

Curriculum Vitae

October 2026

RENZO LUIGI RICCA



PERSONAL DETAILS

Date of birth: January 24, 1960.

Nationality: Italian and British. Married. Two children: Joël, Jolie.

Office: Department of Mathematics and Applications, U. Milano-Bicocca (UniMiB).

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EDUCATION

Ph.D. (Mathematics) (16.07.1994). U. Cambridge (Trinity College). Thesis title: *Geometric and topological aspects of vortex filament motion*. Supervisor: Professor H.K. Moffatt

M.Sci. (15.08.1989). U. Cambridge (Trinity College). Advisor: Professor H.K. Moffatt

Laurea Degree (30.03.1989). Politecnico di Torino. Thesis title: *Study of a vortex filament* (in Italian). Advisors: Professors M. Germano, M.G. Rasetti. Mentors: G. Geymonat, T. Regge.

APPOINTMENTS

2004-to present Professor of Mathematical Physics (from 2008 Tenured), U. Milano-Bicocca

1998-2003 Senior Research Fellow and Lecturer, University College London

1993-1995 Research Associate, Politecnico di Torino

1992-1997 Research Assistant and Fellow, University College London

VISITING POSITIONS

2025-to present, Associate Member, Higgs Centre for Theoretical Physics, Edinburgh U.

2023-to present, Affiliate Member, SKCM² World Premier Institute, Hiroshima U.

2016-2026, (from 2023 Distinguished) Visiting Guest Professor, Beijing U. Technology

2019-to present, Erasmus Professor, 2008-2022 U. Côte d'Azur, 2019 U. Crete, 2025 Natl. Tech. U. Athens, 2025 U. Niš

2005-2007, Senior Visitor, DAMTP, U. Cambridge

2003-2004 Visiting Professor, University College London

2002-2003 Visiting Professor, École Normale Supérieure, Paris

2001 JSPS Visiting Fellow, Kyushu University

2000 EPSRC Senior Research Fellow, Isaac Newton Institute, Cambridge

1997-1998 Senior Scientist, ISIS, EC-Joint Research Centre, Ispra

1996, 1997, 2000 Visiting Professor, Department of Mathematics, U. Geneva

1992 Visiting Post-Doc, Institute for Advanced Study, Princeton

1991 Research Affiliate, Institute for Theoretical Physics, UC Santa Barbara

1989-1992 Research Associate, DAMTP, U. Cambridge

SCIENTIFIC IMPACT

- ORCID ID: 0000-0002-7304-4042
- Google Scholar: h-index = 29; i10-index = 56; 5323 citations
- SCOPUS (59 items): h-index: 29, 1384 citations
- ISI-Web of Science (53 items): H-index = 14; sum of times cited: 616

AWARDS AND INTERNATIONAL RECOGNITION

(i) Awards and Distinctions

- 2023-2026 *BOTAP Scholarship*, Beijing Overseas Talent Aggregation Project - Haiju Project, P.R. China.
- 2013 *Habilitation to Full Professorship*, Sector 01/A4. MIUR, Italian Ministry of Education, Italy.
- 2007-2008 *Lagrange Senior Research Fellowship*, ISI & CRT Foundation, Torino, Italy.
- 2003-2007 *Return Scholarship* (“Incentivazione alla mobilità di studiosi stranieri e italiani residenti all'estero”), MIUR, Italian Ministry of Education, Italy.
- 2001 *JSPS Fellowship*, Japan Society for the Promotion of Science, Japan.
- 1991 *J.T. Knight Prize* (Mathematics). University of Cambridge, UK.
- 1989-1992 *ASP Scholarship*, ASP, Torino, Italy.

(ii) Scientific Boards and Panels

- 2026-to date Editorial Board Member, *J. Knot Theory & Its Ramifications (JKTR)*, World Scientific.
- 2016-to date Editorial Board Member for Mathematical Physics, *Nature Scientific Reports*, Nature-Springer.
- 2013-2018 Reviewer, *Zentralblatt MATH*, Berlin, Germany.
- 2010-2018 Reviewer, FET-Open Scheme, European Commission, Brussels.

