

GIUSEPPE SERGIOLI

Full Professor of Logic and Philosophy of Science, University of Cagliari (Italy)

E-Mail: giuseppe.sergioli@gmail.com

Tel.: +39-070-6757113;

Homepage: https://unica.it/unica/page/it/giuseppe_sergioli

Google Scholar: <http://scholar.google.it/citations?user=mIFHnOUAAAAJ&hl=it&oi=ao>

ORCID:0000-0002-3650-5858.

SHORT BIOGRAPHY

Giuseppe Sergioli is Full Professor of Logic and Philosophy of Science at the University of Cagliari, within the Department of Pedagogy, Psychology, and Philosophy. He graduated in Theoretical Physics from the University of Catania and obtained his Ph.D. in History, Philosophy, and Didactics of Science at the University of Cagliari. He conducted research as a Visiting Scholar at Indiana University Bloomington.

Main areas of scientific interest include the foundations of Quantum Mechanics, Quantum Computation and Information, Quantum Machine Learning, and Argumentation Theory. He has published numerous articles in international journals and has been involved as Principal Investigator in various national and European research projects.

He is a member of various scientific societies, including the Italian Society of Logic and Philosophy of Science (SILFS), where he also serves on the board of directors. Currently, he is the Coordinator of the Ph.D. program in Philosophy, Epistemology, and Human Sciences at the University of Cagliari and actively participates in scientific and editorial committees in his field of study.

PREVIOUS POSITIONS HELD

- 1998-2003: Master's Degree in Theoretical Physics. Dissertation title: "Historical and Epistemological aspects of Quantum Mechanics and "Non-locality" consequences" - University of Catania.
- 2006-2010: Ph.D. (with fellowship) in History, Philosophy and Didactics of Science. Dissertation title: "Reversibility and Universality in Quantum Computation" - University of Cagliari.
- 2009: "Expert on the subject on Logic" (Assistant Professor) - University of Cagliari.
- 2010- 2012: Post-Doctoral Fellow funded by the project: "Logical-Algebraic Approach to Quantum Computing: Theoretical Aspects and Possible Implementations", funded by Regione Sardegna. Role: Principal Investigator - University of Cagliari.
- 2010: Visiting Scholar at the Department of History and Philosophy of Science - Indiana University, Bloomington.
- 2012-2013: Post-Doctoral Fellow funded by the National research project P.R.I.N. 2009: "Nonclassical Logics for the ontology representation in the informatics archives" - University of Cagliari.
- 2014-2016: Researcher (RTD-A) in Logic and Philosophy of Science, funded by the F.I.R.B. project: "Structures and Dynamics of Knowledge and Cognition" (M.I.U.R. code: RBF126ZA6) - University of Cagliari.
- 2016-2018: Tenure-Track Researcher (RTD-B) in Logic and Philosophy of Science - University of Cagliari.
- 2019, 30th November: Associate Professor in Logic and Philosophy of Science - University of Cagliari.
- 2023, 8th September - present: Full Professor in Logic and Philosophy of Science - University of

Cagliari.

