

# Morena Porzio

## Curriculum Vitae

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### Education and Formation

- 2025-now **Postdoctoral Fellow at the Department of Mathematics**, *University of Toronto*, 40 St. George Street; Toronto, ON.
- 2020-2025 **PhD Student in Mathematics**, *Columbia University, GSAS*, New York, NY.
- 2022-2024 **Master of Philosophy in Mathematics**, *Columbia University, GSAS*, New York, NY.
- 2020-2022 **Master of Arts in Mathematics**, *Columbia University, GSAS*, New York, NY, GPA: 4.1.
- 2015-2020 **Master's & Bachelor's Degree in Mathematics**, *Scuola Normale Superiore, Honors College*, Pisa, Italy, 100/100 cum Laude, GPA: 4.0.
- 2018-2020 **Master's Degree in Mathematics**, *University of Pisa*, Pisa, Italy, 110/110 cum Laude, GPA: 4.0.
- 2015-2018 **Bachelor's Degree in Mathematics**, *University of Pisa*, Pisa, Italy, 110/110 cum Laude, GPA: 4.0.
- 2010-2015 **High School Diploma**, *Liceo Scientifico F. Vercelli*, Asti, Italy, 100/100 cum Laude.

### Publications and Preprints

- 2025 **Density of algebraic points on products of curves**, joint work with J. Berg, Y. Fu, E. Gazaki, J. Rawson, I. Vogt, Preprint <https://arxiv.org/abs/2507.00860v1>.
- 2025 **The Arithmetic of Del Pezzo Surfaces and Hilbert Schemes of Points**, *My PhD Thesis* advised by Aise Johan de Jong, Preprint <https://academiccommons.columbia.edu/doi/10.7916/1hz7-fc26>.
- 2024 **On the Stable Birationality type of Hilbert schemes of points**, M. Porzio, Preprint <https://arxiv.org/abs/2408.07593>.
- 2024 **On the homotopy type of the Beilinson–Drinfeld Grassmannian**, G. Nocera, & M. Porzio, Preprint <https://www.math.columbia.edu/~morenaporzio/BDGrassmannian.pdf>.
- 2022 **The Torsion–Free Rank of  $Ext^1(A, \mathbb{Z})$  and Whitehead's Problem**, M. Porzio, *The Graduate Journal of Mathematics*, Volume 7, Issue 1 (2022), 10-16 <https://gradmath.org/wp-content/uploads/2022/09/GJM2022-Porzio.pdf>.  
For a longer version (Bachelor Thesis), see [http://www.logicatorino.altervista.org/matteo\\_viale/Porzio.pdf](http://www.logicatorino.altervista.org/matteo_viale/Porzio.pdf)
- 2022 **An Estimation of Hailstone Radii Using the Collatz Conjecture**, R. Gupta, & M. Porzio, *Journal of Student Research (JSR)*, Vol. 11 No. 2 (2022) <https://doi.org/10.47611/jsrhs.v11i2.3638>.  
Mentorship through Lumiere education, Premium Research & Publication Program.
- 2020 **Picard Groups of Stacks of Elliptic and Hyperelliptic Curves**, M. Porzio, advised by Angelo Vistoli, Master Thesis (2020) <https://etd.adm.unipi.it/t/etd-09102020-102635/>.

### Ongoing Projects

- **Higher Beauville Components of Ceresa Cycles and Modified Diagonals**, *joint work with L. Lagarde, M. Moakher, J. Rawson, and F. Trejos*.  
This work studies the vanishing of the higher Beauville components  $[C]_{(s)}^e$  ( $C$  is a curve embedded in its Jacobian using a degree 1  $\mathbb{Q}$ -divisor  $e$ ), relating it to the vanishing of *modified diagonal cycles*. We also extend the work of Polishchuk on the  $sl_2$ -action on  $CH(J)_{\mathbb{Q}}$  and prove recurrence relations for the Beauville components of  $[C]^e$  as well as between the modified diagonal cycles.
- **Project on full DP2's over characteristic 2**, *joint work with J. Desjardins, A. Knecht, J. Schneider, M. Trip*.

