

Curriculum Vitae

September 2022

RENZO LUIGI RICCA



Personal Details

Date of birth: 24 January, 1960. Place of birth: Casale Monferrato (AL), Italy.
Citizenship: Italian (with British naturalization). Married to Pia Truc; 2 children: Joël, Jolie.

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Education

Ph.D. (Mathematics) (16.07.1994). Trinity College and U. Cambridge. Title: *Geometric and topological aspects of vortex filament motion*. Supervisor: Professor H.K. Moffatt.
M.Sc. (10.10.1990). Trinity College and U. Cambridge. Advisor: Professor H.K. Moffatt.
Laurea (Full Marks) (21.12.1988). Politecnico di Torino. Title: *Study of a vortex filament* (in Italian). Supervisors: Professors M. Germano and M.G. Rasetti.

Appointments

2004-to present Professor of Mathematical Physics (2008- Tenured), U. Milano-Bicocca.
1998-2003 Senior Research Fellow and Lecturer, University College London.
1993-1995 University Researcher, Politecnico di Torino.
1992-1997 Research Assistant and Fellow, University College London.

Visiting Positions

2016-2020, 2022-2024 BJUT Guest Professor, Beijing University of Technology.
2022 (June), Erasmus Professor, Laboratoire Dieudonné, U. Côte d'Azur, Nice.
2019 (February), Erasmus Professor, Department of Mathematics, U. Crete.
2008 (May), Erasmus Professor, Laboratoire Dieudonné, U. Nice Sophia-Antipolis.
2005-2007, Senior Visitor, DAMTP, U. Cambridge & Visiting Professor U. Milano-Bicocca.
2003-2004 Visiting Professor, University College London.
2002-2003, Visiting Professor, École Normale Supérieure, Paris.
2001 (October-November), 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 (March), 1997 (June-July), 2000 (March-July), 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 (CA).
1989-1992 Research Associate, DAMTP, University of Cambridge.

International Recognition and Awards

(i) Awards and Distinctions

- 2022 *Erasmus Visiting Professorship*, U. Côte d'Azur, France.
2018 *Erasmus Visiting Professorship*, U. Crete, Greece.
2013 *Italian National Scientific Habilitation to Full Professorship*, Sector 01/A4. MIUR, Italian Ministry of Education, Italy (re-confirmed in 2018).
2008/2009 *Erasmus Visiting Professorship*, U. Nice Sophia-Antipolis, France.
2007-2008 *Lagrange Senior Research Fellowship*, Institute for Scientific Interchange & CRT Foundation, Torino, Italy.
2003-2007 “*Brain Gain*” *Programme Scholarship* (“Incentivazione alla mobilità di studiosi stranieri e italiani residenti all'estero”), MIUR, Italian Ministry of Education, Italy.
2001 *JSPS Invitation Fellowship*, Japan Society for the Promotion of Science, Japan.
1991 *J.T. Knight Prize* (Mathematics). University of Cambridge, UK.
1989-1992 *ASP Scholarship*, Associazione Sviluppo Piemonte, Torino, Italy.

(ii) Scientific Boards and Panels

- 2016-to present Board Member (Mathematical Physics), Scientific Editorial Board, *Nature Scientific Reports*, Nature-Springer.
2016-2019 Member, Intl. Scientific Committee, IUTAM Symposium “Vortex Dynamics in Science, Nature and Technology”. La Jolla, 2018.
2013-2018 Reviewer, *Zentralblatt MATH* (EMS, Heidelberg Acad. Sci., FIZ Karlsruhe), Berlin, Germany.
2010-2018 Reviewer, Coordination and Support Action, FET-Open Scheme, European Commission, Brussels.

(iii) Entries in Biographical Records

- 2002-2020 *Who's Who in the World*. Marquis Pubs., New York, USA.
2006-2018 *Outstanding Scientists of the XXI Century*. Intl. Biogr. Centre, Cambridge, UK.
2004-2018 *Who's Who in Science & Technology*. Marquis Pubs., New York, USA.
2008 *Man of the Year in Science*. American Biographical Institute, Raleigh, NC, USA.