ORGANISATION AND DIRECTION OF INTERNATIONAL PROGRAMMES

(i) Long Term Research Programs

- 2019 (August-September) Scientific Director and Principal Organiser, *Knotted Fields*, Beijing U. Technology (BJUT) & Northwestern U., Xi'an.
- 2011 (May-July) Scientific Director and Principal Organiser, *Knots and Applications*. Mathematics Research Centre «Ennio De Giorgi», Scuola Normale Superiore, Pisa.
- 2000 (September-December) Program Organiser, *Geometry and Topology of Fluid Flows*. Isaac Newton Institute for Mathematical Sciences, Cambridge.

(ii) Summer Schools, Workshops and International Conferences

- 2026 (April) Co-Organiser, Oberwolfach Seminar *Knots and Their Interdisciplinary Applications*. MFO, Seminar 2618a, Oberwolfach, Germany.
- 2024 (June) Co-Organiser, EQUADIFF24 Mini-Symposium *Topological Fluid Dynamics*. Karlstad University, Sweden.
- 2024 (January) Co-Organiser, GEOTOP-A Intl. Conference *Applications of Geometry and Topology*. Autonomous U. Yucatán (UADY), Mérida, México.
- 2022 (September) Principal Organiser, 74th School of Mathematics «Guido Stampacchia» & Intl. Workshop *Topological Methods in Mathematical Physics*. Majorana Foundation and Centre for Scientific Culture, Erice (Sicily).
- 2021 (January) Chair and Principal Organiser, Intl. Meeting *Applications of Geometry and Topology to Modern Physics* (online).
- 2019 (September) Chair and Principal Organiser, Intl. Summer School (Beijing), *Knotted Fields and Applications*. Beijing U. Technology (BJUT), Beijing.
- 2019 (July) Organiser, *SIAM-AG19 From Algebraic Geometry to Geometric Topology: Crossroads on Applications*. U. Bern.

- 2016 (April) Chair and Principal Organiser, IUTAM Symposium *Helicity, Structures and Singularity in Fluid and Plasma Dynamics*. Istituto Veneto di Scienze Lettere ed Arti, Venice.
- 2011 (July) Chair and Principal Organiser, Workshop *Topological Dynamics in Physics and Biology*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2011 (July) Chair and Principal Organiser, ESF-EMS-ERCOM Conference *Knots and Links: from Form to Function*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2011 (May) Chair and Principal Organiser, Pedagogical School *Knots and Links: From Theory to Applications*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2001 (June) Scientific Director, CIME Summer School *Topological Fluid Mechanics*. International Mathematical Summer Center, CIME Foundation, UMI, Italy.
- 2000 (October) Organiser, LMS Spitalfields Days *In Search of the Ideal Knot*. Isaac Newton Institute for Mathematical Sciences, Cambridge.
- 2000 (September) Scientific Director, NATO-ASI *Pedagogical Workshop on the Geometry and Topology of Fluid Flows*. Isaac Newton Institute for Mathematical Sciences, Cambridge.
- 1996 (May) Organiser, *UK-MHD Meeting*. University College London.

(iii) Science Promotion

- 2018-to date Founding and Scientific Committee Member, *GEOTOP-A*. Intl. web-seminar series: <http://seminargeotop-a.com>
- 2021 Founding Member, *The Association for Mathematical Research*. <https://amathr.org/>