SCIENTIFIC PUBLICATIONS

1. G. Sergioli, C. Cuccu, C.S. Rieger, A.C. Granda Arango, B. K. Behera, R. Era, R. Giuntini (2026). A Quantum-inspired Classification for Random Mixed States. SCIENTIFIC REPORTS, Nature (to appear).
2. G. Sergioli, A.C. Granda Arango, C. Cuccu, S. Centrone, C. Rieger, R. Giuntini (2025). Classification of Quantum Correlations via Quantum-inspired Machine Learning. QUANTUM MACHINE INTELLIGENCE, Vol. 7, n. 112. Springer (ISSN: 25244914).
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4. R. Giuntini, G. Sergioli. "Categorizing Perceptions of Dangers and Risks: A Philosophical Perspective" (2025). In "Novel Nuclear Technologies. Towards a Greenhouse Gas-Free Basic Energy Supply". TUM University Press (ISBN:978-3-95884-095-9).
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6. G.M. Bosyk, C. Massri, G. Bellomo, H. Freytes, R. Giuntini, G. Sergioli (2024). "LOCC convertibility of entangled states in infinite-dimensional systems". NEW JOURNAL OF PHYSICS, 26-063016, IOP Science, ISSN: 1367-2630.
7. F. G. Garavaglia, M. Giunti, G. Sergioli (2025). "Time factor in neural learning processes". LECTURES NOTES IN COMPUTER SCIENCE, Springer, pp.202-218, Vol.15551, ISBN: 978-3-031-94747-6.
8. M. Giunti, F.G. Garavaglia, R. Giuntini, G. Sergioli, S. Pinna (2024). "ChatGPT prospective undergraduate and medical school student". PLOS ONE, 19(10): e0308157. ISSN: 1932-6203.
9. M.L. Dalla Chiara, R. Giuntini, G. Sergioli (2024). "Trivalent Semantic ideas in Quantum Logics". Handbook of Trivalent Logics, MIT PRESS - Massachusetts Institute of Technology (forthcoming).
10. M.L. Dalla Chiara, R. Giuntini, G. Sergioli (2024). "A Quantum approach to Pattern Recognition and Machine Learning. Part I". INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS, 63-55, ISSN: 1572-9575, Springer.
11. M.L. Dalla Chiara, R. Giuntini, G. Sergioli (2024). "A Quantum approach to Pattern Recognition and Machine Learning. Part II". INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS, 63-44, ISSN: 1572-9575, Springer.
12. M.L. Dalla Chiara, R. Giuntini, G. Sergioli (2024). "Reasoning with Data in the framework of a Quantum Approach to Machine Learning". Reasoning with Data, SYNTHESIS LIBRARY – ISBN: 978-3-031-77891-9.
13. R. Giuntini, A.C. Granda Arango, H. Freytes, F.H. Holik, G. Sergioli (2023). "Multi-class classification based on quantum state discrimination". FUZZY SETS AND SYSTEMS, 467-108509. ISSN: 1872-6801, Elsevier.
14. H. Freytes, G. Sergioli (2024). "Heyting κ -frames". STUDIA LOGICA, 112, 761-804, Springer.
15. R. Giuntini, F.Holik, D.K. Park, H.Freytes, C.Blank, G. Sergioli (2023). "Quantum inspired algorithm for direct multi-class classification". APPLIED SOFT COMPUTING, 134-109956, ISSN: 1568-4946, Elsevier.
16. M. L. Dalla Chiara, R. Giuntini, E. Negri, G. Sergioli (2023). "Recognizing Concepts and Recognizing Musical Themes. A Quantum Semantic Analysis". SYNTHESIS LIBRARY "Non-Reflexive Logics, Non-Individuals, and the Philosophy of Quantum

