

CLAUDIO FONTANARI

## Curriculum Vitae

February 2024

### 1 Personal and career information

Born in Trento (Italy) on March 24, 1976.

Married to Silvia, father of Giacomo (b. 2015), Francesco (b. 2017) and Maria (b. 2019).

Current address: Dipartimento di Matematica, Università degli Studi di Trento,  
Via Sommarive 14, I-38123 Trento, Italy.

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#### Present position

Associate Professor in Geometry at the Department of Mathematics of the University of Trento since September 1, 2012.

Italian National Abilitation to the position of Full Professor in Algebra and Geometry taken both in 2012 (valid since December 24, 2013) and in 2018 (valid since September 4, 2019).

#### Prizes and awards

- Member of the *Accademia degli Agiati* (Classe di "Scienze Matematiche, Fisiche e Naturali") since May 19, 2019.
- Medal "Le Scienze" (Italian edition of "Scientific American") for Mathematics (2007).
- Medal by the President of the Italian Republic (2007).

#### Previous positions

- Assistant Professor in Geometry at the Faculty of Engineering of the University of Trento (2008-2012).
- Assistant Professor at the Faculty of Information Engineering of Politecnico di Torino (2005-2008).
- Post-Doc (project *T.A.S.C.A. - Geometry of Spaces of Curves*) at the Local Research Unit of I.N.d.A.M. in Trento (2004).
- Post-Doc (grant *Moduli Spaces and Theta Functions*) at the Department of Mathematics of the University of Trento (2002-2004).

- Visitor at Centro di ricerca matematica Ennio De Giorgi of Scuola Normale Superiore di Pisa (February 24-March 14, 2014).
- Visitor at the Park City Mathematics Institute (PCMI) of the Institute for Advanced Studies (July 2011).
- Visitor at the Institut Mittag-Leffler of the Royal Swedish Academy of Sciences (May 2007).
- Visitor at the Department of Pure Mathematics and Mathematical Statistics of Cambridge University (October 2003).

## Education

- "Laurea in Matematica" at the University of Trento (June 29, 1999), dissertation: Brill-Noether theory for singular curves, advisor prof. Edoardo Ballico, evaluation 110/110 cum laude.
- PhD in Mathematics at the Scuola Normale Superiore di Pisa (December 11, 2002), dissertation: Geometry of moduli spaces, advisor prof. Enrico Arbarello, evaluation 70/70 cum laude.

## 2 Scientific Activity

### Publications

I work in algebraic geometry. My main field of expertise is the geometry of algebraic curves and their moduli spaces, but I am interested in higher dimensional projective varieties and their birational geometry as well. I also enjoy doing interdisciplinary research, both application oriented and related to history and philosophy. Accordingly, my about 120 scientific publications split into four research areas:

- Algebraic curves and moduli spaces
- Projective and birational geometry
- Applications of algebra and geometry
- History and philosophy of mathematics.

### List of publications

#### Algebraic curves and moduli spaces

- (1) *On the Existence of Special Divisors on Singular Curves*, joint with Edoardo Ballico. Rendiconti del Seminario Matematico dell'Università di Padova 106 (2001), 143–151.
- (2) *Linear Series on  $k$ -gonal curves*, joint with Edoardo Ballico. Annali dell'Università di Ferrara–Sezione VII–Scienze Matematiche XLVII (2001), 1–8.
- (3) *On the variety of linear series on a singular curve*, joint with Edoardo Ballico. Bollettino dell'Unione Matematica Italiana (8) 5–B (2002), 631–639.
- (4) *A Brill-Noether theory for  $k$ -gonal nodal curves*, joint with Edoardo Ballico. Rendiconti del Circolo Matematico di Palermo LII (2003), 285–296.
- (5) *On algebraic curves whose osculating planes belong to the maximal number of independent linear complexes*, joint with Edoardo Ballico. Geometriae Dedicata 96 (2003), 199–203.
- (6) *On the Gaussian map for a singular bielliptic canonical curve*, joint with Edoardo Ballico. International Mathematical Journal 3 (2003), 191–194.
- (7) *Gaussian maps, the Zak map and projective extensions of singular varieties*, joint with Edoardo Ballico. Results in Mathematics 44 (2003), 29–34.
- (8) *On the surjectivity of Gaussian maps for complete intersection curves*, joint with Edoardo Ballico. Ricerche di Matematica 53 (2004), 79–85.

- (9) *Moduli of curves via algebraic geometry.*  
Rendiconti del Seminario Matematico dell'Università e del Politecnico di Torino 59 (2001), 137–139.
- (10) *Theta loci and deformation theory.*  
Rendiconti Matematici dell'Accademia dei Lincei 13 (2002), 135–142.
- (11) *On the geometry of moduli of curves and line bundles.*  
Rendiconti Matematici dell'Accademia dei Lincei 16 (2005), 45–59.
- (12) *On the Cohomology of  $\overline{\mathcal{M}}_{0,n}(\mathbb{P}^1, d)$ ,* joint with Gilberto Bini.  
Communications in Contemporary Mathematics 4 (2002), 751–761.
- (13) *Calculating Cohomology Groups of  $\overline{\mathcal{M}}_{0,n}(\mathbb{P}^r, d)$ ,* joint with Gilberto Bini.  
Annali di Matematica Pura e Applicata 182 (2003), 337–344.
- (14) *Moduli of Prym curves,* joint with Edoardo Ballico e Cinzia Casagrande.  
Documenta Mathematica 9 (2004), 265–281.
- (15) *Reconstructing pluricanonical embeddings of general  $k$ -gonal curves via odd theta-characteristics,* joint with Edoardo Ballico.  
Ricerche di Matematica 55 (2006), 227–232.
- (16) *Brill-Noether divisors on the moduli space of curves and applications,* joint with Edoardo Ballico.  
Journal of the Korean Mathematical Society 42 (2005), 1279–1285.
- (17) *A remark on the ample cone of  $\overline{\mathcal{M}}_{g,n}$ .*  
Rendiconti del Seminario Matematico dell'Università e del Politecnico di Torino 63 (2005), 9–14.
- (18) *Moduli of Curves and Spin Structures via Algebraic Geometry,* joint with Gilberto Bini.  
Transactions of the American Mathematical Society 358 (2006), 3207–3217.
- (19) *On the Birational Geometry of  $\overline{\mathcal{M}}_{0,n}(\mathbb{P}^r, d)$ ,* joint with Gilberto Bini.  
Manuscripta Mathematica 115 (2004), 379–387.
- (20) *On the surjectivity of the canonical Gaussian map for multiple coverings,* joint with Edoardo Ballico.  
Advances in Geometry 6 (2006), 333–337.
- (21) *Weighted Gaussian Maps,* joint with Edoardo Ballico.  
Beiträge zur Algebra und Geometrie. Contributions to Algebra and Geometry 47 (2006), 63–66.
- (22) *On the rationality of moduli spaces of pointed curves,* joint with Gianfranco Casnati.  
Journal of the London Mathematical Society 75 (2007), 582–596.

