitschrift.

Zweitgutachter (second advisor) for the bachelor thesis of Max Urlings (April 2022).

## Teaching

- Spring 2022 **Number theory**, Humboldt University.
- Fall 2021 **Algebraic curves (TA)**, Humboldt University.
- Fall 2021 **Algebra II (TA)**, Humboldt University.
- Spring 2021 **Geometric group theory (TA)**, Humboldt University.
- Fall 2020 **Topology of algebraic varieties**, Aarhus University.
- Fall 2019 **Cohomological field theories**, Aarhus University.

## Other activities

Co-organizer of the lecture course on "Derived algebraic geometry" at Scuola Normale Superiore, Pisa (8 lectures given), *Oct 2017-Jun 2018*.

Co-organizer of the lecture course on "Derived categories, Fourier-Mukai transform and Bridgeland stability" at Scuola Normale Superiore, Pisa (8 lectures given), *Oct 2016-Jun 2017*.

## Outreach activities

"University orientation courses" for high school students, organized by Scuola Normale Superiore, *San Gimignano (2016)*, *Roma (2017)*, *Napoli (2018)*.

Tutor for scientific subjects

## Awards and scholarships

- Fall 2021 Junior Fellowship, *Institute Mittag-Leffler*.
- June 2021 Oberwolfach Leibniz Graduate Student Grant, *MFO*.
- 2014-2015 Excellence program in Mathematics, MA, *Sapienza University of Rome*.
- 2012-2013 Excellence program in Mathematics, BA, *Sapienza University of Rome*.
- 2010-2013 Merit-based exemption from tuition fees payment

## Computer skills

- Operating systems Unix, Windows
- Programming languages Mathematica, SageMath

## Languages

- Italian Mother tongue
- English Fluent
- French Intermediate

Berlin, September 5, 2022