SCIENTIFIC CONTRIBUTIONS AT INTERNATIONAL CONFERENCES

(i) Keynote and Invited Lectures

- 2026 (September) A topological approach to turbulence cascade. Workshop on *Physics and Mathematics of Turbulence in Different Media*, Simons Center for Geometry and Physics, Stony Brook.
- 2026 (April) Topological effects on the evolution of quantum defects. *Int. Conference on Mathematical Methods in Physics, ICMMP26*. Marrakech, Morocco.
- 2025 (February) A topological approach to turbulence cascade. *1st International On-line Knot Theory Congress*. <https://knots-congress.github.io>
- 2024 (September) Quantum versus classical vortex dynamics. Workshop on *Fluid Excitations*. Northwest University, Xi'an.
- 2024 (July) Vortex knot cascade by geodesic flows in a knot polynomial space. *AMS-UMI Intl. Joint Meeting 2024*, Palermo.
- 2023 (September) On the energy and helicity of inflexional magnetic braids. *NAOC Colloquium*. National Observatories of the Chinese Academy of Sciences, Beijing.
- 2023 (March) The beautiful interplay of topology and physics. *Kick-off Symposium*. SKCM2 Premier World Institute. Hiroshima U.
- 2019 (November) New routes to quantify topological complexity by adapted polynomials. *EUTOPIA Annual Meeting 2019*. San Sebastian.
- 2019 (September) Progress in topological quantum vortex dynamics. *Frontier Problems of Theoretical Physics*. Northwestern U., Xi'an.
- 2019 (June) Minimal unlinking pathways as geodesics in polynomial space. *BAGEL19 Workshop*. Institute for Mathematics and its Applications. Minneapolis.
- 2017 (September) Quantum vortex dynamics by Seifert surface information. *Form and Deformation in Fluid and Solid Mechanics*. Isaac Newton Institute for Mathematical Sciences, Cambridge.

- 2015 (June) From magnetic helicity to energy-complexity relations for solar loops. *IRF-MSB Forecast and Warnings of Extreme Storms at the Sun*, Lund, Sweden.
- 2014 (June) From “multiple continuity” to modern topological field theory. *Riemann, Topology and Physics*, U. Strasbourg, France.
- 2013 (November) Knot polynomials as new tool for turbulence research. *Turbulence & Wave Processes*, Lomonosov Moscow State U., Russia.
- 2012 (June) Recent progress in topological fluid dynamics: from helicity to Jones polynomials. *Knotted Fields*. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2012 (March) Tackling structural complexity in vortex dynamics, *Vortices and Solitons in Classical and Quantum Fluids*. CIRM, Marseille, France.
- 2009 (March) Topology bounds the energy of knots and links. *Edinburgh Mathematical Society Meeting*, Dundee, UK.

(ii) Lectures at Special Events

- 2026 (September) Topological hydrodynamics and knotted fields. *Simons Center for Geometry and Physics*. Stony Brook University.
- 2025 (November) The modern legacy of Tait’s knot theory. *Higgs Colloquium*. Edinburgh University.
- 2025 (May) Twist-fold processes and energy relaxation in nature. *Knots and Protein Intl. Conf.*, Bologna University.
- 2024 (June) Vortex cascades as geodesics in knot polynomial space. *EQUADIFF24 Intl. Conf.*, Karlstad University, Sweden.
- 2019 (November) GPE defect production by phase twist injection as Aharonov-Bohm effect. *EUTOPIA Annual Meeting*. WG5, San Sebastian.
- 2017 (October) Knot polynomials as a new tool for turbulence research. *FIMA Day*, Consiglio Nazionale delle Ricerche, Rome, Italy.
- 2017 (February) Knots and Applications. *La Matematica nel Mondo Contemporaneo*. Accademia dei Lincei e Scuola Normale Superiore, Pisa, Italy.
- 2014 (May) Roundtable on *Geometrical Aspects of Hydrodynamics*, Simon Center for Geometry and Physics, Stony Brook (NY), USA
- 2012 (October) From the theory of knots to the topology of chaos. *I Mercoledì della Scienza*. Fondazione di Piacenza e Vigevano, Piacenza, Italy.
- 2012 (September) Roundtable *ICNAAM. Symp. On Complex Systems*, Kos, Greece.
- 2012 (June) Roundtable on *Knotted Fields*. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2007 (October) Detecting structural complexity by computational fluid dynamics. Round Table *CAP1 2007*. CILEA, Politecnico di Milano.
- 2006 (February) Modern developments in mathematical biology. *Mathematical Modeling and Systems Biology*. Canavese Bio-industry Park, Ivrea, Italy.
- 2005 (April) Magnetic knots and minimal braids. *Turbulence, Twist and Treacle - Meeting in Celebration of 70th Birthday of H.K. Moffatt*. Isaac Newton Institute, Cambridge, UK.
- 2003 (November) Energy-complexity relations for vortex flows. *Colloquium in Honor of J.J. Moreau*, Laboratoire de Méchanique et Genie Civil, U. Montpellier II.
- 2000 (May) From Kelvin vortex knots to turbulence. *IMA World Mathematical Year Millennium Event*. The Institute of Mathematics and Its Applications, London.