- (23) *On the geometry of bihyperelliptic curves*, joint with Edoardo Ballico and Gianfranco Casnati.  
Journal of the Korean Mathematical Society 44 (2007), 1339–1350.
- (24) *On the birational geometry of moduli spaces of pointed curves*, joint with Edoardo Ballico and Gianfranco Casnati.  
Forum Mathematicum 21 (2009), 935–950.
- (25) *On the geometry of  $\overline{S}_2$* , joint with Gilberto Bini.  
International Journal of Mathematics 20 (2009), 605–621.
- (26) *Towards the cohomology of moduli spaces of higher genus stable maps*.  
Archiv der Mathematik 89 (2007), 530–535.
- (27) *Quantum cohomology of moduli spaces of genus zero stable curves*.  
Ricerche di Matematica 56 (2007), 277–284.
- (28) *A remark on the rational cohomology of  $\overline{S}_{1,n}$* , joint with Gilberto Bini.  
Collectanea Mathematica 60 (2009), 241–247.
- (29) *A short note about the cohomology of moduli spaces of higher genus stable maps*.  
Institut Mittag-Leffler, Report No. 14, 2006/2007.
- (30) *Geometry of effective divisors on moduli spaces*, joint with Andrea Bruno and Alessandro Verra.  
"Vector bundles and low codimensional subvarieties: state of the art and recent developments", in: "Quaderni di Matematica della Seconda Università di Napoli" (2008), 1–12.
- (31) *Characterizing hyperelliptic curves by vanishing and non-vanishing*, joint with Emma Previato.  
Institut Mittag-Leffler, Report No. 32, 2006/2007.
- (32) *Shape matching and moduli spaces*.  
Institut Mittag-Leffler, Report No. 65, 2006/2007.
- (33) *A perfect stratification of  $M_g$  for  $g$  at most 5*, joint with Eduard Looijenga.  
Geometriae Dedicata 136 (2008), 133–143.
- (34) *Positive divisors on quotients of  $\overline{M}_{0,n}$  and the Mori cone of  $\overline{M}_{g,n}$* .  
Journal of Pure and Applied Algebra 213 (2009), 454–457.
- (35) *Footnote to a manuscript by Gwena and Teixidor i Bigas*, joint with Edoardo Ballico.  
Bulletin of the Korean Mathematical Society 46 (2009), 67–69.
- (36) *A brief introduction to algebraic curves*, by Edoardo Sernesi.  
Available online at the url [www.mat.uniroma3.it/users/sernesi](http://www.mat.uniroma3.it/users/sernesi).
- (37) *Normally generated line bundles on general curves*, joint with Edoardo Ballico.  
Journal of Pure and Applied Algebra 214 (2010), 837–840.

- (38) *Normally generated line bundles on general curves, II*, joint with Edoardo Ballico.  
Journal of Pure and Applied Algebra 214 (2010), 1450–1455.
- (39) *On Green and Green-Lazarfeld conjectures for simple coverings of algebraic curves*,  
joint with Edoardo Ballico.  
Le Matematiche, Volume 65, Issue 1 (2010).
- (40) *Koszul cohomology and singular curves*, joint with Edoardo Ballico and Luca Tasin.  
Rendiconti del Circolo Matematico di Palermo 59 (2010), 121–125.
- (41) *Linear systems on weak Del Pezzo surfaces*, joint with Edoardo Ballico and Luca Tasin.  
Revue Roumaine de Mathématiques Pures et Appliquées 55 (2010), 93–96.
- (42) *Singular curves on K3 surfaces*, joint with Edoardo Ballico and Luca Tasin.  
Sarajevo Journal of Mathematics Vol. 6 (19), no. 2 (2010), 165–168.
- (43) *On the rational cohomology of moduli spaces of curves with level structures*, joint with  
Gilberto Bini.  
Geometriae Dedicata 156 (2012), 127–139.
- (44) *On the birational geometry of the universal Picard variety*, joint with Gilberto Bini  
and Filippo Viviani.  
International Mathematics Research Notices (2012) 740–780.
- (45) *On the rational Picard group of the moduli space of curves*.  
arXiv:1012.4991 (2010).
- (46) *An affine open covering of  $\mathcal{M}_g$  for  $g \leq 5$* , joint with Stefano Pascolutti.  
Geometriae Dedicata 158 (2012), 61–68.
- (47) *On the tautological ring of  $\mathcal{M}_{g,n}$* , joint with Gilberto Bini.  
In: *Vedere la matematica ... alla maniera di Mimmo Luminati*, editors F. Broglia, M.  
Dedò, I. Tamanini, ETS, Pisa 2015 (ISBN 9788846742797), 81–87.  
arXiv:1307.7266 (2013).
- (48) *A remark on the Cox ring of  $\overline{M}_{0,n}$* .  
arXiv:1312.0543 (2013).
- (49) *A few remarks about the Hilbert scheme of smooth projective curves*, joint with  
Edoardo Ballico.  
Communications in Algebra 42 (2014), 3895–3901.
- (50) *Families of nodal curves in  $\mathbb{P}^r$  with the expected number of moduli*, joint with Edoardo  
Ballico and Luca Benzo.  
Bollettino dell'Unione Matematica Italiana 7 (2014), no. 3, 183–192.
- (51) *Finiteness of rational curves of degree 12 on a general quintic threefold*, joint with  
Edoardo Ballico.  
Pure Appl. Math. Q. 11 (2015), 537–557.