A split del Pezzo surface  $X/k$  is called *full* if all  $k$ -rational points on  $X$  lie on the exceptional curves. Hirschfeld proved that over finite fields, in order to be full, the DP must have degree at most 5 and for degree up to 3 they are classified up to isomorphism. Partial results are known for degree 2 in odd characteristic. The aim of this project is to complete the classification of DP2's over a field of characteristic 2.

## Grants and Awards

- 2023/2024 **Winner of PhD Candidate Recognition Award for Excellence in Teaching**, *Math Department of Columbia University*, New York, NY.
- 2020-2026 **Winner of Fellowship Package as a Dean's Fellow and doctoral student at the Math Department of Columbia University**, New York, NY.
- 2022-2024 **Sponsored Member of the Association for Women in Mathematics, AWM**, <https://awm-math.org/>.
- 2019 **Winner of the AILA Award 3+2 2019**, *Associazione Italiana di Logica e sue Applicazioni (Italian Association of Logic and its Applications)*.  
<http://www.ailalogica.it/2019/06/03/vincitori-premio-aila-32-anno-2018-19/>
- 2015-2020 **Winner of Full Scholarship with Grant at Scuola Normale Superiore, SNS**, Pisa, Italy.
- 2015 **Winner of INdAM Scholarship**, *National Institution of High Mathematics "Francesco Severi"*, [https://www.altamatematica.it/sites/default/files/graduatoria40-2015-2016\\_0.pdf](https://www.altamatematica.it/sites/default/files/graduatoria40-2015-2016_0.pdf).
- 2015 **National Gold Medal, Italian Mathematical Olympiads (preIMO)**, Cesenatico, Italy.  
Scored as the ninth Italian high-school student, <http://olimpiadi.dm.unibo.it/archivio/medagliere/>.
- 2015 **International Bronze Medal, European Girls' Mathematical Olympiad (EGMO)**, Minsk, Belarus.  
Scored in the top 50 worldwide participants, <https://www.egmo.org/egmos/egmo4/scoreboard/>.
- 2015 **National Bronze Medal, Italian Physics Olympiads (preIPhO)**, Senigallia, Italy.  
Scored in the top 40 Italian high-school students <https://www.olifis.it/>

## Teaching and Mentoring

- Year 24-25 **Math Grad Representative**, *Columbia University*, New York.
- Fall '24,'23 **TA of MATHGR6261, Commutative Algebra**, *Columbia University*, New York.
- Fall '23 to Fall '24 **Graduate Student Editor at Columbia Journal of Undergraduate Mathematics**,  
<https://journals.library.columbia.edu/index.php/cjum>.
- Spring '24 **TA of MATHGR6262, Arithmetic and Algebraic Geometry**, *Columbia University*, New York.
- Spring '24 **TA of MATHV2030, Ordinary Differential Equations**, *Columbia University*, New York.
- Summer '23 **Instructor of MATHUN2030, Ordinary Differential Equations**, *Columbia University*, New York.

- Summers '23, '22 **Mentor at Lumiere Education**, *Premium Research and Publication Program*, <https://www.lumiere-education.com/>, Online.
- Spring '23 **TA of MATHGU4043**, *Algebraic Number Theory*, Columbia University, New York.
- From '21 to '24 **Administrator of the Putnam Exam**, Columbia University, New York, NY.
- Spring '25, Fall '22, Spring '22, Fall '21 **TA of MATHUN2030**, *Ordinary Differential Equation*, Columbia University, New York.
- Spring '21 **Young Mentor in THE STEM factor project**, *Global Shapers* <https://www.globalshapers.org/>, Florence, Italy.  
Cycle of interviews and Q&A sessions, whose main goal is to address gender issues among the STEM world.
- Fall '18 **TA of the master course Algebra**, University of Pisa, Pisa, Italy.
- Apr '18 **Staff member at EGMO 2018**, <http://www.egmo2018.org/>, Florence, Italy.  
Staff member and invigilator at the European Girls' Mathematical Olympiad, an international math competition.
- Springs '16, '17, '18 **Trainer at Italian EGMO training**, *Staff Member – Problems proposer and grader*.
- Winter '17 **Co-instructor at Math Olympiads Internship**, UMI – Unione Matematica Italiana (*Italian Mathematics Union*), Massa, Italy.
- Spring '16 **Staff Member of the National Mathematical Olympiads**, UMI, Cesenatico, Italy.  
Corrector of the problems proposed and a staff member at the national mathematical competition.