(iii) Other oral Contributions

- 2024 (January) Proof of quantized circulation and zero-helicity condition for quantum knots and links. *Applications of Geometry and Topology*. Autonomous U. Yucatán (UADY), Mérida, México.
- 2023 (December) Quantum vortex knots and links under zero helicity condition. *Vortex Dynamics: the Crossroads of Mathematics, Physics and Applications*. BIRS Institute for Advanced Mathematics, Hangzhou.

- 2023 (November) A topological route to superfluid turbulence. *LMFL Fluid Mechanics Webinar Series*, U. Lille (online).
- 2023 (April) On quantum vortex knots and links. *Quantum Topology Webinar Series*. U. Illinois at Chicago (online).
- 2022 (September) Multi-valued potentials and physical reality. *Topological Methods in Mathematical Physics*. Majorana Foundation, Erice.
- 2022 (May) Vortex dynamics by geometric and topological methods. *IQM22*, Politecnico di Milano.
- 2021 (October) Minimal unlinking pathways as geodesics in knot polynomial space. *Helicity and space-time symmetry*. Advanced Mathematical Institute (OCAMI), Osaka (online).
- 2021 (August) Twist effects of quantum vortex defect. *Dynamics Days XV*. U. de la Côte d’Azur Nice.
- 2021 (January) Vortex reconnection in classical and quantum systems. *Applications of Geometry and Topology to Topics of Modern Physics*. BJUT & Bicocca (online).
- 2020 (September) Recent developments in topological field theory. *IC-MSQUARE Mathematical Modeling in Physical Sciences*. Tinos Island (online).
- 2020 (August) Topological cascade through vortex reconnection. *Physical Knotting, Vortices and Surgery in Nature*. Novosibirsk (online).
- 2019 (October) Quantum vortex dynamics by geometric and topological methods. *Waves, Coherent Structures and Turbulence*. U. East Anglia, Norwich.
- 2019 (September) Defect production by phase twist injection as Aharonov-Bohm effects. *Knotted Fields and Applications*. BJUT, Beijing.
- 2019 (July) Momentum of vortex tangles by weighted area information. *SIAM-From algebraic geometry to geometric topology: crossroads on applications*. U. Bern.
- 2018 (November) Writhe and twist helicity in quantum vortex systems. *From many Particle Systems to Quantum Fluids*. Gran Sasso Science Institute, L’Aquila.
- 2018 (November) Geometric devils in topological dynamics. *GEOTOP-A Webinar Series*. <http://seminargeotop-a.com> (online).
- 2018 (January) Quantum vortex dynamics by signed area information. *Phonon Hydrodynamics in Solid and Superfluids*. U. Palermo.
- 2017 (June) Influence of winding number on vortex torus knots dynamics. *IUTAM Symposium Dynamics and Topology of Vorticity and Vortices*. Carry-le-Rouet.
- 2016 (September) Vortex knots cascade by HOMFLYPT polynomial. *Knots and Links in Biological and Soft Matter Systems*. ICTP, Trieste.
- 2016 (July) Knots cascade detected by a monotonically decreasing sequence of HOMFLYPT values. *Knots, Low Dimensional Topology & Applications - Knots in Hellas 2016*. IOA, Ancient Olympia, Greece.
- 2016 (July) Vortex knots cascade by HOMFLYPT polynomial. *XI AIMS Dynamical Systems, Diff. Equations and Applications – Session on Vortex Dynamics*. Orlando, FL.
- 2016 (June) Vortex knots cascade by HOMFLYPT polynomial. *EUROMECH Colloquium 581*, Institute of Thermophysics, SB RAS, Novosibirsk, Russia.
- 2015 (September) Geometric daemons in topological dynamics. *IMRA Geometry and Biophysics*, Strasbourg, France.
- 2015 (August) HOMFLYPT polynomial for vortex knots and cascade process. *Knots in Theory and Science*, Basel, Switzerland.
- 2015 (April) From helicity to the HOMFLYPT polynomial of fluid knots and links. *Knots and Links in Fluid Flows*, Moscow Independent U., Moscow.
- 2014 (September) Groundstate energy and topological complexity of magnetic knots. *Knots in Soft Condensed Matter*, Vienna, Austria.
- 2014 (June) Writhe helicity conservation under anti-parallel reconnection. *ESF Reconnection Events in Classical, Quantum and Magnetized Fluids*, Glasgow U., UK.