- (52) *Neutral linear series and Brill-Noether theory of singular curves.*  
Rend. Mat. Appl. (7) 38 (2017), 171–174.
- (53) *A computational approach to the ample cone of moduli spaces of curves*, joint with Riccardo Ghiloni and Paolo Lella.  
International Journal of Algebra and Computation 28 (2018), 37–51.
- (54) *Maximal rank of space curves in the range  $A$* , joint with Edoardo Ballico and Philippe Ellia.  
European Journal of Mathematics 4 (2018), 778–801.
- (55) *Non-surjective Gaussian maps for singular curves on  $K3$  surfaces*, joint with Edoardo Sernesi.  
Collectanea Mathematica 70 (2019), 107–115.
- (56) *On the Hilbert scheme of linearly normal curves in  $\mathbb{P}^r$  of relatively high degree*, joint with Edoardo Ballico and Changho Keem.  
Journal of Pure and Applied Algebra 224 (2020), 1115–1123.
- (57) *Betti numbers of Brill-Noether varieties on a general curve*, joint with Camilla Felisetti.  
Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. 33 (2022), 65–72.
- (58) *Holomorphic differential forms on moduli spaces of stable curves.*  
Geometriae Dedicata 218, 4 (2024), <https://doi.org/10.1007/s10711-023-00851-6>.

## Projective and birational geometry

- (1) *Grassmann defectivity à la Terracini*, joint with Carla Dionisi.  
Le Matematiche LVI (2001), 245–255.
- (2) *Grassmann defective surfaces.*  
Bollettino dell’Unione Matematica Italiana (8) 7-B (2004), 369–379.
- (3) *On Waring’s problem for many forms and Grassmann defective varieties.*  
Journal of Pure and Applied Algebra 74 (2002), 243–247.
- (4) *On the secant varieties to the osculating variety of a Veronese surface*, joint with Edoardo Ballico.  
Central European Journal of Mathematics 3 (2003), 315–326.
- (5) *On a Lemma of Bompiani*, joint with Edoardo Ballico.  
Rendiconti del Seminario Matematico dell’Università e del Politecnico di Torino 62 (2004), 205–208.
- (6) *Zero-dimensional subschemes of ruled varieties*, joint with Edoardo Ballico and Cristiano Bocci.  
Central European Journal of Mathematics 2 (2004), 538–560.

- (7) *On the osculatory behaviour of higher dimensional projective varieties*, joint with Edoardo Ballico.  
Collectanea Mathematica 55 (2004), 229-236.
- (8) *Birational geometry of defective varieties*, joint with Edoardo Ballico.  
*Projective Varieties with Unexpected Properties - Siena 2004*, De Gruyter Proceedings in Mathematics (2005), 13–18.
- (9) *A remark on error-correcting codes from ruled surfaces*, joint with Edoardo Ballico.  
International Journal of Pure and Applied Mathematics 18 (2005), 497-501.
- (10) *The Horace method for error-correcting codes*, joint with Edoardo Ballico.  
Applicable Algebra in Engineering, Communication and Computing 17 (2006), 135–139.
- (11) *A Terracini Lemma for osculating spaces with applications to Veronese surfaces*, joint with Edoardo Ballico.  
Journal of Pure and Applied Algebra 195 (2005), 1–6.
- (12) *Osculating spaces to secant varieties*, joint with Edoardo Ballico, Cristiano Bocci and Enrico Carlini.  
Rendiconti del Circolo Matematico di Palermo LIII (2004), 429–436.
- (13) *On Waring’s problem for partially symmetric tensors*.  
Annali dell’Università di Ferrara–Sezione VII– Scienze Matematiche 52 (2006), 37–43.
- (14) *A remark on characterizations of projective spaces among singular varieties*, joint with Edoardo Ballico.  
Resultate der Mathematik 51 (2008), 197–200.
- (15) *Towards bounded negativity of self-intersection on general blown-up projective planes*.  
Communications in Algebra 40 (2012), 1762–1765.
- (16) *Why should a birational geometer care about Bridgeland stability conditions?*, joint with Diletta Martinelli.  
Bollettino dell’Unione Matematica Italiana 11 (2018), 69–74.
- (17) *Effective Adjunction Theory*, joint with Marco Andreatta.  
Annali dell’Università di Ferrara 64 (2018), 243–257.
- (18) *A remark on rationally connected varieties and Mori dream spaces*, joint with Diletta Martinelli.  
Proceedings of the Edinburgh Mathematical Society 62 (2019), 259–263.
- (19) *Rational curves on fibered Calabi-Yau manifolds*, joint with Simone Diverio and Diletta Martinelli.  
Documenta Mathematica 24 (2019), 663–675.
- (20) *When is  $\overline{M}_{0,n}(\mathbb{P}^1, 1)$  a Mori dream space?*  
Advances in Geometry 21 (2021), 343–346.