## Invited Talks at Seminars

- Jun 24 2025 **Algebraic Points on Curves**, *Lightning Talk - On the stable birationality of Hilbert schemes of points on surfaces*, [https://icerm.brown.edu/program/topical\\_workshop/tw-25-apc](https://icerm.brown.edu/program/topical_workshop/tw-25-apc), ICERM, Providence.
- May 17 2025 **2025 AWM Research Symposium**, *Higher Beauville Components of Ceresa Cycles and Modified Diagonals*, <https://awm-math.org/meetings/awm-research-symposium/>, University of Wisconsin-Madison, Madison.
- Apr 4 2025 **UVA Number Theory Seminar**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://math.virginia.edu/seminars/ntsem/>, University of Virginia, Charlottesville.
- Dec 3 2024 **Utah Algebraic Geometry Seminar**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://www.math.utah.edu/agseminar/>, University of Utah, Salt Lake City.
- Nov 19 2024 **Emory Algebra and Number Theory Seminar**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://sarangop1728.github.io/eants>, Emory University, Atlanta, GA.
- Nov 11 2024 **Association for Women in Mathematics**, *On the density of algebraic solutions on products of curves*, <https://www.math.columbia.edu/diversity/awm/>, Columbia University.
- Nov 4 2024 **Poster Session at Instructional Workshop on Rational Points**, *On the stable birationality of Hilbert schemes of points on surfaces*, University of Groningen <https://www.rationalpoints.nl/events-2/instructional-workshop-on-rational-points/>.
- Nov 4 2024 **Seminar on Arithmetic Geometry and Algebraic Groups**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://seminaragag.github.io/>, Online.

- Oct 30 2024 **University of Michigan algebraic geometry seminar**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://events.umich.edu/event/126925>, University of Michigan, Ann Arbor.
- Oct 24 2024 **Tufts Algebra, Geometry, and Number Theory Seminar**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://sites.google.com/view/tuftsagents/home>, Tufts University, Boston.
- Jun 28 2024 **WIAG 2** <https://sites.google.com/view/wiag2024/>, *Project Group presentation on Classification of del Pezzo surfaces*, IAS, Institute for Advanced Study, Princeton.
- Oct 1 2024 **Poster Session at Workshop on Algebraic Cycles**, *On the stable birationality of Hilbert schemes of points on surfaces*, <https://sites.google.com/view/workshop-on-algebraic-cycles>, Leibniz Universität, Hannover.
- Apr 10 2024 **Columbia Undergraduate Math Society, Spring 2024**, *Riemann–Roch Theorem for Graphs and Specialization of Divisors from Curves*, <https://math.columbia.edu/~ums/>, Columbia University, NY.
- Mar 22 2024 **Degree  $d$ -points on Algebraic Surfaces - AIM Workshop** <https://aimath.org/workshops/upcoming/degreesurface/>, *Stable Birationality Types of Hilbert schemes of points on Surfaces*, Caltech University, Pasadena, CA.
- Mar 6 2024 **Arizona Winter School 2024: Abelian Varieties, Spring 2024**, <https://swc-math.github.io/aws/2024/index.html>, *Project Group presentation on Ceresa's cycles*, University of Arizona, Tucson, AZ.
- Apr 19 2023 **Columbia Undergraduate Math Society, Spring 2023**, *Obstructions to the existence of rational points on algebraic varieties*, <https://www.math.columbia.edu/~ums/2023spring.html>, Columbia University, NY.

