University Academic Curriculum Vitae

Personal information

Name: Ivano Colombaro

Education since leaving school

- 2013, BSc in Physics. Alma Mater Studiorum, University of Bologna, Italy
- 2016, MSc in Theoretical Physics “Cum Laude”. Alma Mater Studiorum, University of Bologna, Italy
- 2022, PhD in Information and Communication Technologies “Cum Laude”. Universitat Pompeu Fabra, Barcelona, Spain

Present appointment

- **Fixed-term Researcher, Type A (RTDa)**
- Start of appointment: January 2023
- Level of appointment: Junior Assistant Professor (non-tenured)
- Employer: Free University of Bozen-Bolzano
- Brief description of responsibilities:
  - Research activities: conduct independent and collaborative research within mathematical physics and applied mathematics.
  - Teaching duties: deliver undergraduate courses, including lectures, seminars and laboratory sessions.
  - Scientific dissemination: present research findings at international conferences, workshops and short research stay in collaborators institutions.
  - Academic Service: peer-review and editorial activities.

Professional experience

Chronological list of all previous employments (each with job title, starting and finishing dates, level, employer, responsibilities)

From / to	Job title	Name of academic Institution	Academic level	responsibilities
2017	Visiting researcher	Universitat Pompeu Fabra	Early-stage researcher	Research on physics and information theory.
2017/ 2022	PhD candidate	Universitat Pompeu Fabra	Doctoral Researcher	Develop my doctoral thesis and research in multidisciplinary fields of mathematical physics and applied mathematics.
2017/ 2022	Teaching Assistant	Universitat Pompeu Fabra	Graduate	Teaching to Bachelor’s students.

Experience in academic teaching

- Title of courses given last 5 years, name of University/Institute, subject area, academic level (under-/post-graduate/ PhD),
  - Elements of Fractional Calculus, Department of Mathematics, University of Bologna, PhD course (A.Y. 24/25)
  - *Mathematics*, Free University of Bozen-Bolzano, Professional Bachelor in Wood Technology (A.Y. 23/24, 24/25, 25/26)
  - *Laboratory Mathematics*, Free University of Bozen-Bolzano, Professional Bachelor in Wood Technology (A.Y. 23/24, 24/25, 25/26)
  - *Fundamentals of Physics*, Free University of Bozen-Bolzano, Bachelor in Agricultural, Food and Mountain Environmental Sciences (A.Y. 22/23, 23/24, 24/25)
  - *OFA (Additional Learning Obligations) Mathematics*, Free University of Bozen-Bolzano, Bachelor in Agricultural, Food and Mountain Environmental Sciences (A.Y. 23/24, 24/25, 25/26)
  - *OFA (Additional Learning Obligations) Physics*, Free University of Bozen-Bolzano, Bachelor in Agricultural, Food and Mountain Environmental Sciences (A.Y. 23/24, 24/25)
  - *Calculus 1*, Universitat Pompeu Fabra, Bachelor's Degree in Engineering (A.Y. 20/21, 21/22, 22/23)
  - *Numerical Methods: Python*, Universitat Pompeu Fabra, Bachelor's Degree in Engineering (A.Y. 21/22)
- Undergraduate supervision (Bachelor + Master level) + Postgraduate supervision (PhD level): number of students supervised in the last five years with subject areas
  - External Co-Supervisor of one student at University of Ferrara, B. Sc. in Mathematics (A. Y. 24/25). Thesis: *On linear waves in fluid-filled compliant tubes*.

Other academic responsibilities

- Internal appointments to faculty and university boards
  - From A.Y. 25/26, Quality Assurance Coordinator for the Professional Bachelor's Degree program in Wood Technologies (LP-03) at the Faculty of Engineering, Free University of Bozen-Bolzano.
- external appointments at national and international level
  - In 2025, admitted to the Italian National Register of Experts (Albo degli Esperti) to serve as an external reviewer for the Research Quality Assessment (VQR) 2020-2024.

