

UNIVERSITÀ DEGLI STUDI DI MILANO

Procedura di selezione per la chiamata a professore di I fascia da ricoprire ai sensi dell'art. 18, comma 1, della Legge n. 240/2010 per il settore concorsuale 01/A2 - Geometria e Algebra \_\_\_\_\_ ,  
(settore scientifico-disciplinare \_\_MAT/03 - Geometria \_\_\_\_\_ )  
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## **Claudio Bartocci**

### **CURRICULUM VITAE**

#### **Education and qualifications**

- 1990: *dottorato di ricerca in matematica*, Università degli Studi di Milano (thesis: "Elementi di geometria globale delle supervarietà", advisor: U. Bruzzo);
- 1993: Ph.D. in Mathematics, University of Warwick, (thesis: "Foundations of graded differential geometry", supervisor: N. Hitchin);
- 1998: *Qualification aux fonctions de professeur des universités* (sect. 25), Ministère de l'Education Nationale, de la Recherche et de la Technologie, France;
- 2019: *Abilitazione scientifica nazionale (art. 16, legge 240/2010) per Professore universitario di prima fascia per il settore concorsuale 01/A2 - Geometria e Algebra, settore scientifico-disciplinare MAT/03 - Geometria*, Italy.

#### **Permanent appointments**

- 1990 - 1999: *Ricercatore di Fisica matematica*, Dipartimento di Matematica, Università di Genova;
- 1999 - 2018: *Professore associato di Fisica matematica* (MAT/07), Dipartimento di Matematica, Università di Genova;
- from June 2018: *Professore associato di Geometria* (MAT/03), Dipartimento di Matematica, Università di Genova.

#### **Temporary appointments**

- February - November 1994: visiting assistant professor, Department of Mathematics, State University of New York at Stony Brook (N.Y.);
- May - July 1996: *chercheur visiteur*, Institut de Mathématiques de Jussieu, Université Paris VII, Paris;
- April 2001: visiting scholar, Department of Mathematics, University of Pennsylvania, Philadelphia;
- June - July 2006: *directeur d'études invité*, École des Hautes Études en Sciences Sociales, Centre d'analyse et de mathématique sociale, Paris;
- March - November 2007: visiting professor, SISSA, Trieste;
- January - April 2011: fellow, The Italian Academy, Columbia University, New York;
- June - July 2011: *directeur d'études invité*, École des Hautes Études en Sciences Sociales, Centre d'analyse et de mathématique sociale, Paris;
- May 2013: *directeur d'études invité*, École des Hautes Études en Sciences Sociales, Centre d'analyse et de mathématique sociale, Paris;

- January - February 2016: *professeur invité*, Université Paris Diderot, Laboratoire SPHere, Paris.

————— **Other affiliations**

- from October 2019; *Université Paris-Cité, Laboratoire SPHERE, chercheur associé étranger*.

————— **Short visiting research stays**

- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 1-15/XII/1988;
- SISSA, Trieste, March 1989;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 15/V-15/VI/1989;
- Université de Paris VII - D. Diderot, UFR de Mathématiques, 1-20/XII/1992.
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, May 1995;
- Centre Émile Borel, Institut Henri Poincaré, Paris, 13-23/II/1995 and 19-30/VI/1995;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, October 1996;
- Institut de Mathématiques de Jussieu, Université Paris VII -D. Diderot, 2/V-2/VII/1996;
- Tata Institute of fundamental Research, Bombay, 1-23/III/1997;
- SISSA, Trieste, 19/IV-9/V1997;
- SISSA, Trieste, 18-30/V/1998;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 6-12/VII/1998;
- Tata Institute of fundamental Research, Bombay, 4-18/X/1998;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 20-27/VI/1999;
- Institut für Mathematik, Humboldt-Universität zu Berlin, 17-24/X/1999;
- Department of Mathematics and Statistics, Boston University, 23-30/IV/2001;
- Department of Mathematics and Statistics, Boston University, 25-29/V/2002;
- Isaac Newton Institute for Mathematical Sciences, Cambridge (UK), 23-29/VII/2002;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 28/IX-5/X/2002;
- Department of Mathematics and Statistics, University of Massachusetts at Amherst, 14-18/IV/2003;
- Mathematisches Forschungsinstitut Oberwolfach, “RiP Research Stay”, 1-14/II/2004;
- Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 7-12/VI/2004;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 25/VI/-3/VII/2005;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 2-10/II/2007;
- Korea Institute for Advanced Study (KIAS), Seoul, 23-30/VI/2007;
- IMPA, Rio de Janeiro, 12-17/II/2008;
- Instituto de Matemática, Universidade Estadual de Campinas, 17-22/II/2008;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 4-10/VI/2009;
- SISSA, Trieste, 20-24/IX/2011;
- IMT Institute for Advanced Studies, Lucca, 27-29/IV/2012;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 17-24/III/2013;
- Max Planck Institute for the History of Science, Berlin, 10-15/III/2014;
- IMECC, Universidade Estadual de Campinas (Brazil), 21-28/VIII/2015;
- Institut de Mathématiques de Bourgogne, Université de Bourgogne, Dijon (France), 6-9/XI/2017;