- 2014 (March) Relaxation of magnetic knots to braids and groundstate energy minima. *CAKE*, Max Planck Institut Leipzig, Germany.
- 2013 (March) The Jones polynomial as a new invariant of fluid dynamics. *IUTAM Vortex Dynamics: Formation, Structure and Function*, Fukuoka, Japan.
- 2012 (December) On the energy spectrum of knots and links. *Quantized Flux in Tightly Knotted and Linked Systems*, Cambridge, UK.
- 2012 (October) Topological bounds on the energy and complexity of magnetic fields. *Tangled Magnetic Fields in Astro- and Plasma Physics*, Edinburgh, UK.
- 2012 (September) Tackling fluid tangles complexity by knot polynomials. *ICNAAM Symp. on Complex Systems*, Kos, Greece.
- 2012 (July) Impulse of vortex knots from diagram projections. *IUTAM Topological Fluid Dynamics*, Cambridge, UK.
- 2011 (September) Energy-complexity relations by structural complexity methods. *ICNAAM Symp. on Complex Systems*, Halkidiki, Greece.
- 2011 (July) On the groundstate energy spectrum of magnetic knots. *ESF-EMS-ERCOM Knots and Links: from Form to Function*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2011 (June) Topological dynamics by structural complexity methods. *Topology in Fluid Flow Visualization*. Ennio De Giorgi Mathematical Research Centre, Scuola Normale Superiore, Pisa.
- 2011 (May) From Gauss' derivation of linking number to its rôle in modern topological dynamics. *Entanglement and Linking*. Ennio De Giorgi Mathematical Research Centre, Scuola Normale Superiore, Pisa.
- 2010 (June) Topological dynamics by structural complexity analysis. *VI Conf. on Dynamical Systems and Applications*, Antalya, Turkey.
- 2010 (May) New lower bounds on the energy of knots and braids. *VIII AIMS Conf. Dynamical Systems, Differential Equations and Applications*, Special Session on "Magnetohydrodynamics: Mathematical Problems and Astrophysical Applications", Dresden, Germany.
- 2010 (May) Vortex dynamics estimates by structural complexity analysis. *VIII AIMS Conf. Dynamical Systems, Differential Equations and Applications*, Special Session on "New Trends in Mathematical Fluid Dynamics", Dresden, Germany.
- 2009 (August) Topology bounds the energy of knots and links. *XVI ICMP*. Prague, Check Republic.
- 2009 (May) Topology bounds the energy of knots and links. *Knots and Applications*, ICTP, Trieste, Italy.
- 2008 (September) On the groundstate energy of knotted magnetic flux tubes. *EURO MHD 2008*. Nice, France.
- 2008 (May) Detecting structural complexity: from visiometrics to genomics and brain research. *MathKnow08*. Politecnico di Milano, Italy.
- 2008 (April) From Da Rios' equations to integrable vortex dynamics. *Nonlinearity & Geometry: Darboux Days*. Bedlewo, Poland.
- 2007 (July) A new Stretch-Twist-Fold model for fast dynamo. *ICIAM '07*. Zürich, Switzerland.
- 2006 (March) Twist and fold modeling of supercoiled filaments. *Knots and Macromolecules*. Istituto Veneto di Scienze, Lettere ed Arti, Venice, Italy.
- 2006 (January) Twist and fold modeling for DNA supercoiling. *I FIMA Int. Conf. Models and Methods for Human Genomics*. Champoluc-Ayas, Italy.
- 2005 (September) Measures of structural complexity for vortex flows. *Singularities, coherent structures and their role in intermittent turbulence*. U. Warwick, UK.
- 2005 (August) Linear and angular momentum of a vortex tangle. *High Reynolds Number Vortex Interactions*. Tolouse, France.