- (21) *Birational geometry of defective varieties, II*, joint with Edoardo Ballico.  
Communications in Algebra 49 (2021), 1578–1582.
- (22) *On the existence of finite surjective parametrizations of affine surfaces*, joint with Edoardo Ballico.  
Journal of Algebra 601, 101–104 (2022).
- (23) *On the Splitting Principle of Beniamino Segre*, joint with Camilla Felisetti.  
Annali di Matematica Pura ed Applicata 201, 1577–1581 (2022).
- (24) *On generalized nefness and bigness in adjunction theory*, joint with Camilla Felisetti.  
Vietnam Journal of Mathematics 52, 255–263 (2024).
- (25) *On varieties whose general surface section has negative Kodaira dimension*, joint with Ciro Ciliberto.  
arXiv:2305.08730.
- (26) *Variations on the Weak Bounded Negativity Conjecture*, joint with Ciro Ciliberto.  
To appear on Advances in Geometry, arXiv:2305.15416 and arXiv:2305.17923.
- (27) *A question on effective strictly nef divisors (with an appendix by Andreas Horing)*.  
arXiv:2306.06985.
- (28) *A remark on generalized abundance for surfaces*.  
European Journal of Mathematics 10, 7 (2024), <https://doi.org/10.1007/s40879-023-00716-y>.
- (29) *A question about generalized nonvanishing*.  
arXiv:2312.09441.

## Applications of algebra and geometry

- (1) *Projective Curves and Cryptography*, joint with Edoardo Ballico.  
International Journal of Pure and Applied Mathematics 19 (2005), 253–258.
- (2) *Hierarchical secret sharing in ad hoc networks through Birkhoff interpolation*, joint with Edoardo Ballico, Giulia Boato and Fabrizio Granelli.  
Advances in Computer, Information, and Systems Sciences, and Engineering. Proceedings of IETA 2005, TeNe 2005 and EIAE 2005. Springer (2006).
- (3) *Hierarchical deterministic image watermarking via polynomial interpolation*, joint with Giulia Boato and Farid Melgani.  
Proceedings of ICIP 2005, IEEE Signal Processing Society (2005).
- (4) *Hierarchical ownership and deterministic watermarking of digital images via polynomial interpolation*, joint with Giulia Boato, Francesco G. B. De Natale and Farid Melgani.  
Elsevier Signal Processing: Image Communication, Volume 21, Issue 7 (2006), 573–585.

- (5) *An Improved Asymmetric Watermarking Scheme Suitable for Copy Protection*, joint with Giulia Boato and Francesco G. B. De Natale. IEEE Transactions on Signal Processing 54 (2006), 2833–2834.
- (6) *A Multilevel Asymmetric Scheme for Digital Fingerprinting*, joint with Giulia Boato and Francesco G. B. De Natale. IEEE Transactions on Multimedia, Volume 10, Issue 5 (2008), 758–766.
- (7) *A New Sequential Multiple Watermarking Scheme*, joint with Giulia Boato and Francesco G. B. De Natale. Proceedings of ICIP 2006, IEEE Signal Processing Society (2006).
- (8) *Digital Image Tracing by Sequential Multiple Watermarking*, joint with Giulia Boato and Francesco De Natale. IEEE Transactions on Multimedia, Volume 9, Issue 4 (2007), 677–686.
- (9) *Statistical Analysis of a Linear Algebra Asymmetric Watermarking Scheme*, joint with Giulia Boato, Francesco G. B. De Natale and Fernando Pérez-González. Proceedings of ICIP 2007, IEEE Signal Processing Society (2007).
- (10) *Quantum watermarking for wireless communications*, joint with Giulia Boato and Francesco G. B. De Natale. Proceedings of ICEAA'07, IEEE Signal Processing Society (2007).
- (11) *A joint asymmetric watermarking and image encryption scheme*, joint with Giulia Boato, Valentina Conotter and Francesco G. B. De Natale. Proceedings of Electronic Imaging 2008 (Security, Forensics, Steganography, and Watermarking of Multimedia Contents X), SPIE 2008.
- (12) *Hierarchically Distributed Access Control Protocol for Wireless Sensor Networks*, joint with Giulia Boato, Francesco G. B. De Natale and Andrea Massa. Technical Report DIT-07-044, University of Trento.
- (13) *Multimedia asymmetric watermarking and encryption*, joint with Giulia Boato, Nicola Conci, Valentina Conotter and Francesco G. B. De Natale. Electronics Letters Volume 44, Issue 9 (2008), 601–602.
- (14) *Wireless Sensor Networks as Hierarchical Complex Systems*, joint with Giulia Boato, Francesco G. B. De Natale and Andrea Massa. Proceedings of JECCS 2008.
- (15) *Watermarking Robustness Evaluation based on Perceptual Quality via Genetic Algorithms*, joint with Giulia Boato, Valentina Conotter and Francesco G. B. De Natale. IEEE Transactions on Information Forensics and Security, Volume 4, Issue 2 (2009), 207–216.
- (16) *Robustness and security assessment of image watermarking techniques by a stochastic approach*, joint with Giulia Boato, Valentina Conotter and Francesco G. B. De Natale. Proceedings of Electronic Imaging 2009, SPIE 2009.

- (17) *Glocal Multimedia Retrieval*, joint with Giulia Boato, Fausto Giunchiglia and Francesco G. B. De Natale.  
Technical Report DISI-09-002, University of Trento.
- (18) *Comparison of watermarking algorithms via a GA-based watermarking tool*, joint with Giulia Boato, Valentina Conotter and Francesco G. B. De Natale.  
Proceedings of ICIP 2009, IEEE Signal Processing Society (2009).
- (19) *Towards multimedia opinion mining*, joint with Giulia Boato, Valentina Conotter and Francesco G. B. De Natale.  
Proceedings of Living Web 2009.
- (20) *Rectangular Thinned Arrays Based on McFarland Difference Sets*, joint with Giacomo Oliveri, Federico Caramanica and Andrea Massa.  
IEEE Transactions on Antennas and Propagations Volume 59, Issue 5 (2011), 1546–1552.
- (21) *On weakly APN functions and 4-bit S-Boxes*, joint with Valentina Pulice, Anna Rimoldi and Massimiliano Sala.  
Finite Fields and Their Applications 18 (2012), 522–528.
- (22) *On the geometry of small weight codewords of dual algebraic geometric codes*, joint with Chiara Marcolla.  
International Journal of Pure and Applied Mathematics, vol. 98, no. 3 (2015), 303–307.
- (23) *Approximation by Spline Curves: towards an Application to Cognitive Neuroscience*, joint with Maria-Laura Torrente, Stefano Anzellotti and Chiara Finocchiaro.  
arXiv:1507.03865 (2015).