- SISSA, Trieste, 18-21/XII/2017;
- Department of Mathematics, University of Kent, Canterbury (UK), 22-26/I/2018;
- Département d'histoire et philosophie des sciences, Université Paris Diderot, Paris, 4-24/VI/2018;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 3-7/X/2018;
- SISSA, Trieste, 5-8/XI/2018;
- SISSA, Trieste, 30/I-1/II/2019;
- Département d'histoire et philosophie des sciences, Université Paris Diderot, Paris, 10-30/VI/2019;
- Département d'histoire et philosophie des sciences, Université Paris-Cité, Paris, 22/XI-17/XII/2021;
- Departamento de Matemática Pura y Aplicada, Univ. de Salamanca, 18-24/IX/2022.
- Département d'histoire et philosophie des sciences, Université Paris-Cité, Paris, 12-21/I/2023

### ———— Selected Publications

#### —— Books

- M1. C.B., U. Bruzzo, D. Hernández Ruipérez, *The geometry of supermanifolds*, Mathematics and its applications vol. 71, Kluwer Academic Publishers, Dordrecht/Boston/London 1991.
- M2. C.B., U. Bruzzo, D. Hernández Ruipérez, *Fourier-Mukai and Nahm transforms in geometry and mathematical physics*, Progress in Mathematics vol. 276, Birkhäuser, Boston 2009.

#### —— Research articles in mathematics

- A1. C.B., U. Bruzzo, “Cohomology of supermanifolds”, *Journal of Mathematical Physics*, 28 (1987), 2363-2368.
- A2. C.B., U. Bruzzo, “Some remarks on the differential-geometric approach to supermanifolds”, *Journal of Geometry and Physics*, 4 (1987), 391-404.
- A3. C.B., U. Bruzzo, “Cohomology of the structure sheaf of real and complex supermanifolds”, *Journal of Mathematical Physics*, 29 (1988), 1789-1795 (“Erratum”, *Journal of Mathematical Physics*, 30 (1989), 1951).
- A4. C.B., U. Bruzzo, “Cohomological methods in supermanifold theory”, in: *Group theoretical methods in physics (Varna, 1987)*, Lecture Notes in Phys. 313, H.D. Doebner, J.D. Hennig and T.D. Palev eds, Springer-Verlag, Berlin, 1988, pp. 109-115.
- A5. C.B., “Foundations of super vector bundles”, in: *Proceedings of the conference on differential geometry and its applications (Dubrovnik, 26/6 - 3/7/1988)*, E. Bolkan et al. eds, University of Novi Sad, Novi Sad, 1989, pp. 15-21.
- A6. C.B., U. Bruzzo, “Existence of connections on superbundles”, *Letters in Mathematical Physics*, 17 (1989), 61-68.
- A7. C.B., U. Bruzzo, “Super line bundles”, *Letters in Mathematical Physics*, 17 (1989), 263-274.
- A8. C.B., U. Bruzzo, D. Hernández Ruipérez, “A remark on a new category of supermanifolds”, *Journal of Geometry and Physics*, 6 (1989), 509-516.
- A9. C.B., U. Bruzzo, G. Landi, “Geometry of standard constraints and Weil triviality in supersymmetric gauge theories”, *Letters in Mathematical Physics*, 18 (1989), 235-245.
- A10. C.B., U. Bruzzo, “On DeWitt supermanifolds and their Picard variety”, *Comptes Rendus de l'Académie des Sciences Sér. I Mathématiques*, 309 (1989), 75-80.
- A11. C.B., “Some topics in the theory of super line bundles”, in: *Proceedings of the 8th*

*Italian conference on general relativity and gravitational physics (Cavalese, 1988)*, M. Cerdonio et al. eds, World Scientific 1989, pp. 582-588.

A12. C.B., U. Bruzzo, G. Landi, "Cohomology of supermanifolds, standard constraints and quantum anomalies", in: *Proceedings of the XVIIth International Conference on Differential-Geometric Methods in Theoretical Physics (Chester, 12-19/8/1988)*, A.I. Solomon ed., World Scientific 1989, pp. 185-196.

A13. C.B., U. Bruzzo, G. Landi, "Chern-Simons forms on principal super fibre bundles", *Journal of Mathematical Physics*, 31 (1990), 45-54.

A14. C.B., U. Bruzzo, D. Hernández Ruipérez, "Some results on line bundles over SUSY-curves", in: *Differential geometric methods in theoretical physics (Proceedings, Tahoe City 1989)*, L.L. Chau and W. Nahm eds, Plenum Publ. Corp., New York, 1990, pp. 667-672.

A15. C.B., U. Bruzzo, D. Hernández Ruipérez, "Products and vector bundles in the category of G-supermanifolds", *Siberian mathematical Journal*, 34 (1992), 1-9 [originally published in Russian: "Proizvedeniya i vektornye rassloeniya v kategorii G-supermnogoobrazii", *Sibirskii Matematicheskii Zhurnal*, 34 (1991)].

A16. C.B., U. Bruzzo, D. Hernández Ruipérez, V.G. Pestov, "An axiomatic approach to supermanifolds", *Soviet Math. Doklady*, 44 (1992), 744-747 [originally published in Russian: "Ob aksiomaticheskom podhode k supermnogoobraziyam", *Doklady Math. Akademii Nauk SSSR*, 321 (1991), 649-652].

A17. C.B., U. Bruzzo, D. Hernández Ruipérez, V.G. Pestov, "Foundations of supermanifold theory: the axiomatic approach", *Differential Geometry and Its Applications*, 3 (1993), 135-155.