Organization and Direction of International Programs

(i) Intensive Research Programs

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

(ii) Summer Schools, Workshops and International Conferences

- 2022 (September) Principal Organizer of 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 Organizer of International B&B “Science-Silk Road” Meeting on *Applications of Geometry and Topology to Topics of Modern Physics*. Online meeting by Tencent's VooV platform.
2019 (September) Chair and Principal Organizer of International Summer School (Beijing), on *Knotted Fields and Applications*. Beijing University of Technology (BJUT), Beijing.
2019 (July) Organizer of *SIAM-AG19 Session From algebraic geometry to geometric topology: crossroads on applications*. University of Bern.

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

(iii) International Activities

- 2018 (August) Founding and Scientific Committee Member, *GEOTOP-A – Geometry and Topology – Applied*. Web-seminar series: <http://seminargeotop-a.com>
- 2021 (November) Founding Member, *AMR – The Association for Mathematical Research*. <https://amathr.org/>

Invited Lectures at International Conferences and Meetings

(i) Plenary Talks/Keynote Lectures

- 2021 (January) Vortex reconnection in classical and quantum systems. Online meeting on *Applications of Geometry and Topology to Topics of Modern Physics*. BJUT & Bicocca.
- 2020 (September) Recent developments in topological field theory. IC-MSQUARE Zoom Conf. on *Mathematical Modeling in Physical Sciences*. Tinos Island.
- 2020 (August) Topological cascade through vortex reconnection. Zoom Conference on *Physical Knotting, Vortices and Surgery in Nature*. Novosibirsk.
- 2019 (November) New routes to quantify topological complexity by adapted polynomials. *EUTOPIA Annual Meeting 2019*. San Sebastian.
- 2019 (October) Quantum vortex dynamics by geometric and topological methods. Int. Meeting on *Waves, Coherent Structures and Turbulence*. University of East Anglia, Norwich.
- 2019 (September) Progress in topological quantum vortex dynamics. Workshop on *Frontier Problems of Theoretical Physics*. Northwestern U., Xi'an.
- 2019 (September) Defect production by phase twist injection as Aharonov-Bohm effects. Intl. Conference *Knotted Fields and Applications*. BJUT, Beijing.
- 2019 (July) Momentum of vortex tangles by weighted area information. SIAM-AG19 Session *From algebraic geometry to geometric topology: crossroads on applications*. U. Bern.
- 2019 (June) Minimal unlinking pathways as geodesics in polynomial space. *BAGEL19 Workshop*. Institute for Mathematics and its Applications. Minneapolis.
- 2018 (November) Writhe and twist helicity in quantum vortex systems. Int. Workshop. on *From many Particle Systems to Quantum Fluids*. Gran Sasso Science Institute, L'Aquila.
- 2018 (November) Geometric devils in topological dynamics. *GEOTOP-A* international web-seminar. GEOTOP-A Channel: <http://seminargeotop-a.com>

- 2018 (January) Quantum vortex dynamics by signed area information. Int. Conf. *Phonon Hydrodynamics in Solid and Superfluids*. U. Palermo.
- 2017 (September) Quantum vortex dynamics by Seifert surface information. INI Workshop on *Form and Deformation in Fluid and Solid Mechanics*. Isaac Newton Institute for Mathematical Sciences, Cambridge.
- 2017 (June) Influence of winding number on vortex torus knots dynamics. IUTAM Symposium on *Dynamics and Topology of Vorticity and Vortices*. Carry-le-Rouet.
- 2016 (September) Vortex knots cascade by HOMFLYPT polynomial. Workshop on *Knots and Links in Biological and Soft Matter Systems*. ICTP, Trieste.
- 2016 (July) Knots cascade detected by a monotonically decreasing sequence of HOMFLYPT values. Invited lecture at *Intl. Conf. on Knots, Low Dimensional Topology & Applications - Knots in Hellas 2016*. IOA, Ancient Olympia, Greece.
- 2016 (July) Vortex knots cascade by HOMFLYPT polynomial. Invited lecture at *XI AIMS Int. Conf. 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 Meeting on *Geometry and Biophysics*, Strasbourg, France.
- 2015 (August) HOMFLYPT polynomial for vortex knots and cascade process. Workshop on *Knots in Theory and Science*, Basel, Switzerland.
- 2015 (June) From magnetic helicity to energy-complexity relations for solar loops. IRF-MSB project meeting *Forecast and Warnings of Extreme Storms at the Sun*, Lund, Sweden.
- 2015 (April) From helicity to the HOMFLYPT polynomial of fluid knots and links. Intl. Conference on *Knots and Links in Fluid Flows*, Moscow Independent U., Moscow.
- 2014 (September) Groundstate energy and topological complexity of magnetic knots. Intl. Meeting *Knots in Soft Condensed Matter*, Vienna, Austria.
- 2014 (June) Writhe helicity conservation under anti-parallel reconnection. ESF Workshop *Reconnection Events in Classical, Quantum and Magnetized Fluids*, Glasgow University, UK.
- 2014 (June) From “multiple continuity” to modern topological field theory. Intl. Meeting *Riemann, Topology and Physics*, U. Strasbourg, France.
- 2014 (March) Relaxation of magnetic knots to braids and groundstate energy minima. Int. Conf. *CAKE*, Max Planck Institut Leipzig, Germany.
- 2013 (November) Knot polynomials as new tool for turbulence research. Int. Conf. *Turbulence & Wave Processes*, Lomonosov Moscow State University, Russia.
- 2013 (March) The Jones polynomial as a new invariant of fluid dynamics. IUTAM Symposium *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. *Int. Symp. On Complex Systems*, ICNAAM 2012, Kos, Greece.
- 2012 (July) Impulse of vortex knots from diagram projections. IUTAM Symposium *Topological Fluid Dynamics*, Cambridge, UK.
- 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, Intl. Conf. *Vortices and solitons in classical and quantum fluids*. CIRM, Marseille, France.