## Organized Learning Seminars

- Spring 2025 **Talk till you are stuck, AG Research Seminar**, <https://www.math.columbia.edu/~morenaporzio/TTURTseminar.html>.
- Spring 2024 **Elliptic Curves and Abelian Varieties**, <https://www.math.columbia.edu/~morenaporzio/PAWSseminar.html>.
- Spring 2022 **Motives, Standard Conjectures and Weil Cohomology Theories**, <https://math.columbia.edu/~morenaporzio/Motives&WCT.html>.

## Talks at Learning Seminars

- Apr 19 2024 **Spring 2024 AG learning seminar: Decomposition of the diagonal**, *Nilpotence conjecture and Kimura's theorem*, [https://yoonjookim.github.io/seminars/spring\\_2024.html](https://yoonjookim.github.io/seminars/spring_2024.html), Columbia University.
- Apr 12 2023 **Preprint Seminar, Spring 2023**, *Smooth subvarieties of Jacobians*, <https://www.math.columbia.edu/~tpad/preprintS2023.html>, Columbia University.
- Feb 24 2023 **Spring 2023 Informal AG Seminar on MMP**, *Minimal Model Program in dimension 2*, <https://www.math.columbia.edu/~andresfh/sp23agseminar.html>, Columbia University.
- Feb 16 2023 **Milnor-Witt motives seminar 2023**, *Milnor-Witt  $K$ -theory*, <https://math.columbia.edu/~magenroy/MilnorWittMotivesSeminar.html>, Columbia University.
- Nov 16 2022 **Rigid Analytic Geometry and Perfectoid Spaces**, *Generalities on Constructible Sets and Spectral Spaces*, <https://www.math.columbia.edu/~scheffelin/perfectoid>, Columbia University.
- Nov 9 2022 **Non-abelian Hodge correspondence and  $P=W$  conjecture**, *Perverse sheaves and Lefschetz hyperplane theorem*, <http://math.columbia.edu/~anabasheva/pw.html>, Columbia University.

- Oct 14 2022 **Motivic homotopy theory learning seminar**, *Basics of the unstable motivic homotopy category*, <http://math.columbia.edu/~magenroy/motivicseminar.html>, Columbia University.
- Nov 24 2021 **SNS Dissertation Talk**, *Surjectivity of Brauer Map for surfaces: positives results and counterexample*, Zoom – Scuola Normale Superiore.
- Oct 29 2021, **Deformation Theory Seminar**, *Application of deformation theory to contracting*  
Nov 5 2021 *curves functor  $\mathcal{M}_{g,n+1} \rightarrow \mathcal{M}_{g,n}$* , <https://www.math.columbia.edu/~dejong/seminar/seminar-deformation-theory.html>, Columbia University.
- Apr 27 2021, **Derived Algebraic Geometry Learning Seminar - Formal moduli problems**,  
May 5 2021, *Ring Spectra and Generalized Cohomology Theory*, <https://uz.sns.it/~Wilhelm795/FMP2021.html>, Zoom – Scuola Normale Superiore.
- May 11 2021 **Intersection Theory Learning Seminar**, *Grothendieck-Riemann-Roch*, <https://www.math.columbia.edu/~plei/s21-INT.html>, Columbia University.
- Mar 26 2021 **Geometric Invariant Theory Learning Seminar**, *GIT and Coarse Moduli Problems*,  
Oct 30 2020, <https://www.math.columbia.edu/~plei/f20-GIT.html>, Columbia University.