A18. C.B., "Instantons on K3 surfaces", in: *Proceedings of the XIXth International Colloquium on Group Theoretical Methods in Physics*, Anales de Física (Monografías), M.A. del Olmo et al. eds, Madrid 1993, vol. II, pp. 64-67.

A19. C.B., U. Bruzzo, D. Hernández Ruipérez, "Fourier-Mukai transform and index theory", *Manuscripta Mathematica*, 85 (1994), 141-163.

A20. C.B., "Mukai-Nahm transform on K3 surfaces", in: *Proceedings of the 10th Italian conference on general relativity and gravitational physics (Bardonecchia, 1992)*, M. Francaviglia et al. eds, World Scientific 1994, pp. 29-35.

A21. C.B., U. Bruzzo, M. Carfora, A. Marzuoli, "Entropy of random coverings and 4-D quantum gravity", *Journal of Geometry and Physics*, 18 (1996), 247-294.

A22. C.B., U. Bruzzo, D. Hernández Ruipérez, "A novel approach to the study of moduli spaces of instantons on K3 surfaces", in: *Proceedings of the 11th Italian conference on general relativity and gravitational physics (Trieste, 26-30/IX/1994)*, M. Carfora et al. eds, World Scientific 1996, pp. 73-87.

A23. C.B., U. Bruzzo, D. Hernández Ruipérez, V.G. Pestov, "Supermanifold theory: towards a unifying approach", in: *Proceedings of the IV Workshop de Outono: Xeometría diferencial e as suas aplicaciós (Santiago de Campostela, 18-20/IX/1995)*, Anales de Física - Monografías 3, 1996, pp. 1-17.

A24. C.B., U. Bruzzo, D. Hernández Ruipérez, "A Fourier-Mukai transform for stable bundles on K3 surfaces", *Journal für die reine und angewandte Mathematik*, 486 (1997), 1-16.

A25. C.B., U. Bruzzo, D. Hernández Ruipérez, "Moduli of reflexive K3 surfaces", in: *Complex Analysis and Geometry (Trento 1995)*, V. Ancona et al. eds, Pitman Research Notes in Mathematics 366, Longman, Harlow 1997, pp. 60-68.

A26. C.B., U. Bruzzo, D. Hernández Ruipérez, V.G. Pestov, "Quotient supermanifolds", *Bulletin of the Australian Mathematical Society*, 58 (1998), 107-120.

A27. C.B., U. Bruzzo, D. Hernández Ruipérez, "Existence of  $\mu$ -stable bundles on K3 surfaces and the Fourier-Mukai transform", in: *Algebraic Geometry (Catania*

- 1993/Barcelona 1994), P. Newstead ed., Lecture Notes in Pure and Appl. Math. 200, M. Dekker, New York 1998, pp. 245-257.
- A28. C.B., U. Bruzzo, D. Hernández Ruipérez, “A hyperkähler Fourier transform”, *Differential Geometry and its Applications*, 8 (1998), 239-249.
- A29. C.B., U. Bruzzo, D. Hernández Ruipérez, J. Muñoz Porras, “Mirror symmetry on K3 surfaces via Fourier-Mukai transform”, *Communications in Mathematical Physics*, 195 (1998), 79-93.
- A30. C.B., U. Bruzzo, G. Sanguinetti, “Categorical mirror symmetry for K3 surfaces”, *Communications in Mathematical Physics*, 206 (1999), 265-272.
- A31. C.B., I. Biswas, “Higgs bundles and the Fourier-Mukai transform”, *Southeast Asian Bulletin of Mathematics*, 25 (2001), 201-207.
- A32. C.B., U. Bruzzo, D. Hernández Ruipérez, J. Muñoz Porras, “Relatively stable bundles over elliptic fibrations”, *Mathematische Nachrichten*, 238 (2002), 23-36.
- A33. C.B., “La geometria dei sistemi integrabili”, *Lettera Matematica Pristem*, 44, giugno 2002, 22-28.
- A34. C.B., M. Jardim, “A Nahm transform for instantons over ALE spaces”, in: *Clifford Algebras: Applications to Mathematics, Physics, and Engineering*, R. Ablamowicz ed., Progress in Mathematical Physics, Birkhäuser, Boston, 2003, pp. 155-166.
- A35. C.B., I. Mencattini, “Hyper-symplectic structures on integrable systems”, *Journal of Geometry and Physics*, 50 (2004), 339-444.
- A36. C.B., M. Jardim, “Hyperkähler Nahm transforms”, in: *Algebraic structures and moduli spaces*, H. Nakajima and E. Markman eds., CRM Proceedings & Lectures Notes, AMS, 2004, pp. 150-159.
- A37. C.B., G. Falqui, M. Pedroni, “A geometric interpretation of the separability of the Neumann-Rosochatius system”, *Differential Geometry and its Applications*, 21 (2004), 349-360.
- A38. C.B., E. Macrì, “Classification of Poisson surfaces”, *Communications in Contemporary Mathematics*, 7 (2005), 1-7.
- A39. C.B., I. Mencattini, “Some remarks on special Kähler manifolds”, *Journal of Geometry and Physics*, 59 (2009), 755-763.
- A40. C.B., G. Falqui, I. Mencattini, G. Ortenzi, M. Pedroni, “On the geometric origin of the bi-hamiltonian structure of the Calogero-Moser system”, *International Mathematics Research Notices*, (2010) 2010, 279-296.
- A41. C.B., U. Bruzzo, “The emergence of algebraic geometry in contemporary physics”, in: *New trends in geometry, and its role in natural and living sciences*, C.B., L. Boi, C. Sinigaglia eds., Imperial College Press, London 2011, pp. 3-15.
- A42. C.B., U. Bruzzo, V. Lanza, C. Rava, “ADHM data for the Hilbert scheme of points of the total space of  $\mathcal{O}_{\mathbb{P}^1}(-n)$ ”, arXiv:1403.0460 (2014).
- A43. C.B., U. Bruzzo, C. Rava, “Monads for framed sheaves on Hirzebruch surfaces”, *Advances in Geometry*, 15 (2015), 55-76.
- A44. C.B., U. Bruzzo, V. Lanza, C. Rava, Hilbert scheme of points of  $\mathcal{O}_{\mathbb{P}^1}(-n)$  as quiver varieties, *Journal of Pure and Applied Algebra*, 221 (2017), 2132-2155.
- A45. C.B., U. Bruzzo, C. Rava, “Erratum to ‘Monads for framed sheaves on Hirzebruch surfaces’”, *Advances in Geometry* 16 (2016), 531-534.
- A46. C.B., V. Lanza, C. Rava, “Moduli spaces of framed sheaves and quiver varieties”, *Journal of Geometry and Physics*, 118 (2017), 20-39.
- A47. C.B., A. Tacchella, “Poisson-Nijenhuis structures on quiver path algebras”, *Letters in Mathematical Physics*, 107 (2017), 1265-1291.
- A48. C.B., V. Lanza, C. Rava, “Corrigendum and addendum to ‘Moduli spaces of framed sheaves and quiver varieties’”, *Journal of Geometry and Physics*, 121 (2017), 176-179.