- 2011 (September) Energy-complexity relations by structural complexity methods. *Int. Symp. on Complex Systems*, ICNAAM 2011, Halkidiki, Greece.
- 2011 (July) On the groundstate energy spectrum of magnetic knots. ESF-EMS-ERCOM Intl. Conf. *Knots and Links: from Form to Function*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2010 (June) Topological dynamics by structural complexity analysis. *Sixth Intl. Conf. on Dynamical Systems and Applications*, Antalya, Turkey.
- 2009 (March) Topology bounds the energy of knots and links. *Edinburgh Mathematical Society Meeting*, Dundee, UK.

(ii) Contributions to International Programs and Advanced Schools

- 2022 (May) Vortex dynamics by geometric and topological methods. *IQM22*, Politecnico di Milano.
- 2019 (November) GPE defect production by phase twist injection as Aharonov-Bohm effect. *EUTOPIA Annual Meeting 2019*. WG5, San Sebastian.
- 2019 (September) 6 lectures. Summer School on *Knotted Fields*. University of Technology.
- 2018 (September) 7 lectures. Advanced Master Course on *An Introduction to Topological Fluid Dynamics*. Institute for Theoretical Physics, Beijing University of Technology.
- 2017 (September) 6 lectures. GNFM and INdAM *Summer School on Mathematical Physics*. Italian Mathematical Union, Ravello.
- 2017 (June) 3 lectures. International Early Summer School on *Contemporary Aspects, Overview and Outlook on Knots*. Freiburg University.
- 2017 (February) 3 lectures. School on *Knots and Applications - From the Mathematics of Knots to DNA Topology*. Scuola Normale Superiore, Pisa.
- 2014 (September) Lecture at Summer School on *Finsler Geometry with Applications*. Samos Island, Greece.
- 2012 (September) 6 Lectures at IAR School *Fluid Mechanics and Magneto-hydrodynamics*. ITAP, Marmaris, Turkey.
- 2011 (May) 6 Lectures at Pedagogical School *Knots and Links: From Theory to Applications*. Ennio De Giorgi Mathematics Research Centre, Scuola Normale Superiore, Pisa.
- 2007 (September) Lecture at Summer School *Meeting Mathematics and Physics*. MatNet & U. Bergamo, San Pellegrino, Italy.
- 2001 (June) 5 Lectures at CIME Summer School *Topological Fluid Mechanics*. Unione Matematica Italiana, Cetraro, Italy.
- 2000 (June) 3 Lectures at Summer School *Geometric and Topological Methods in Dynamical Systems*. University of Bourgogne, Dijon, France.
- 1998 (September) 4 Lectures at EC Summer School *Turbulence and Applications*. Landau Network and EC-JRC Ispra, Centre "A. Volta", Como, Italy.
- 1996 (May) 4 Lectures at Summer School *Vortex and Flux Tubes: Observations, Stability, Topology*. Observatoire de la Côte d'Azur, Nice, France.
- 1995 (December) 2 Lectures at *Workshop Mathematical Methods in Materials Science*. IAC-CNR, Rome, Italy.
- 1995 (May) 3 Lectures at Workshop *Geometry and Topology in Low Dimensions*. Scuola Normale Superiore and University of Pisa, Italy.