## Schools and Conferences

- June 23-27 **ICERM - Algebraic Points on Curves**, *Brown University*, Providence, [https://icerm.brown.edu/program/topical\\_workshop/tw-25-apc](https://icerm.brown.edu/program/topical_workshop/tw-25-apc).
- May 16-18 **2025 AWM Research Symposium**, *University of Wisconsin-Madison*, Madison, <https://awm-math.org/meetings/awm-research-symposium/>.
- Nov 4-8 **Instructional workshop on rational points**, *University of Groningen*, Netherlands, <https://www.rationalpoints.nl/events-2/instructional-workshop-on-rational-points/>.
- Sept30- **Workshop on Algebraic Cycles**, *Leibniz Universität*, Hannover, <https://sites.google.com/view/workshop-on-algebraic-cycles>.
- Oct2 2024 **Collaborative Workshop in Algebraic Geometry**, *IAS - Institute for Advanced Studies*, Princeton, <https://www.ias.edu/math/events/collaborative-workshop-algebraic-geometry>.
- June 24-28 **The Geometry of Hilbert Schemes of Points**, *CIRM*, Levico Terme (Italy), <https://sites.google.com/view/ghisp2024/home>.
- May 6-10 **On the occasion of Hélène Esnault's 70th birthday**, *IHES - Centre de conférence Marilyn et James Simons*, Bures-sur-Yvette (Paris), <https://indico.math.cnrs.fr/event/11114/>.
- Apr 22-26 **Degree d points on algebraic surfaces**, *AIM Workshop*, Caltech University, Pasadena (CA), <https://aimath.org/workshops/upcoming/degreesurface/>.
- Mar 18-22 **Arizona Winter School 2024: Abelian Varieties**, *University of Arizona*, Tucson (AZ), <https://swc-math.github.io/aws/2024/index.html>.
- Mar 2-6 **Monodromy and Its Applications**, *Conference on the Occasion of Nicholas Katz' 80th Birthday*, *Princeton University*, Princeton, <https://sites.google.com/princeton.edu/katz80>.
- Dec 7-9 **Conference on 100 Years of Noetherian Rings**, *IAS - Institute for Advanced Studies*, Princeton, <https://www.ias.edu/math/events/conference-100-years-noetherian-rings>.
- June 19-23 **Arithmetic, Birational Geometry, and Moduli Spaces**, *Brown University*, Providence, <https://sites.google.com/view/abgms2023/>.
- June 12-16 **AGNES Fall 2022 (Algebraic Geometry Northeastern Series)**, *University of Massachusetts*, Amherst, <https://sites.google.com/site/agneshomepage/amherst-2022?authuser=0>.

- Oct7, Nov4 **ENYGMMa (Empowering New York Gender Minority Mathematicians)**,  
2022, Sept22 *CUNY, Columbia University, Stony Brook University, New York City*, [https://sites.  
2023 google.com/stonybrook.edu/enygmma/home?authuser=0](https://sites.google.com/stonybrook.edu/enygmma/home?authuser=0).
- Sept 12-16 **Summer school "Motives in Ratisbona"**, *University of Regensburg, Re-*  
2022 *gensburg*, [https://www.uni-regensburg.de/mathematics/motives2022/startseite/  
index.html](https://www.uni-regensburg.de/mathematics/motives2022/startseite/index.html).
- May **O-minimality and foliations**, *CIRM (Centre International de Rencontres Mathéma-*  
31-4(Jun) *tiques)*, Virtual Workshop, <https://conferences.cirm-math.fr/2682.html>.  
2021
- Jun 8-20 **Algebraic and Tropical Online Meetings (ATOM)**, Virtual School, [https://  
2020 researchseminars.org/seminar/ATOM](https://researchseminars.org/seminar/ATOM).
- Aug **Summer School of Logic**, *AILA (Italian Association of Logic and its Applications)/SILFS*  
26-1(Sept) *(Italian Society of Logic and Philosophy of Science)*, Gargnano, Italy, [http://sel.di.  
2019 unimi.it/](http://sel.di.unimi.it/).
- Nov 27-30 **Young Perspectives in Deformation Theory**, *Politecnico of Turin, Turin*, [https:  
2018 //sites.google.com/site/ypdt2018/](https://sites.google.com/site/ypdt2018/).