## History and philosophy of mathematics

- (1) *Archimede: Metodo. Nel laboratorio del genio*, joint with Fabio Acerbi and Marialia Guardini.  
Bollati Boringhieri, Torino 2013.
- (2) *I corsi di geometria superiore in Italia*, joint with Ciro Ciliberto.  
Lettera Matematica Pristem 87 (2013), 19–20.
- (3) *Matematica e filosofia. Contributi al dialogo interdisciplinare*, joint with Achille C. Varzi.  
La Matematica nella Società e nella Cultura, Vol. VII, N. 3 (December 2014).
- (4) *Curve algebriche piane e sghembe. Corso del prof. G. Castelnuovo 1922–23*, joint with Ciro Ciliberto.  
Unione Matematica Italiana, Bologna 2015.

- (5) *Guido Castelnuovo and the geometry of algebraic curves: from research to teaching.*  
Rend. Mat. Appl. (7) 37 (2016), 137–145.
- (6) *Geometrie e filosofie dall'Ottocento ad oggi.*  
Rivista di storia della filosofia 1 (2016), 131–133.
- (7) *Archimede e la matematica oggi*, joint with Marco Andreatta.  
In: *Archimede, ieri e oggi*, series *Hesperia - Studi sulla grecità di Occidente (serie monografica - 1)*, number 34, 2018, *L'Erma di Bretschneider*, publisher in Rome.
- (8) *Da Rovereto all'Istituto Nazionale di Alta Matematica: una lettera di Cesare Coriselli a Francesco Severi.*  
Atti della Accademia Roveretana degli Agiati, a. 270, 2020, ser. X, vol. II, B, 141–147.
- (9) *Presentazione di Dietrich von Hildebrand, La bellezza alla luce della redenzione.*  
Edizioni Dehoniane Bologna, 2021.
- (10) *Un appunto autografo di Malfatti nella Biblioteca Comunale di Ala*, joint with Maria Giulia Lugaresi.  
Atti della Accademia Roveretana degli Agiati, a. 271, 2021, ser. X, vol. III, B, 71–76.
- (11) *Objectivity and Rigor in Classical Italian Algebraic Geometry*, joint with Silvia De Toffoli.  
Noesis 38 (2022), 195–212.
- (12) *Recalcitrant Disagreement in Mathematics: an Endless and Depressing Controversy in the History of Italian Algebraic Geometry*, joint with Silvia De Toffoli.  
Global Philosophy 33 (2023), 38, <https://doi.org/10.1007/s10516-023-09691-1>.
- (13) *Francesco Severi's private library*, joint with Stefano Gattei.  
Springer INdAM Ser. 53 (2023), 5–57.
- (14) *Two letters by Guido Castelnuovo*, joint with Ciro Ciliberto.  
Springer INdAM Ser. 53 (2023), 243–270.
- (15) *Guido Castelnuovo and his heritage: geometry, combinatorics, teaching.*  
Springer INdAM Ser. 53 (2023), 271–279.

### **Edited books**

- (1) *The art of doing algebraic geometry*, joint with Thomas Dedieu, Flaminio Flamini, Concettina Galati and Rita Pardini.  
Trends Math. Birkhäuser/Springer (2023).

## Invited talks and communications

- *Un approccio induttivo alla coomologia razionale degli spazi di moduli delle mappe stabili*, Pavia, June 5, 2002.
- *Geometry of spin moduli spaces*, in: *Perspectives in Classification and Moduli Theory*, Cortona, October 14–20, 2002.
- *Problemi di interpolazione su varietà proiettive*, Roma, March 4, 2004.
- *Geometria birazionale degli spazi di moduli*, in: *Giornate di Geometria Algebrica ed argomenti correlati VII*, Rimini, May 18–22, 2004.
- *Interpolation on higher dimensional projective varieties*, in: *Projective varieties with unsuspected properties*, Siena, June 8–12, 2004.
- *Birational geometry of moduli spaces*, in: *Enumerative Geometry: Old and New*, Torino, June 14–16, 2004.
- *Curve su superficie K3 e divisori effettivi su  $M_g$* , Milano, December 16, 2004.
- *Hierarchical deterministic image watermarking via polynomial interpolation*, poster for: *International Conference on Image Processing*, Genova, September 11–14, 2005.
- *The Kodaira dimension of the moduli space of curves and the Slope Conjecture*, Trieste, SISSA, October 27, 2006.
- *Principio d'induzione e spazi di moduli*, in: *Moduli di Curve*, Milano, April 17, 2007.
- *Induction principle, rational cohomology, and moduli spaces*, in: *Moduli Spaces*, Institut Mittag-Leffler, Djursholm, Sweden, May 22, 2007.
- *Induction principle and moduli spaces*, Padova, May 31, 2007.
- *Towards quantum watermarking*, in: *Algebra Seminar*, Trento, June 21, 2007.
- *Teoremi di annullamento in coomologia per spazi di moduli di mappe stabili*, in: *Giornata di geometria*, Torino, June 25, 2007.
- *Quantum watermarking for wireless communications*, in: *International Conference on Electromagnetics in Advanced Applications*, Torino, September 17–21, 2007.
- *Wireless Sensor Networks as Hierarchical Complex Systems*, in: *The 5th European Conference on Complex Systems*, Jerusalem, September 14–19, 2008.
- *Brill-Noether theory for singular curves*, Milano, February 12, 2009.
- *Immersioni proiettivamente normali di curve a moduli generali*, Firenze, May 8, 2009.
- *Normally generated line bundles on general curves*, Pisa, Scuola Normale Superiore, November 4, 2009.