(iii) Contributions to Special International Events

- 2017 (October) Knot polynomials as a new tool for turbulence research. *FIMA Day*, Consiglio Nazionale delle Ricerche, Rome, Italy.
- 2014 (May) Participation in *Geometrical Aspects of Hydrodynamics* workshop, Simon Center for Geometry and Physics, Stony Brook (NY), USA
- 2012 (September) Public Panel Discussion on Complex Systems. *Int. Symp. On Complex Systems*, ICNAAM 2012, Kos, Greece.

- 2012 (June) Open discussion on Calugareanu-White-Fuller theorem. Mini-programme *Knotted Fields*. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2011 (March) Topology bounds the energy of knots and links. Edinburgh Mathematical Society meeting, Dundee, UK.
- 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 Mécanique et Génie 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.

(iv) Contributions to International Conferences and Meetings

- 2011 (June) Topological dynamics by structural complexity methods. Workshop *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. Workshop *Entanglement and Linking*. Ennio De Giorgi Mathematical Research Centre, Scuola Normale Superiore, Pisa.
- 2010 (May) New lower bounds on the energy of knots and braids. *Eighth AIMS Conference on 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. *Eighth AIMS Conference on Dynamical Systems, Differential Equations and Applications*, Special Session on "New Trends in Mathematical Fluid Dynamics", Dresden, Germany.
- 2009 (May) Topology bounds the energy of knots and links. Intl. Conf. *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. *II Workshop on Nonlinearity & Geometry: Darboux Days*. Bedlewo, Poland.
- 2006 (March) Twist and fold modeling of supercoiled filaments. *Knots and Macromolecules*. Istituto Veneto di Scienze, Lettere ed Arti, Venice, Italy.
- 2005 (September) Measures of structural complexity for vortex flows. *Singularities, coherent structures and their role in intermittent turbulence*. Department of Mathematics, University of Warwick, UK.
- 2005 (June) From vortex rings, to knots and links. *Vortex Rings and Filaments in Classical and Quantum Systems*. International Center Theoretical Physics, Trieste, Italy.
- 2002 (July) On Kelvin's vortex knots. Workshop *Geometry, Symmetry and Mechanics*. Department of Mathematics, University of Warwick, UK.
- 2001 (December) In search of symmetries in magnetic knots. Symposium *Geometric Mechanics and Symmetry*. Department of Mathematics, University of 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.

- 1998 (August) Topological ideas in vortex dynamics. Conference *Knots in Hellas '98*. Delphi, Greece.
- 1997 (June) Inflexional disequilibrium of elastic and magnetic knots. Workshop *Mathematics and Mechanics for Materials Science and Molecular Biology*. Capri, Italy.
- 1995 (August) New developments in topological fluid mechanics. Conference *Knot Theory and Applications*. Stefan Banach International Mathematical Centre, Warsaw, Poland.
- 1994 (May) The Calugareanu invariant in topological fluid mechanics. Conference *Romania and Romanians in Contemporary Science*. Sinaia, Romania.
- 1990 (June) Invariants of the Da Rios-Betchov equations. Symposium *Generation of Large-Scale Structures in Continuous Media*. Perm, Soviet Union.

Regular Contributions to Meetings

(i) Lectures and Oral Contributions at International Conferences

- 2021 (August) Twist effects of quantum vortex defect. *Dynamics Days XV*. U. de la Côte d'Azur Nice.
- 2009 (August) Topology bounds the energy of knots and links. *XVI ICMP*. Prague, Check Republic.
- 2007 (July) A new Stretch-Twist-Fold model for fast dynamo. *ICIAM '07*. Zürich, Switzerland.
- 2006 (January) Twist and fold modeling for DNA supercoiling. I FIMA Int. Conf. *Models and Methods for Human Genomics*. Champoluc-Ayas, Italy.
- 2005 (August) Linear and angular momentum of a vortex tangle. *High Reynolds Number Vortex Interactions*. Toulouse, France.
- 2003 (June) Energy-complexity relations for vortex flows. *Fluxes and Structures in Fluids*. Saint Petersburg, Russia.
- 2002 (July) Measuring structural complexity of fluid flows. *Fundamentals of Vortices, Convection and Turbulence in Rotating Flows*. Dpt. Mech. Eng., University College London.
- 2000 (August) Relaxation of magnetic knots. *XVI IMACS World Congress*. Lausanne, Switzerland.