- A49. C.B., U. Bruzzo, C. Rava, “Homology of twisted quiver bundles with relations”, *Journal of Algebra*, 546 (2020), 432-456.
- A50. C.B., U. Bruzzo, V. Lanza, C. Rava, “On the irreducibility of some quiver varieties”, *SIGMA* 16 (2020), 069, 13 pages.
- A51. C.B., A. Gentili, J.-J. Szczeciniarz, “Some remarks on blueprints and  $\mathbb{F}_1$ -schemes”, *São Paulo Journal of Mathematical Sciences*, 15 (2021), 754-789.

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**Talks and lectures - last 10 years (a selection excluding public lectures)**

- “ADHM data for sheaves on Hirzebruch surfaces”, invited talk, International Workshop on Moduli Spaces and Mathematical Physics, Centro de Investigación en Matemáticas (CIMAT), Guanajuato (Mexico), 28/I-4/II/2013.
- “Problemi e congetture: gli sviluppi della geometria in Hilbert e Poincaré”, Dipartimento di Matematica, Università di Udine, 15/II/2013.
- “Solving the universe: Clifford’s geometric algebras”, invited talk, International Conference Geometry and Logic, Scuola Normale Superiore, Pisa, 17-19/VI/2013.
- “Poincaré’s Creation of Algebraic Topology: ‘Reasoning Well from Badly Drawn Figures’”, Colloquium Research Group “Modern Geometry and the Concept of Space”, Max Planck Institute for the History of Science, Berlin, 11/III/2014.
- “Analogy and invention: some remarks on Poincaré’s Analysis situs papers”, invited talk, International Colloquium Philosophers and Mathematics, Center for Philosophy of the University of Lisbon, 29-30/X/2014
- “Poincaré e la topologia algebrica”, invited talk, Workshop Geometrie e filosofie dall’Ottocento a oggi, Dipartimento di Lettere e Filosofia, Università di Firenze, 7-8/V/2015.
- “Framed sheaves on Hirzebruch surfaces”, invited talk, International Conference Interactions between geometry and physics, Guarujá (São Paulo, Brazil), 17-21/VIII/2015.
- “Poisson quiver varieties and Hilbert schemes of points of ”, IMECC, Universidade Estadual de Campinas (Brazil), 26/VIII/2015.
- “Freedom and imagination: the subversive power of mathematics”, invited address, Colloquium Generale, Universität Bern, 14/X/2015.
- “Instantons, fibrés encadrés, variétés de représentations de carquois”, Séminaire de physique mathématique, Université Paris Diderot, 29/I/2016.
- “Aux origines de la théorie des connexions : les contributions de Weyl et de Cartan à la croisée de la géométrie et de la physique (1918-1925)”, Séminaire d’histoire et philosophie de la physique, Laboratoire SPHERE, Université Paris Diderot, 2/II/2016.
- “Quiver varieties and Hilbert schemes of points of  $\mathcal{O}_{\mathbb{P}^1}(-n)$ ”, Séminaire de physique mathématique et de topologie algébrique, Université d’Angers, 3/II/2016.
- “The early age of connections: at the intersection of geometry & physics”, Seminar of Historical Epistemology, Dipartimento di Filosofia, Università di Milano, 2/V/2016.
- “NP structures on quiver path algebras”, Geometry & Mathematical Physics Seminar, SISSA, Trieste, 26/V/2016.
- Workshop on Arithmetic and Geometry (invited participant), Cetraro (CS), 26/VIII-4/IX/2016.
- “Points: from Euclid to geometry”, invited talk, Colloque International Huitième Rencontre Française de Philosophie des Mathématiques, Marseille, 3-5/XI/2016.
- “La geometria del caos: dalle mappe di Poincaré ai tori di Arnol’d”, invited talk, Inaugural Conference of the Arnold-Regge Center for Algebra, Geometry and Theoretical

Physics, Alessandria, 1/III/2017.