- *Projectively normal embeddings of curves with general moduli*, Coimbra, February 8, 2010.
- *Dimensione di Kodaira della varietà di Picard universale*, Torino, June 10, 2010.
- *Un ricoprimento aperto affine di  $\mathcal{M}_g$  per  $g \leq 5$* , Bologna, XIX Congresso U.M.I., September 16, 2011.
- *Sull'irriducibilità delle famiglie di curve iperspaziali*, Milano, June 20, 2012.
- *On the classification of algebraic curves*, Trento, Mini-workshop on Codes and Cryptography, August 10, 2012.
- *Da Guido a Emma Castelnuovo*, Bergamo, XXX Convegno UMI-CIIM, October 26, 2012.
- *"Sia benedetto questo errore!": la "pericolosa intuizione del caso limite" da Guido a Emma Castelnuovo*, Salerno, XXXI Convegno UMI-CIIM, October 18, 2013.
- *Filosofia More Geometrico. Prove di dialogo sul metodo matematico in filosofia a partire da Descartes e Spinoza*, with Achille Varzi and Paola Giacomoni, Trento, May 20, 2014.
- *Guido Castelnuovo docente di Geometria Superiore*, Venezia, In onore di Guido Castelnuovo, May 16, 2015.
- *Guido Castelnuovo insegnante di matematica*, Trento, International Holocaust Remembrance Day, January 27, 2016.
- *Analisi e sintesi tra matematica e filosofia*, Trento, Collegio di Merito Bernardo Clesio, March 8, 2016.
- *Come guadagnare un milione di dollari con la geometria*, Trento, MUSE, April 12, 2016.
- *Rational curves on Calabi-Yau manifolds*, Levico Terme, GVA2016, June 25, 2016.
- *Uno, nessuno, centomila modi di essere. Argomenti di Metafisica, Realismo e Ontologia*, with Franca D'Agostini and Achille Varzi, Trento, October 13, 2017.
- *The Fields Medal awarded to Maryam Mirzakhani*, in the framework of the series of lectures *Geniuses and heroes in science*, Trento, January 30, 2018.
- *Introduzione all'Omologia Persistente*, minicourse in the framework of the Summer School for Indam fellows, Perugia, July 30–August 1, 2018.
- *Dalla Geometria Analitica alla Geometria Algebrica*, lecture in the framework of the Summer School for Indam fellows, Perugia, July 31, 2018.
- *Guido Castelnuovo and his heritage: geometry, combinatorics, teaching*, Levico Terme, TiME 2019 - Curves and Surfaces: a History of Shapes, September 3, 2019.

- *Francesco Severis personal library*, ESHS Bologna 2020 (online), 9th International Conference of the European Society for the History of Science, September 2, 2020.
- *A fundamental theorem of the geometry on algebraic surfaces and the splitting principle*, IMPANGA (online), May 21, 2021.
- *Holomorphic differential forms on moduli spaces of stable curves*, Milano, A workshop on Geometry and Commutativa algebra, September 4, 2023.
- *La lettera di Eratostene a Tolomeo e la duplicazione del cubo tra mito e geometria*, Pisa, XXII Convegno UMI, September 6, 2023.
- *Generalized abundance and nonvanishing: remarks and open questions*, IPM Algebraic Geometry Seminar (online), November 29, 2023.

### Organization of schools, workshops, and conferences

- local organizer of *School (and Workshop) on Cremona Transformations*, Torino, September 19–24, 2005 (scientific organizers: G. Casnati, R. Notari, M.L. Spreafico).
- scientific organizer of *School (and Workshop) on Vector Bundles and Low Codimensional Subvarieties*, Trento, September 11–16, 2006 (main speakers: Ph. Ellia, R.M. Mirò-Roig).
- scientific organizer of *School (and Workshop) on the geometry of special varieties*, Trento, September 10–15, 2007 (main speakers: C. Ciliberto, F. Russo).
- scientific organizer of *School (and Workshop) on algebraic stacks*, Trento, September 1–6, 2008 (main speakers: B. Fantechi, A. Kresch).
- local organizer of *School (and Workshop) on Hodge theory and algebraic geometry*, Trento, August 31 – September 5, 2009 (scientific organizers: G. Casnati, A.J. Di Scala, R. Notari, S. Salamon).
- organizer of *Multimedia Geometry Seminar Spring 2011*, Trento, February-May, 2011 (<http://disi.unitn.it/~mg/activity.html>).
- scientific organizer of *School (and Workshop) on tropical and toric geometry*, Trento, September 12–17, 2011 (main speakers: S. Di Rocco, G. Mikhalkin).
- scientific organizer of *School (and Workshop) on invariant theory and projective geometry*, Trento, September 17–22, 2012 (main speakers: L. Manivel, G. Ottaviani).
- scientific organizer (joint with Edoardo Sernesi) of *Curves and Their Jacobians: State of the Art*, Levico Terme, February 13–16, 2013.
- scientific organizer (joint with Edoardo Sernesi) of *Curves and Equations*, Levico Terme, February 5–8, 2014.