(ii) Science outreach

- 2017 (February) Knots and Applications. *La Matematica nel Mondo Contemporaneo*. Accademia dei Lincei e Scuola Normale Superiore, Pisa, Italy.
- 2012 (October) From the theory of knots to the topology of chaos. *I Mercoledì della Scienza*. Fondazione di Piacenza e Vigevano, Piacenza, Italy.
- 2007 (October) Detecting structural complexity by computational fluid dynamics. Round Table *CAPI 2007*. CILEA, Politecnico di Milano.
- 2006 (February) Modern developments in mathematical biology. *Mathematical Modeling and Systems Biology*. Canavese Bio-industry Park, Ivrea, Italy.

Fund-Raising and Research-Related Activities

(i) Funded Research Projects

- 2019 Fondo di Ateneo Quota Competitiva (FAQC) *Geometric and Topological Aspects of Knotted Fields and Applications* (Principal Investigator, UniMiB).
- 2016 Natural Science Foundation of China (NSFC) Grant N. 11572005 *Topological Fluid Mechanics* (X. Liu principal investigator, BDIC-BJUT).
- 2010 INdAM-ESF funding for Intensive Research Trimester *Knots and Applications* (Principal Applicant and Organizer, U. Milano-Bicocca).
- 2006-2010 MIUR COFIN 2006-PRIN Project: *Geometric Methods in the Theory of Non-Linear Waves and Applications* (B.A. Dubrovin Principal Investigator, SISSA-Trieste).

- 2004-2006 MIUR COFIN 2004-PRIN Project: *Mathematical Models for DNA Dynamics* $M^2 \times D^2$ (G. Gaeta Principal Investigator, U. Milano).
- 2003-2007 MIUR Research Project: *Measures of Complexity and Energy for Fluid Systems* (Principal Investigator, U. Milano-Bicocca).
- 2001-2004 The Royal Society of London, Joint Research Project: *Physical Knots* (Principal Investigator, U. Lausanne).
- 2000 London Math. Society, Collaborative grant: *Vortex Knots in Ideal Fluids* (X. He Principal Investigator, U. Warwick).
- 1998-1999 Swiss National Science Foundation, Project: *Knot Theory and Applied Topology* (C. Weber Principal Investigator, U. Geneva).
- 1998 PPARC, Project: *The Energy and Topology of Coronal Magnetic Fields* (M.A. Berger Principal Investigator, UCL).
- 1997 UK-USA NSF, Project: *Topology in Heliosphere* (A. Ruzmaikin Principal Investigator, JPL, Pasadena).
- 1994 The Leverhulme Trust, Project: *Energetic and Topological Aspects of Magnetic Field Structures* (M.A. Berger Principal Investigator, UCL).
- 1994 PPARC, Project: *The Structure and Energy of Coronal Magnetic Fields* (M.A. Berger Principal Investigator, UCL).

(ii) Reviewing and Peer Refereeing

- Reviewing for grant proposals and projects: NSF (USA), EPSRC (UK), EC-FET (EU).
- Reviewing for intl. journals: *Mathematika*, *Zentralblatt MATH*.
- Refereeing for primary journals: *JFM*, *Fluid Dyn. Res.*, *JKTR*, *Phys. Fluids*, *GAFD*, *PRL*, *Proc. R. Soc.*, *Phys. Rev.*, *NonLinearity*, *J. Phys A*, *Phys. Letts.* and many others.
- Refereeing for intl. publishers: Imperial College Press, Springer-Verlag, World Scientific.