- 2005 (June) From vortex rings, to knots and links. *Vortex Rings and Filaments in Classical and Quantum Systems*. ICTP, Trieste, Italy.
- 2003 (June) Energy-complexity relations for vortex flows. *Fluxes and Structures in Fluids*. Saint Petersburg, Russia.
- 2002 (July) On Kelvin's vortex knots. *Geometry, Symmetry and Mechanics*. U. Warwick, UK.
- 2002 (July) Measuring structural complexity of fluid flows. *Fundamentals of Vortices, Convection and Turbulence in Rotating Flows*. U. College London.
- 2001 (December) In search of symmetries in magnetic knots. *Geometric Mechanics and Symmetry*. U. Warwick, UK.
- 2001 (January) From fluid knots to complex systems. *Knots in Science*. MAA-AMS Joint Mathematics Meetings, New Orleans, USA.
- 2000 (November) Asymptotic potential theory for slender tubes, intrinsic kinematics and minimal surfaces. *BRIMS Day*. Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.
- 2000 (October) A history of Kelvin's vortex knots. *Spitalfields Day*. Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.
- 2000 (August) Relaxation of magnetic knots. *XVI IMACS World Congress*. Lausanne, Switzerland.
- 1998 (August) Topological ideas in vortex dynamics. *Knots in Hellas '98*. Delphi, Greece.
- 1997 (June) Inflexional disequilibrium of elastic and magnetic knots. *Mathematics and Mechanics for Materials Science and Molecular Biology*. Capri, Italy.
- 1995 (August) New developments in topological fluid mechanics. *Knot Theory and Applications*. Stefan Banach International Mathematical Centre, Warsaw, Poland.
- 1994 (May) The Călugăreanu invariant in topological fluid mechanics. *Romania and Romanians in Contemporary Science*. Sinaia, Romania.
- 1990 (June) Invariants of the Da Rios-Betchov equations. *Generation of Large-Scale Structures in Continuous Media*. Perm, Soviet Union.

TEACHING AT SUMMER SCHOOLS

(i) International Advanced Schools

- 2026 (April) “Knotted Fields” (4 hours). Oberwolfach Seminar 2618a, MFO, Oberwolfach.
- 2025 (April) “Stretch-twist-fold kinematics re-visited” (1 hour). Summer School on Mathematical Fluid Dynamics, Cargèse.
- 2023 (June) “Topological Vortex Dynamics” (10 hours). Summer School on Mathematical Fluid Dynamics, Cargèse.
- 2022 (September) “An Introduction to Topological Magnetohydrodynamics” (10 hours). Laboratoire Dieudonné, U. Côte d’Azur.
- 2018 (September) “An Introduction to Topological Fluid Dynamics” (8 hours). Beijing U. Technology.
- 2017 (June) “Aspects of Topological Fluid Mechanics” (3 hours). Early Summer School on Contemporary Aspects, Overview and Outlook on Knots. Freiburg U..
- 2014 (September) “Intrinsic Kinematics of Strings” (1 hour). Summer School on Finsler Geometry with Applications. Samos Island, Greece.
- 2012 (September) “Topological Magnetohydrodynamics” (6 hours). IAR School on Fluid Mechanics and Magneto-hydrodynamics. ITAP, Marmaris, Turkey.
- 2011 (May) “Physical Knot Theory” (6 hours). Pedagogical School on Knots and Links: From Theory to Applications. Ennio De Giorgi Mathematical Research Centre, Scuola Normale Superiore, Pisa.
- 2001 (June) “Elements of Topological Fluid Mechanics” (5 hours). CIME Summer School on Topological Fluid Mechanics. Unione Matematica Italiana, Cetraro, Italy.