- organizer (joint with Gilberto Bini, Marco Franciosi, Donatella Iacono and Antonio Rapagnetta) of *Algebraic Varieties and their Moduli*, Pisa, May, 22 – June 5, 2015.
- scientific organizer (joint with Paola Giacomoni and Achille Varzi) of *Analisi: storia, teoria e pratica di un metodo tra matematica e filosofia*, Trento, June 8–9, 2015.
- scientific organizer (joint with Marco Andreatta, Edoardo Ballico, Gianluca Occhetta and Roberto Pignatelli) of *Classification of Projective Varieties*, Levico Terme, August 31 – September 4, 2015.
- scientific coordinator of the Algebraic Geometry session at *XX Congresso dell’Unione Matematica Italiana*, Siena, September 7–12, 2015.
- scientific organizer (joint with Enrico Arbarello, Gilberto Bini and Bert van Geemen) of *The Hodge Conjecture: state of the art*, Levico Terme, June 6 –10, 2016.
- scientific organizer (joint with Marco Andreatta, Angelo Lopez and Alessandro Verra) of *Modern Algebra and Classical Geometry*, Trento, June 21–24, 2017.
- local organizer (joint with Paola Giacomoni, Andrea Sereni and Achille Varzi) of *Philosophy of mathematics: history, theories and practice*, Trento, July 13–14, 2017.
- scientific organizer (joint with Marco Andreatta) of *L’arte dell’inventare. Sei incontri attorno alla mostra su Archimede al MUSE*, Trento, September–November 2017.
- scientific director (joint with Marco Andreatta) of the *Visiting chair from Collège de France to the University of Trento* of Claire Voisin, Trento, May 9–10, 2018.
- scientific organizer (joint with Gilberto Bini) of *Topological Data Analysis and Persistent Homology*, Levico Terme, June 11–15, 2018.
- scientific organizer (joint with Edoardo Ballico, Roberto Pignatelli and Luis Solá-Conde) of *A journey through projective and birational geometry*, Trento, January 7–11, 2019.
- scientific organizer (joint with Paola Giacomoni and Achille Varzi) of *Che cos’è un esperimento mentale?*, Trento, May 31, 2019.
- scientific organizer (joint with Enrico Arbarello and Gilberto Bini) of *Motives Today*, Trento, June 3–7, 2019.
- scientific organizer (joint with Ilaria Ampollini) of *Rompicapi dal passato. Matematica per tutti tra Sei e Settecento*, Trento, March–June 2020.
- scientific organizer (joint with Stefano Gattei) of *Oltre Galileo: la scuola galileiana*, Trento, October 2021–January 2022.
- scientific organizer (joint with Gilberto Bini) of the INdAM Workshop *Italian algebraic geometry between tradition and future*, Rome, December 6–8, 2021.



- scientific organizer (joint with Gilberto Bini) of *Moduli spaces and stability conditions*, Trento-Levico Terme, June 5–10, 2022.

### **Coordination and participation in research projects**

Local coordinator of the FIRB 2012 project *RBFR12DZRV 003 - Moduli Spaces and Applications* (national coordinator Gilberto Bini, <http://futuroinricerca.miur.it/documenti/2012/DD735-Ric.pdf>).

Participant in the projects:

- PRIN 2017 *2017SSNZAW 006 - Moduli Theory and Birational Classification*, national coordinator Lucia Caporaso, 2019–2023
- PRIN 2015 *2015EYPTSB 002 - Geometry of Algebraic Varieties*, national coordinator Alessandro Verra, 2017–2020
- PRIN 2010–2011 *2010S47ARA 010 - Geometria delle Varietà Algebriche*, national coordinator Alessandro Verra, 2013–2016
- PRIN 2008 *2008F3Z77Z 002 - Geometria delle Varietà Algebriche*, national coordinator Alessandro Verra, 2010–2012
- PRIN 2006 *2006011222 003 - Geometria delle Varietà Algebriche*, national coordinator Alessandro Verra, 2007–2009.

### 3 Teaching Activity

At the Third Faculty of Politecnico di Torino, since 2004–05 to 2007–08, in the following courses:

- *Geometria* for "Ingegneria dell'informazione, delle telecomunicazioni e elettronica"
- *Geometria descrittiva* for "Ingegneria del cinema e dei mezzi di comunicazione"
- *Elementi di matematica discreta* and *Fundamentals of discrete mathematics* (in English) for "Ingegneria telematica"
- *Analisi complessa* for "Ingegneria dell'informazione".

Lecturer of the PhD course *Algebraic curves and moduli* at SISSA (Scuola Internazionale di Studi Superiori Avanzati) in Trieste (2007–08).

At the Faculty of Engineering of the University of Trento, since 2008–09, instructor of *Geometria e Algebra Lineare* and of *Matematica e Statistica*.

In the framework of the PHD School on Groebner Bases, Curves, Codes, and Cryptography (Trento, July 30–August 10, 2012), lecturer of the PhD course *A brief introduction to complex algebraic curves*.

At the University of Trento, in the years 2012–13 and 2013–14, instructor of *Didattica della geometria* for T.F.A. and P.A.S..

At the Department of Mathematics of the University of Trento, instructor of

- *Geometria I* in the years 2013–14, 2014–15, 2015–16;
- *Algebraic Geometry* in the year 2013–14;
- *Foundations of Geometry* in the year 2014–15;
- *Elementi di Matematica* in the year 2015–16;
- *Analisi Matematica con elementi di Algebra* in the year 2016–17;
- *Elementary Mathematics from a Higher Viewpoint* in the years 2016–17, 2017–18, 2018–19;
- *Hodge Theory* in the year 2016–17;
- *Matematica e Statistica I* in the years 2017–18, 2018–19, 2019–20, 2020–21, 2021–22;
- *Topics in History of Mathematics* in the years 2017–18, 2020–21, 2021–22, 2022–23;
- *Geometry and Topology for Data Analysis* in the years 2018–19 and 2019–20;
- *Storia della Fisica e della Matematica* in the years 2020–21, 2021–22, 2022–23, 2023–24;
- *Matematica* in the years 2022–23 and 2023–24;

- *Elementi di geometria* in the year 2022–23.