Memberships

Membership of academic or professional bodies (including membership of Editorial Boards of scientific publications; membership of scientific committees for international conferences)

- From 2017, member of the Italian Group of Mathematical Physics - INdAM – GNFM
- In 2025, member of the European Mathematical Society
- From December 2023, member of the Editorial Board of *Fractional Calculus and Applied Analysis*, Springer. Electronic ISSN: 1314-2224, Print ISSN: 1311-0454

Research and scholarships

- Summary of research and scholarship during the previous five years
  - 2018-2022: FPI fellowship (PhD) from the Spanish Ministry of Science, Innovation and Universities
- Summary of significant achievements in research and scholarship

- 2023: Distinguished EPJ Referee 2023 from *The European Physical Journal Plus*

- Research grants and contracts:

Date granted	Award Holder(s)	Funding Body	Title
2023	Ivano Colombaro (PI), Giuseppe Arnone (participant)	Italian National Institute of Advanced Mathematics - Group of Mathematical Physics	GNFM/INdAM Young Researchers Project 2023 - code CUP_E53C22001930001. Modelli per la convezione governati dalla legge di Darcy frazionaria.
2025	Ivano Colombaro (PI)	Free University of Bozen-Bolzano	European Digital Innovation Hub (EDIH) project.

Publications

- Journal articles in refereed academic journals (with DOI whenever possible)

[1] *I. Colombaro*, A. Giusti, F. Mainardi, A class of linear viscoelastic models based on Bessel functions, Meccanica (2017), 52(4): 825–832. DOI: 10.1007/s11012-016-0456-5.

[2] *I. Colombaro*, A. Giusti, F. Mainardi, On the propagation of transient waves in a viscoelastic Bessel medium. Z. Angew. Math. Phys. (2017), 68:62–74. DOI: 10.1007/s00033-017-0808-6.

[3] *I. Colombaro*, A. Giusti, F. Mainardi, On transient waves in linear viscoelasticity, Wave Motion (2017), 74:191–212. DOI: 10.1016/j.wavemoti.2017.07.008.

[4] A. Giusti, *I. Colombaro*, Prabhakar-like Fractional Viscoelasticity, Comm. Nonlin. Sci. Num. Sim. (2018), 56: 138–143. DOI: 10.1016/j.cnsns.2017.08.002.

[5] *I. Colombaro*, A. Giusti, S. Vitali, Storage and Dissipation of Energy in Prabhakar Viscoelasticity, Mathematics (2018), 6(2): 15. DOI: 10.3390/math6020015.

[6] *I. Colombaro*, R. Garra, A. Giusti, F. Mainardi, Scott-Blair models with time-varying viscosity, App. Math. Lett. (2018), 86: 57–63. DOI: 10.1016/j.aml.2018.06.022.

[7] *I. Colombaro*, J. Font-Segura, A. Martinez, An Introduction to Space–Time Exterior Calculus, Mathematics (2019), 7(6): 564. DOI: 10.3390/math7060564.

[8] A. Giusti, *I. Colombaro*, R. Garra, R. Garrappa, F. Polito, M. Popolizio, F. Mainardi, A practical guide to Prabhakar fractional calculus. Fract. Calc. Appl. Anal. (2020); 23(1): 9-54. DOI: 10.1515/fca-2020-0002.

[9] *I. Colombaro*, J. Font-Segura, A. Martinez, Generalized Maxwell equations for exterior-algebra multivectors in (k, n) space-time dimensions. Eur. Phys. Jour. Plus (2020); 135: 305. DOI: 10.1140/epjp/s13360-020-00305-y.

[10] A. Martinez, J. Font-Segura, *I. Colombaro*, An Exterior-Algebraic Derivation of the Symmetric Stress-Energy-Momentum Tensor in Flat Space-Time. Eur. Phys. Jour. Plus (2021); 136: 212. DOI: 10.1140/epjp/s13360-021-01192-7.