- 2000 (June) “Revisiting Gauss Linking Number” (3 hours). Summer School on Geometric and Topological Methods in Dynamical Systems. U. Bourgogne, Dijon, France.
- 1998 (September) “From Fluid Knots to Structural Complexity” (4 hours). EC Summer School on Turbulence and Applications. Landau Network and EC-JRC Ispra, Centre “A. Volta”, Como, Italy.
- 1996 (May) “Magnetic Knots and Applications” (4 hours). Summer School on Vortex and Flux Tubes: Observations, Stability, Topology. Observatoire de la Côte d'Azur, Nice, France.

(ii) National Summer Schools

- 2017 (September) “Topological Fluid Mechanics” (6 hours). GNFM and INdAM Summer School on Mathematical Physics. Unione Matematica Italiana, Ravello.
- 2017 (February) “From the Mathematics of Knots to DNA Topology” (3 hours). Scuola Normale Superiore & Accademia Lincei, Pisa.
- 2007 (September) “An Introduction to Structural Complexity” (1 hour). Summer School on Mathematics and Physics. MatNet & U. Bergamo, San Pellegrino, Italy.
- 1995 (December) “Linking and Self-linking of Elastic filaments” (2 hours). Workshop on Mathematical Methods in Materials Science. IAC-CNR, Rome, Italy.
- 1995 (May) “Applications of the Călugăreanu invariant” (3 hours). Workshop on Geometry and Topology in Low Dimensions. Scuola Normale Superiore & U. Pisa, Italy.

UNIVERSITY TEACHING

(i) Doctoral Degree (III level)

- 2024 “Riemann, Topology and Physics” (4 hours). Dept. Theoretical Physics, BJUT.
- 2021 “Knotted Fields” (30 hours). Dept. Mathematics and Applications, UniMiB.
- 2018 “Classical and Quantum Knots – Theory and Applications” (20 hours). Dept. Mathematics and Applications, UniMiB.
- 2008 “Geometric and Topological Vortex Dynamics” (10 hours). Laboratoire J.A. Dieudonné, U. Nice Sophia Antipolis.
- 2008 “Physical Applications of Knot Theory” (6 hours). Dept. Methods and Models for Mathematics, U. Rome “La Sapienza”.
- 2006 “Physical Applications of Knot Theory” (20 hours). Dept. Mathematics, Politecnico di Torino.
- 2005 “Elements of Topological Fluid Mechanics” (10 hours). Dept. Mathematics and Applications, UniMiB.
- 2002 “An Introduction to Geometric and Topological Magnetohydrodynamics” (6 hours). Dept. Advanced Science and Technology, U. Piemonte Orientale.
- 2001 “Lectures on Topological Fluid Mechanics” (20 hours). Research Institute for Mathematical Sciences, Kyoto U.
- 2000 “Geometric and Topological Aspects of Fluid Dynamics” (10 hours). Dept. Mathematics, U. Geneva.

(ii) Master Degree (II level)

- 2015-to date Topological Methods in Field Theories (formerly Mathematical Methods for Modern Physics), UniMiB.
- 2019 Erasmus Course: Hydrodynamics for Condensates, U. Crete.
- 2009-2011 Applied Mathematics (BioInformatics), UniMiB.
- 2009 Erasmus Course: Topological Magnetohydrodynamics, Laboratoire J.A. Dieudonné, U. Nice Sophia Antipolis.
- 2004-2008 Physical Theories and Mathematical Models, UniMiB.
- 2003 Mathematical Methods III (M241), UCL.
- 1994-1998 Mathematical Methods (Hydrogeology), U. College London.
- 1995 (April) Geometric Methods in Fluid Mechanics. Scuola Normale Superiore, Pisa.

(iii) Bachelor Degree (I level)

2011-to date Mathematics (Biological Sciences), UniMiB.
2008-2011, 2013-2014 Mathematics II (Chemistry), UniMiB.
2010-2013 Mathematical Models and Differential Equations, UniMiB.
2008-2010 Elements of Mathematics II (Chemistry), UniMiB.
2003 Elementary Mathematics (A1A), UCL.
2002 Mathematics (B51B, Economics, Statistics), UCL.
1997-1998 Mathematics II (A3, Physical Sciences), UCL.
1997-1998 Mathematical Methods (B6, Chemistry), UCL.