At the University of Trento, promotion and design of the following innovative courses:

- *Hodge Theory* for Master students in Mathematics
- *Topics in History of Mathematics* for Master students in Mathematics
- *Geometry and Topology for Data Analysis* for Master students in Mathematics
- *Elementi di geometria* for Bachelor students in Philosophy.

### Teaching publications

- (1) *Geometria e Algebra Lineare*, joint with Nadia Chiarli, Silvio Greco and Paolo Valabrega. Levrotto & Bella, Torino 2012 (new edition 2020).

### Supervisor of Bachelor and Master Theses

At the University of Trento, about 50 theses  
(<https://webapps.unitn.it/du/en/Persona/PER0046643/Tesi>).

### Tutor for the Doctoral School

- Tutor of Laura Facchini and Bruno Gameiro Simoes for the Doctoral School in Mathematics, University of Trento (2009–10).
- Tutor of Letizia Pernigotti and Bruno Gameiro Simoes for the Doctoral School in Mathematics, University of Trento (2010–11).
- Tutor of Amedeo Altavilla and Bruno Gameiro Simoes for the Doctoral School in Mathematics, University of Trento (2011–12).
- Tutor of Irene Platoni for the Doctoral School in Mathematics, University of Trento (2012–13 and 2013–14).
- Tutor of Chiara Giberti and Natascia Zangani for the Doctoral School in Mathematics, University of Trento (2015–16 and 2016–17).
- Tutor of Agnese Del Zozzo for the Doctoral School in Mathematics, University of Trento (2020–21, 2021–22 and 2022–23).

### **Advisor of PhD Theses**

- Advisor of Letizia Pernigotti for her PhD Thesis at the Department of Mathematics, University of Trento. Title of the thesis: *Geometry of moduli spaces of higher spin curves*, thesis defense: November 4, 2013.
- Advisor of Natascia Zangani for her PhD Thesis at the Department of Mathematics, University of Trento. Title of the thesis: *Voisin's conjecture on Todorov surfaces* (co-advisor Robert Laterveer), thesis defense: June 19, 2020.

### **Scientific tutor of Post-Doc Fellowships**

- Luca Benzo at the Department of Mathematics, University of Trento (2014–2015).
- Paolo Lella at the Department of Mathematics, University of Trento (2014–2016).
- Mattia Galeotti at the Department of Mathematics, University of Trento (2018–2019).
- Camilla Felisetti at the Department of Mathematics, University of Trento (2020–2022).

## 4 Third Mission

Coordinator of the PopMat Laboratory of Communication, History and Philosophy of Mathematics of the University of Trento  
(<https://www.maths.unitn.it/en/409/laboratory-of-communication-history-and-philosophy-of-mathematics>).

## 5 Service to the academic community

### Service to the international and Italian mathematical community

- Member of the Consiglio Scientifico of the Istituto Nazionale di Alta Matematica from January 2020 to December 2023.
- Secretary of the Italian Mathematical Union (U.M.I.), from June 2015 to May 2018.
- Adjoint Secretary of the Italian Mathematical Union (U.M.I.), from July 2012 to May 2015.
- Member of the editorial board of the journal *Nuova lettera matematica* (<https://www.nuovaletteramatematica.it/>).
- Member of the editorial board of the Springer INdAM Series (<https://www.springer.com/series/10283>), from January 2020 to December 2023.
- Co-managing editor of the journal of the Italian Mathematical Union (U.M.I.) *La Matematica nella Società e nella Cultura*, from January 2013 to December 2015.
- Referee for mathematical journals, among which Int. Mat. Res. Not., Trans. Amer. Math. Soc., J. Pure Appl. Algebra, J. Algebra, Journal de l'École polytechnique – Mathématiques, and for research projects, among which ISF (Israel Science Foundation), NSA Mathematical Sciences Grants Program and VIGONI program (a binational cooperation among research groups belonging to German and Italian Universities).
- Member of the PhD jury of Stefano Pasotti (November 30, 2006). Title of the thesis: *Vector bundles on algebraic curves: holomorphic triples in low genus*, Ph.D. supervisor: Edoardo Ballico.
- Member of the PhD jury of Francesco Prantil (November 3, 2008). Title of the thesis: *Augmented bundles on algebraic curves*, Ph.D. supervisor: Edoardo Ballico.
- Member of the PhD jury of Elena Martinengo (January 13, 2009). Title of the thesis: *Higher brackets and Moduli space of vector bundles*, Ph.D. supervisor: Marco Manetti.
- Member of the PhD jury of Simone Busonero (January 13, 2009). Title of the thesis: *Compactified Picard schemes and Abel maps for singular curves*, Ph.D. supervisor: Lucia Caporaso.

- Member of the PhD jury of Myrla Kedylna Barbosa (March 21, 2022). Title of the thesis: *Algebraic and Combinatorial Properties of Ranks of Divisors on Finite Graphs*, Ph.D. supervisor: Margarida Melo.
- President of the committee for the Giuseppe Bartolozzi Prize edition 2013. Winner: Gianluca Crippa.
- President of the committee awarding the Premio Franco Tricerri Prize edition 2015. Winner: Elia Saini.
- President of the committee awarding the Mario Baldassarri Prize edition 2015. Winner: Margherita Lelli-Chiesa.
- President of the committee awarding the Castelnuovo Prize edition 2017. Winner: *BetOnMath* by Andrà, Parolini, Verani.

### **Service to the local mathematical community in Trento**

- Delegate for the *Liceo Matematico* of the Department of Mathematics, University of Trento.
- Alumni Delegate of the Department of Mathematics, University of Trento.
- Quality Delegate of the Department of Mathematics, University of Trento, up to October 31, 2018.
- Representative of the assistant professors in the Board of Administration of the University of Trento since June 22, 2011 to February 20, 2012.

Trento, February 5, 2024

Claudio Fontanari