Teaching, Examination & University Offices

(i) Doctoral Courses (PhD, III level)

- 2022 (Summer) “An Introduction to Topological Magnetohydrodynamics”, Laboratoire Dieudonné, U. Côte d’Azur.
- 2021 (Winter) “Knotted Fields”, Department of Mathematics and Applications, U. Milano-Bicocca.
- 2018 (Spring) “Classical and Quantum Knots – Theory and Applications”, Department of Mathematics and Applications, U. Milano-Bicocca.
- 2009 (Winter) “An Introduction to Topological Magnetohydrodynamics”, Laboratoire J.A. Dieudonné, U. Nice Sophia Antipolis.
- 2008 (Spring) “Geometric and Topological Vortex Dynamics”, Laboratoire J.A. Dieudonné, U. Nice Sophia Antipolis.
- 2008 (Spring) “Physical Applications of Knot Theory”, Department of Methods and Models for Mathematics, U. Rome “La Sapienza”.
- 2006 (Spring) “Physical Applications of Knot Theory”, Department of Mathematics, Politecnico di Torino.
- 2005 (Spring) “Elements of Topological Fluid Mechanics”, Department of Mathematics and Applications, U. Milano-Bicocca.
- 2002 (Spring) “An Introduction to Geometric and Topological Magnetohydrodynamics”, Department of Advanced Science and Technology, U. Piemonte Orientale.
- 2001 (Spring) “Seven Lectures on Topological Fluid Mechanics” Research Institute for Mathematical Sciences, Kyoto University (also at Osaka City U., Nagoya U., Tokyo U. and NIFS-Toki).
- 2000 (Spring) “Geometric and Topological Aspects of Fluid Dynamics”, U. Geneva.

(ii) Graduate Courses (MS, II level)

2015-to date Mathematical Methods for Modern Physics, U. Milano-Bicocca.
2019 From Fluid Knots to Minimal Surfaces, Beijing University of Technology.
2019 Erasmus Course: Hydrodynamics of Condensates, U. Crete.
2018 An Introduction to Topological Fluid Dynamics, Beijing University of Technology.
2009-2011 Applied Mathematics (BioInformatics), U. Milano-Bicocca.
2004-2008 Physical Theories and Mathematical Models, U. Milano-Bicocca.
2003 Mathematical Methods III (M241), UCL.
1994-1998 Mathematical Methods (Hydrogeology), University College London.
1995 (April) Geometric Methods in Fluid Mechanics. Scuola Normale Superiore, Pisa.

(iii) Undergraduate Courses (BS, I level)

2011-to date Mathematics (Biological Sciences), U. Milano-Bicocca.
2008-2011, 2013-2014 Mathematics II (Chemistry), U. Milano-Bicocca.
2010-2013 Mathematical Models and Differential Equations, U. Milano-Bicocca.
2008-2010 Elements of Mathematics II (Chemistry), U. Milano-Bicocca.
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.

(iv) Direction and Examination of PhD, MS and BS Projects

Direction of Ph.D. projects: Francesca Maggioni (2004-2006); Chiara Oberti (2011-2015); 3. Franz Schlöder (2016-2020); Matteo Foresti (2016-to present); Alice Roitberg (2018-to present); Hao Guan (2022-to present); Martina Luise (2022-to present).
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 MS and BS projects: more than 60 students to date.

(v) University Offices

Departmental Coordinator, Member of the Internationalization Committee of the University of Milano-Bicocca.

Referees

- Europe**
- Professor C.F. Barenghi – Department of Mathematics, University of Newcastle, UK. carlo.barenghi@newcastle.ac.uk
 - Professor Emeritus H.K. Moffatt, FRS – DAMTP, University of Cambridge & Trinity College, Cambridge, UK. hkm2@damtp.cam.ac.uk
 - Professor A. Niemi – Department of Physics & Astronomy, Uppsala University, Sweden. antti.niemi@me.com
 - Professor D. Ruelle – IHES, Bures-sur-Yvette, France. ruelle@ihes.fr
- USA**
- Professor L.H. Kauffman – Department of Mathematics, University of Illinois at Chicago, USA. kauffman@uic.edu
 - Professor K.R. Sreenivasan – Courant Institute of Mathematical Sciences, New York University, USA. krs3@nyu.edu
 - Professor Emeritus De W.L. Sumners – Department of Mathematics, Florida State University, USA. sumners@math.fsu.edu
- Asia**
- Professor T. Kambe – Institute of Dynamical Systems, Tokyo, Japan. kambe@ruby.dti.ne.jp
 - Professor Z.-S. She – State Key Laboratory for Complex Systems, University of Peking, P.R. China. she@pku.edu.cn