- “The emergence of the theory of connections and fibre bundles: at the crossroad between geometry and physics”, Scuola Normale Superiore, Pisa, 7/III/2017.
- “Quiver varieties and moduli spaces of framed sheaves on projective surfaces”, Institut de Mathématiques de Bourgogne, Université de Bourgogne, Dijon (France), 10/XI/2017.
- “Associative geometry and integrable systems”, The Algebra, Geometry and Topology Seminar, School of Mathematics, University of Kent, Canterbury (UK), 26/I/2018.
- “Moduli spaces of sheaves on algebraic surfaces as quiver varieties”, invited talk, International Workshop *Group Actions in Algebraic and Symplectic Geometry*, ICMAT, Madrid, 2/X/2018.
- “A new idea of space: Riemann’s revolution”, invited talk, International Workshop *Il punto di vista geometrico* (organized by Università di Padova, Scuola Normale Superiore and Università di Udine), Istituto Veneto di Scienze, Lettere ed Arti, Venezia, 9/XI/2018.
- “Representations of quivers with relations in the category of sheaves”, talk, International Workshop *Quiver varieties, moduli spaces, and applications to mathematical physics (4th Christmas workshop)*, Genova, 20/XII/2018.
- “Poisson-Nijenhuis structures on quiver path algebras”, invited talk, International Conference *Noncommutative Manifolds and their Symmetries*, Scalea (CS), 19/IX/2019.
- “Ladders of sets and isomorphisms”, Lezioni Enriques - Seminario di Storia e Filosofia della Matematica, Dipartimento di Matematica, Università degli Studi di Milano, 12/XI/2019.
- “The invention of the empty set”, invited talk, International Workshop *Il punto di vista aritmetico* (organized by Università di Padova), Istituto Veneto di Scienze, Lettere ed Arti, Venezia, 12/XI/2021.
- “From formal schemes to Quot scheme: the emergence of moduli theory in Grothendieck FGA”, invited talk, International Conference *Grothendieck a Multifarious Giant: Mathematics, Logic and Philosophy*, Chapman University, 28/V/2022.
- “Relative algebraic geometry and  $F_1$ -geometry”, D.to de Matemáticas, Universidad de Salamanca, 28/IX/2022.
- “Entre intuition et heuristique: aux origines de la conjecture de Poincaré”, Séminaire d’Histoire et Philosophie des Sciences, Laboratoire J. Dieudonné, Université Côte d’Azur, Nice, 22/11/2022.
- “L’existence de l’inexistant: une nouvelle problématique, celle du corps à un élément”, Séminaire Mathématiques 19e-21e, histoire et philosophie, Laboratoire SPHERE, Université Paris-Cité, Paris, 17/I/2023.
- “L’existence de l’inexistant: une nouvelle problématique, celle du corps à un élément”, Séminaire Mathématiques 19e-21e, histoire et philosophie, Laboratoire SPHERE, Université Paris-Cité, Paris, 17/I/2023.

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### Grants and fellowships

- Consiglio Nazionale delle Ricerche Grant for Undergraduate students (1986).
- Pre-Doctoral Fellowship, Istituto Nazionale di Alta Matematica “F. Severi” (XI/1986 - III/1987).
- Doctoral Fellowship, Ministero dell’Università e della Ricerca (IV/1987 - IV/1990).
- Research Fellowship, Consiglio Nazionale delle Ricerche (IV/1990 - IV/1991).
- Research Fellowship, Consiglio Nazionale delle Ricerche (II/1994 - X/1994).
- CNR-NATO Senior Grant (V/1996 - VI/1996).

- Fellowship, The Italian Academy, Columbia University, New York (spring semester 2011).

#### ————— Research Grants

- “Methods of algebraic geometry in gauge theory and string theory”, research project funded by the Università di Genova: *principal investigator* (1998);
- “Algebraically integrable systems: moduli spaces of geometric structure and generalized Fourier-Mukai transforms”, research team of the Università di Genova of the PRIN “Geometry of integrable systems” (national coordinator: B. Dubrovin): *scientific coordinator* (1999-2001);
- “Geometry of integrable systems and string theory”, research project funded by the Università di Genova: *principal investigator* (2000);
- Unità di ricerca dell’Università di Genova “Algebraically integrable systems: separation of variables and Poisson structures on moduli spaces of sheaves on complex surfaces”, research team of the Università di Genova of the PRIN “Geometry of integrable systems” (national coordinator: B. Dubrovin): *scientific coordinator* (2001-2003);
- “Algebraically integrable systems: special Kähler geometry and Poisson structures”, research team of the Università di Genova of the PRIN “Geometry of integrable systems” (national coordinator: B. Dubrovin): *scientific coordinator* (2004-2006);
- “Adelic Grassmannian and Weyl algebra”, research project funded by the Università di Genova: *principal investigator* (2008);
- “Theory of integrable systems:  $tt^*$ -geometry and twistor methods”, research project funded by the Fondazione CARIGE: *scientific coordinator* (2008).
- “Aspetti matematici nello studio delle interazioni fondamentali: dalle algebre di operatori alla geometria non-commutativa”, FRA 2017, research project funded by the Università di Genova: *scientific coordinator* (2017-2018).
- “Wall and chamber structure for moduli spaces of framed sheaves”, research project funded by the Università di Genova, FRA 2022: *scientific coordinator* 2022.
- “The Mathematical Legacy of Hermann Grassmann”, Bando Cassini Senior 2023, *scientific coordinator*.