[11] *I. Colombaro*, J. Font-Segura, A. Martinez, An Exterior Algebraic Derivation of the Euler-Lagrange Equations from the Principle of Stationary Action. Mathematics (2021); 9(18): 2178. DOI: 10.3390/math9182178.

[12] A. Martinez, *I. Colombaro*, J. Font-Segura, On the angular momentum and spin of generalized electromagnetic field for r-vectors in (k, n) space-time dimensions. Eur. Phys. Jour. Plus (2021); 136: 1047. DOI: 10.1140/epjp/s13360-021-02023-5.

[13] *I. Colombaro*, A. Giusti, A. Mentrelli, Energy dissipation in viscoelastic Bessel media, Acta Mech. (2023); 234: 2389. DOI: 10.1007/s00707-023-03506-5.

[14] *I. Colombaro*, Time-like definition of quaternions in exterior algebra, Ric. di Mat. (2024); 73(5): 2865. DOI: 10.1007/s11587-023-00810-z.

[15] A. Giusti, *I. Colombaro*, R. Garra, R. Garrappa, A. Mentrelli, On variable-order fractional linear viscoelasticity. Fract. Calc. Appl. Anal. (2024); 27(4): 1564. DOI: 10.1007/s13540-024-00288-y.

[16] *I. Colombaro*, On Exterior-Algebraic Quaternions with Application to Maxwell Equations, Acta Appl. Math. (2025); 98: 1. DOI: 10.1007/s10440-025-00734-w.

[17] *I. Colombaro*, M. Tudela-Pi, On mathematical characterization of a Bessel functions-based passive element in electronic circuits, Appl. Math. Model. (2026); 154, 116683. DOI: 10.1016/j.apm.2025.116683.

- Conference papers

[c1] *I. Colombaro*, A. Giusti, F. Mainardi, A one parameter class of Fractional Maxwell-like models, AIP Conference Proceedings (2017), 1836(1): 020003. DOI: 10.1063/1.4981943.

[c2] *I. Colombaro*, A. Giusti, F. Mainardi, Wave Dispersion in the Linearised Fractional Korteweg - de Vries equation, WSEAS Transaction of Systems, 16, 43:46, (2017).

[c3] *I. Colombaro*, A. Giusti, Bessel Models of Linear Viscoelasticity, International Journal of Theoretical and Applied Mechanics, 3, 26:31, (2018).

[c4] *I. Colombaro*, J. Font-Segura, A. Martinez, Derivation of the Symmetric Stress-Energy- Momentum Tensor in Exterior Algebra . J. Phys.: Conf. Ser. (2021); 2090: 012050.
DOI: 10.1088/1742-6596/2090/1/012050.

[c5] *I. Colombaro*, G. Arnone, Electro-mechanical analogy for Prabhakar-like fractional viscoelasticity. J. Phys.: Conf. Ser. (2024); 2701: 012068. DOI: 10.1088/1742-6596/2701/1/012068.

[c6] *I. Colombaro*, Exterior-algebraic formulation of quaternions with applications. J. Phys.: Conf. Ser. (2025); 3027: 012020. DOI: 10.1088/1742-6596/3027/1/012020.

Further data

Presentations at scientific conferences over past 3 years (invited or selected, keynote, nature and status of conference)

- XII International Conference on Waves and Stability in Continuous Media, June 2023, invited talk: *Dissipation of energy for Bessel models*.
- 12th International Conference on Mathematical Modeling in Physical Sciences, August 2023, invited paper [c5].
- 13th International Conference on Mathematical Modeling in Physical Sciences, September 2024, invited paper [c6].
- XIII International Conference on Waves and Stability in Continuous Media, June 2025, invited talk: *On variable-order fractional calculus and linear viscoelasticity*.

Language competence	Written and spoken competence in all languages according to CERF levels, Common European Reference Framework (http://www.coe.int/t/dg4/linguistic/cadre1_en.asp); append certificates wherever available Italian: Mother Tongue English: written (C1) and spoken (C1) Spanish: written (C1) and spoken (C2) German: written (B1) and spoken (B1) Catalan: written (A1) and spoken (A2)