UNIVERSITY OFFICES

(i) Direction and Examination of PhD and Master Projects

Direction of Ph.D. projects: Francesca Maggioni (2004-2006); Chiara Oberti (2011-2015); Franz Schlöder (2016-2020); Matteo Foresti (2016-2022); Alice Roitberg (2018-2023); Hao Guan (at BJUT, 2022-2025); Samuele Faglioni (at Hiroshima U., 2023-to date).
Examination of Ph.D. candidates: A. Xiong (U. Birmingham, 2022); S. Candelaresi (NORDITA, Stockholm U., 2012); J.N. Hartnack (Technical U. Denmark, 1999).
Supervision of Master thesis projects: more than 60 students to date.

(v) Internationalisation Office

- Internationalisation and Erasmus Departmental Coordinator.
- UniMiB Internationalisation Committee Member.

FUND-RAISING AND RESEARCH-RELATED ACTIVITIES

(i) Funded Research Projects

2023 Natural Science Foundation of China (NSFC) Grant N. 11572005 *Topological Fluid Mechanics* (PI, BJUT).
2019 Fondo di Ateneo Quota Competitiva (FAQC) *Geometric and Topological Aspects of Knotted Fields and Applications* (PI, UniMiB).
2016 Natural Science Foundation of China (NSFC) Grant N. 11572005 *Topological Fluid Mechanics* (Co-PI, BDIC-BJUT).
2010 INdAM-ESF funding for Intensive Research Trimester *Knots and Applications* (PI, UniMiB-U. Pisa).
2006-2010 MIUR COFIN 2006-PRIN Project: *Geometric Methods in the Theory of Non-Linear Waves and Applications* (co-applicant, SISSA-Trieste).
2004-2006 MIUR COFIN 2004-PRIN Project: *Mathematical Models for DNA Dynamics $M^2 \times D^2$* (co-applicant, U. Milano).
2003-2007 MIUR Research Project: *Measures of Complexity and Energy for Fluid Systems* (PI, UniMiB).
2001-2004 The Royal Society of London, Joint Research Project: *Physical Knots* (PI, UK-U. Lausanne).
2000 London Math. Society, Collaborative grant: *Vortex Knots in Ideal Fluids* (PI, UCL-U. Warwick).
1998-1999 Swiss National Science Foundation, Project: *Knot Theory and Applied Topology* (co-applicant, U. Geneva).
1998 PPARC, Project: *The Energy and Topology of Coronal Magnetic Fields* (co-applicant, UCL).

- 1997 UK-USA NSF, Project: *Topology in Heliosphere* (co-applicant, JPL, Pasadena).
1994 The Leverhulme Trust, Project: *Energetic and Topological Aspects of Magnetic Field Structures* (co-applicant, UCL).
1994 PPARC, Project: *The Structure and Energy of Coronal Magnetic Fields* (co-applicant, UCL).

(ii) Reviewing and Peer Refereeing

- Reviewing for international funding agencies: NSF (USA), EPSRC (UK), EC-FET (EU).
- Refereeing for primary journals: JFM, Fluid Dyn.Res., JKTR, PRL, Proc.R.Soc., Phys.Rev., J. Phys A, and many others.
- Refereeing for int. publishers: Imperial College Press, Springer-Nature, World Scientific.

REFEREES

- Europe**
- Professor C.F. Barengi (U. Newcastle, UK): carlo.barengi@newcastle.ac.uk
 - Professor M. Farge (Ecole Normale Supérieure Paris, France): marie.farge@ens.fr
 - Professor H.K. Moffatt (U. Cambridge, UK): hkm2@damtp.cam.ac.uk
 - Professor A. Niemi (Uppsala U., Sweden): antti.niemi@me.com
 - Professor D. Ruelle (IHES, Bures-sur-Yvette, France): ruelle@ihes.fr
- USA**
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