#### ————— Participation in research projects (excluded those listed above)

- “Europroj”, funded by the EC (1993-1997);
- “Gruppo Nazionale per le Strutture Algebriche e geometriche e loro Applicazioni (GNSAGA)”, funded by the Consiglio Nazionale delle Ricerche (CNR) and later by the Istituto Nazionale di Alta Matematica (INDAM) (1994- );
- “Azione Integrata SISSA (Trieste) - Universidad de Salamanca: Sheaves on Calabi-Yau manifolds and applications to integrable systems and string theory”, funded by the Italian “Ministero dell’Istruzione, dell’Università e della Ricerca” and the Spanish “Ministerio de Educación, Ciencia y Tecnología” (2002-2003);
- “Algebraic varieties of dimension  $>2$ , algebraic cycles, K-theory and motives” (national coordinator A. Verra), PRIN funded by the Italian “Ministero dell’Istruzione, dell’Università e della Ricerca” (2003-2004);
- “Marie Curie Research Training Network ENIGMA - European Network in Geometry, Mathematical Physics and Applications”, funded by the EC (FP6, 2004-2007);
- “The Theory of Nonlinear Integrable Systems and Applications”, funded by E.I.N.S.T.E.I.N. Consortium and Russian Foundation for Basic Research (2006-2008);
- “Azione Integrata SISSA (Trieste) - Universidad de Salamanca: Moduli spaces of coherent sheaves, triangulated categories and applications in mathematical physics”,



funded by the Italian “Ministero dell'Istruzione, dell'Università e della Ricerca” and the Spanish “Ministerio de Educación, Ciencia y Tecnología” (2007-2008);

- “Geometric methods in the theory of nonlinear waves and applications” (national coordinator B. Dubrovin), PRIN funded by the Italian “Ministero dell'Istruzione, dell'Università e della Ricerca” (2007- 2009);
- “Geometric, analytic and numerical methods in the theory of nonlinear waves and applications” (national coordinator B. Dubrovin), PRIN funded by the Italian “Ministero dell'Istruzione, dell'Università e della Ricerca” (2010-2012).
- “Geometry of algebraic varieties” (national coordinator A. Verra), PRIN funded by the Italian “Ministero dell'Istruzione, dell'Università e della Ricerca” (2012-2014).
- “Analytical and geometric methods in mathematical physics and probability”, research project funded by the Università di Genova, 2012
- “Mathematical aspects in the theory of interacting fields”, research project funded by the Università di Genova, 2013.
- “Mathematical aspects in the theory of interacting fields and quantization deformation”, research project funded by the Università di Genova, 2014 & 2015.
- “Tensors: Algebra and Geometry”, (national coordinator L. Chiantini), PRIN funded by the Italian “Ministero dell'Istruzione, dell'Università e della Ricerca” (2017-2019).
- “Metodi di geometria e di analisi funzionale nella teoria delle interazioni fondamentali”, research project funded by the Università di Genova, 2019 & 2020.

—— (Co)-organization of conferences, workshops, and schools

- *XIXth International Conference on Differential Geometric Methods in Theoretical Physics*, Rapallo (Genova), 19-24/VI/1990.
- *Summer Workshop on Algebraic Geometry and Physics*, Medina del Campo (Spain) 15-20/IX/1997.
- *Summer School on Algebraic Geometry and Physics*, Luminy, Marseille, 6-14/IX/1999.
- *Ricerca e FORMazione in Matematica*, Genova, 12-15/VI/2000.
- *Matematica e cultura 2001*, Venezia, 30-31/III/2001.
- *Matematica e cultura 2002*, Venezia, 22-24/III/2002.
- *Workshop on Algebraic Geometry and Physics (WAGP) - K-theory, derived categories and strings*, Dipartimento di Matematica, Università di Genova, Genova, 18-21/VI/2002.
- *Matematica e cultura 2003*, Venezia, 28-29/III/2003.
- *2003 School and Workshop on Algebraic Geometry and Physics* (School on Fourier-Mukai functors and Nahm transforms; Workshop on Geometric Integral Transforms and Applications), Departamento de Matemática Pura y Aplicada, Universidad de Salamanca, 18-23/VI/2003.
- *More geometrico: ruolo e significato del pensiero geometrico nelle scienze contemporanee*, Università degli Studi di Milano, Milano, 3-4/V/2005.
- *International workshop Moduli spaces, enumerative problems, and integrable systems*, Dipartimento di Matematica, Università di Genova, Genova, 25-28/V/2008.
- *More geometrico: An interdisciplinary conference on geometry, cognition, space and movement*, SISSA, Trieste, 6-8/X/2009.
- *Moduli spaces and Integrable Systems (Christmas Workshop)*, international workshop, Dipartimento di Matematica, Università di Genova, 19-21/XII/2012.
- *Ideas of point: an elusive concept in mathematics and physics throughout history*, international conference, SISSA, Trieste, 14-16/XI/2013.
- *Prevedere il passato: matematica e astronomia nelle ricerche storiche di A.C. Garibaldi (1932-2013)*, international workshop co-organized with Observatoire de Paris - Histoire des sciences et de l'astronomie, Dipartimento di Matematica, Università di Genova, 12/IX/2014.

- *Moduli spaces and Integrable Systems (2nd Christmas Workshop)*, international workshop, Dipartimento di Matematica, Università di Genova, 18-20/XII/2014.
- *Quivers, Moduli spaces and Integrable Systems (3rd Christmas Workshop)*, international workshop, Dipartimento di Matematica, Università di Genova, 19-21/XII/2016.
- *Quiver varieties, Moduli spaces, and Applications to mathematical physics (4th Christmas Workshop)*, international workshop, Dipartimento di Matematica, Università di Genova, 19-21/XII/2018.
- *Moduli Spaces and Integrable Systems (5th Christmas Workshop)*, Dipartimento di Matematica, Università di Genova, 19-20/XII/2022.

—— **Institutional service (a selection)**

- “Giunta del Dipartimento”, Dipartimento di Matematica, Università di Genova (member, 2004-2013 and 2017- 2018).
- “Commissione scientifica di Area 01 [Mathematics & Computer science]”, Università di Genova (member, 2007-2011).
- “Commissione scientifica del Dipartimento di Matematica”, Università di Genova (member, 2013- ).
- Scientific committee of the “Biblioteca of the Scuola di Scienze Matematiche, Fisiche e Naturali, Università di Genova” (member, 2014-2016).
- Graduate Admissions Committee, Dipartimento di Matematica, Università di Genova (member, 2000, 2001 and 2016 - ).
- “Collegio dei docenti” of the doctoral school in Mathematics, Università di Genova (member, 1999-2014 / coordinator, 2004-207 ).
- “Collegio dei docenti” of the doctoral school in Philosophy and Human Sciences, Università degli Studi di Milano (member, 2016- 2017; 2019- 2020).
- Member of Ph.D. thesis committees in Italy (Università di Genova, 2003, 2007; SISSA, Trieste, 2008, 2019); Spain (Universidad de Salamanca, 2009), France (Université de Nice, 2009).

———— **Ph. Supervision**

- Edoardo Provenzi, “A mathematical overview of canonical and covariant loop quantum algebra”, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2002-2004.
- Alberto Tacchella, “A multicomponent generalization of the KP/CM correspondence”, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2006-2010.
- Claudio Rava, “ADHM data for framed sheaves on Hirzebruch surfaces”, Dottorato di ricerca in Fisica Matematica, Sissa, Trieste, 2008-2012 (joint supervision with U. Bruzzo).
- Valeriano Lanza, “Hilbert schemes of points of the total space of  $\mathcal{O}_{\mathbb{P}^1}(-n)$  as quiver varieties”, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2011-2015.
- Andrea Gentili, “A first order deformation theory for linear quasi-categories”, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2011-2015;
- Andrea Gandolfo, “The genesis of the theory of connections: H. Weyl and É. Cartan, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2011-2016 (joint supervision with U. Bruzzo).
- Giovanni Filocamo, “Forme della conoscenza matematica: visualizzazione, rappresentazione non simbolica, intuizione”, Dottorato di ricerca in Matematica e Applicazioni, Università di Genova, 2012-2017.

- Flavio Baracco, “Weyl’s phenomenological background”, Dottorato di ricerca in Filosofia e Scienze dell’Uomo, Università degli Studi di Milano, 2017-2019 (joint supervision with M. D’Agostino).

———— **Postdoc supervision**

- Igor Mencattini, 2008.

———— **Teaching experience** (at the University of Genova, if not otherwise specified)

— **Laurea quadriennale in matematica** (if not otherwise specified)

- “Esercitazioni di Istituzioni di Fisica Matematica” (1990-91; 1991-1992; 1992-93).
- “Esercitazioni di Meccanica Razionale” ](1990-91, Ingegneria; 1991-1992, Matematica; 1992-93, Fisica; 1994-95, Fisica; 1995-96, Fisica; 1996-97, Fisica).
- “Istituzioni di Fisica Matematica, I modulo, indirizzo generale” (1993-94; 1994-95; 1995-96).
- “Istituzioni di Fisica Matematica, I modulo, indirizzo applicativo” (1994-1995).
- “Istituzioni di Fisica Matematica, I modulo” (1996-1997; 1997-1998; 1998-99; 2000-2001).
- “Analisi I, Il modulo” (1998-1999, Polo universitario G. Marconi, La Spezia).
- “Istituzioni di Fisica Matematica, Il modulo” (1998-99; 1999-2000, 2002-2003).
- “Meccanica Razionale” (2001-2002).
- “Fisica Matematica, I modulo” (2003-2004).

— **Laurea triennale in matematica**

- “Sistemi dinamici e meccanica analitica” (2002-2003; 2003-2004; 2004-2005, 2005-2006;).
- “Istituzioni di Fisica Matematica I” (2006-2007, 2008-2009, 2009-2010; 2010-2011; 2011-2012; 2012-2013; 2013-2014; 2014-2015; 2015-2016; 2016-2017).
- “Storia della matematica” (2016-2017; 2017-2018; 2018-2019; 2019-2020, 2020-2021, 2021-2022, 2022-2023).
- “Geometria differenziale” (2016-2017; 2017-2018; 2018-2019; 2019-2020, 2020-2021, 2021-2022, 2022-2023).

— **Laurea triennale in filosofia**

- “Storia della scienza, I modulo (Scienze matematiche e fisiche)” (Università Vita & Salute - San Raffaele, Milano, per affidamento, 2017-2018)

— **Laurea magistrale in fisica**

- “Fisica Matematica” (2008-2009).

— **Laurea magistrale in matematica**

- “Fisica Matematica II” [gauge theory] (2004-2005).
- “Complementi di storia della matematica” (2008-2009; 2009-2010; 2010-2011; 2011-2012; 2012-2013; 2013-2014; 2014-2015; 2015-2016).
- “Introduzione alle superfici di Riemann” (minicourse, 2011-2012).
- “Metodi geometrici in fisica matematica” (a.a. 2005-2006; 2008-2009; 2009-2010, 2010-2011; 2011-2012; 2012-2013; 2013-2014; 2014-2015; 2015-2016; 2016-2017; 2017-2018; 2018-2019; 2019-2020).
- “Coomologia dei fasci (minicourse, 2018-2019).

— **Graduate courses**

- “Mukai transform on complex surfaces” (with U. Bruzzo), Dottorato in Fisica Matematica, SISSA, 1993.
- “Seiberg-Witten invariants and geometry of Kähler surfaces”, Dottorato in Matematica, Genova-Torino, 1999.

- “Classical decomposition of semisimple Lie groups” (with F. De Mari), Dottorato in Matematica, Genova, 2001, 2002, 2005, 2006.
- “Gauge theory: an introduction”, Dottorato in Matematica, Università di Genova, 2002, 2003, 2005, 2006; Dottorato in Fisica Matematica, SISSA, 2007.
- “Representations of compact Lie groups”, Dottorato in Matematica, Università di Genova, 2016.
- “Spacetime Geometries”, Dottorato di ricerca in Filosofia e Scienze dell’Uomo, Università degli Studi di Milano, March 2017.
- “Gauge Theory”, Dottorato in Matematica, Università di Genova, 2023
- **Other teaching activities**
- “La matematica nella storia del pensiero”, 5 two-hour lectures for high-school teachers, Liceo Colombo, Genova, January-March 2018.

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#### Other activities (miscellanea)

- Referee for the following international journals: International Mathematical Research Notes; Advances in Mathematics; Journal of Geometry and Physics; Foundations of Science; Journal of Mathematical Physics; Journal of High Energy Physics (JHEP); Nuovo Cimento B; Canadian Mathematical Bulletin; Publicacions Matemàtiques; European Journal for Philosophy of Science; SIGMA; Rivista di filosofia.
- Remote Evaluator for NEST Programme (European Commission, 2003, 2004, 2005).
- “Reviewer for NSA proposals” (NSA/AMS, USA, 2008).
- Member of the editorial board of the journal Lettera Matematica Pristem (2003-2019).
- Reviewer for Mathematical Reviews (1988- ) and Zentralblatt MATH (2003- ).
- Consultant for a major Italian publishing house (1997- ).
- General editor (with P. G. Odifreddi) and scientific editor of: *La matematica* (advisory board: Sir Michael Atiyah, A. Connes, F. Dyson, Yu. Manin, D. Mumford, H. Putnam, S. Smale), Vol 1. *I luoghi e i tempi*, Einaudi, Torino 2007 [French translation: *La mathématique. Les lieux et les temps*, CNRS Éditions, Paris 2009], Vol 2. *Problemi e teoremi*, Einaudi, Torino 2008; Vol. 3. *Suoni, forme parole*, Einaudi, Torino, 2011; Vol. 4. *Pensare il mondo*, Einaudi, Torino, 2010.
- Author of the books: *Una piramide di problemi. Storie di geometria da Gauss a Hilbert* (Raffaello Cortina, Milano 2012; [ZbMATH 1277.51002]); *Dimostrare l'impossibile* (Raffaello Cortina, Milano 2014; finalist for the 2015 “Premio Galileo”); *Numeri* (with L. Civalieri, Codice, Torino 2014; 2nd revised ed., Codice, Torino 2017); *Zerologia. Sullo zero, il vuoto e il nulla* (with P. Martin & A. Tagliapietra, il Mulino, Bologna 2016).
- Curator of the exhibitions: “Numeri”, Palazzo delle Esposizioni, Rome, 14/X/2014 - 3/VI/2015; “Numeri nel tempo. Contare, misurare, calcolare”, Metaponto (part of the project “Matera Capitale Europea della Cultura 2019”), 21/VI - 30/XI/2019.
- Invited speaker at many events intended for the general public: e.g. Salone internazionale del libro, Torino (2002, 2006, 2007, 2011, 2012); Festival della scienza, Genova (2003, 2004, 2005, 2006, 2007, 2008, 2010, 2012, 2013, 2016, 2019); Festival della matematica, Roma (2007, 2008, 2009); Fiera interazionale dell’editoria scientifica, Trieste (2007); Festival dei saperi, Pavia (2008); Festival della letteratura, Mantova (2008, 2012, 2019); MathFestival, Italian Academy, Columbia University, New York (2009); Milano Scienza, Milano Mondo 2009; Festival PordenoneLegge, Pordenone (2010); Festival BergamoScienza, Bergamo (2011); La Milaneseiana, Milano (2012, 2013) BookCity Filosofia, Milano (2013, 2020); Festival della comunicazione, Camogli (2015, 2016); Festivalscienza, Cagliari (2015); Festival della mente, Sarzana (2016, 2017); Festival jonico della filosofia, Savoca (2017); Festival della politica, Mestre (2019);

Seed|Festival Internazionale di architettura, Perugia (2023); Festival delle scienze, Roma (2020, 2023).

Data

26/07/2023

Luogo

Genova