- Mechanics " vol 476, pp. 297-320, ISBN: 978-3-031-31839-9.
- 17.** G.M. Bosyk, M. Losada, H. Freytes, G. Sergioli (2022). Coherence Resource Power of Iso coherent States. SCIENTIFIC REPORTS,12-7239, ISSN 2405-2322, Nature.
 - 18.** G. Casu, C. Ternullo, A. Floris, G. Sergioli (2022). How to recognise and avoid fallacies? Using audiovisual tools for logical education in schools. In "Beyond the two cultures- Experiences from a POT project" - Erickson - University and Research Area. ISBN: 978-88-590-32182.
 - 19.** R. Giuntini, P. Graziani, G. Sergioli, S. Sozzo (2022). Connecting Things in the Setting of Foundations and Philosophy of Science: Introduction to the Special Issue. FOUNDATIONS OF SCIENCE, ISBN: 1572-8471, Springer.
 - 20.** F. Holik, M. Losada, H. Freytes, A. Plastino, G. Sergioli (2021) "Partial orbits of quantum gates and full three particle entanglement". QUANTUM INFORMATION PROCESSING, 20-351, ISSN:0219-7499, Springer.
 - 21.** H. Freytes, G. Sergioli (2021). An Holistic Extension for Classical Logic via Quantum Fredkin Gate. ENTROPY, 23,1178, ISSN: 10994300, Mdpi.
 - 22.** G. Sergioli, C. Militello, L. Rundo, L. Minafra, F. Torrisi, G. Russo, K.L. Chow, R. Giuntini (2021). A quantum-inspired classifier for clonogenic assay evaluations. SCIENTIFIC REPORTS 11-2830, ISSN 2405-2322, Nature.
 - 23.** G.M. Bosyk, M. Losada, C. Massri, H. Freytes, G. Sergioli (2021). Generalized coherence vector applied to coherence transformations and quantifiers. PHYSICAL REVIEW A, 103.012403, ISSN 2469-9926, American Physical Society.
 - 24.** M.L. Dalla chiara, R. Giuntini, R. Leporini, G. Sergioli. Quantum Individuals, indiscernibility and entanglement in the quantum computational semantics. In Individuals and Non-Individuals in Quantum Mechanics, Synthese Library pp. 87-112 Vol. 525-112, SPRINGER. Isbn: 978-3-032-01407-8.
 - 25.** M. Losada, G.M. Bosyk, H. Freytes, G. Sergioli (2020). Transformation of superpositions by means of incoherent operations. SCIENTIFIC REPORTS, n.10-8245, ISSN 2405-2322, Nature.
 - 26.** G.M. Bosyk, H. Freytes, F. Holik, G. Sergioli (2020). Introduction to the Special Issue: Quantum structure and quantum information theory. SOFT COMPUTING, 24, 10215-10217, ISSN: 1433-7479, Springer.
 - 27.** G. Sergioli (2019). Quantum & Quantum-like machine learning. A note on similarities and differences. SOFT COMPUTING, 24, 10247-10255, ISSN: 1432-7643, Springer.
 - 28.** M. Bosyk, G. Bellomo, F. Holik, H. Freytes, G. Sergioli (2019). Optimal common resource in majorization-based resource theories. NEW JOURNAL OF PHYSICS, ISSN: 1367-2630, 21-083028, IOP Science.
 - 29.** M. Giunti, G. Sergioli, G. Vivanet, S. Pinna (2019). Representing n-ary relations in the Semantic Web. LOGIC JOURNAL OF THE IGPL, 29-4, 697-717, ISSN 1367-0751 Oxford Academic.
 - 30.** G. Sergioli, R. Giuntini, H. Freytes (2019). A new Quantum Approach to binary Classification. PLoS ONE, 14(5): e0216224, ISSN:1932-6203.
 - 31.** C. de Ronde, H. Freytes, G. Sergioli (2019). Quantum probability: a reliable prediction for an agent or a reliable source of reality?; SYNTHESIS, 198, 5679-5699, ISSN: 0039-7857, Springer.
 - 32.** H. Freytes, R. Giuntini, G. Sergioli (2019). Holistic type extension for classical logic via Toffoli quantum gate. ENTROPY 21, 636, ISSN: 10994300, Mdpi.
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43. F. Ervas, A. Ledda, F. Paoli, G. Sergioli (2018). Introduction to the Special Issue: Logic Pluralism and Translation. *TOPOI*, 38, 263-264, ISSN: 1572-8794, SPRINGER.
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58. G. Sergioli, A. Ledda, R. Giuntini (2016). Binary gates in three valued quantum computational logics. In: D. Aerts, C. de Ronde, H. Freytes, R. Giuntini (Edts.), *Probing the Meaning and Structure of Quantum Mechanics: Superpositions, Semantics, Dynamics and Identity*, 76-90, ISBN: 978-981-3146-27-3, World Scientific - Singapore.
59. M.L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli (2016). A first-order epistemic quantum computational semantics with relativistic-like epistemic effects. *FUZZY SETS AND SYSTEMS*, 298, 69-90, ISSN: 0165-0114, Elsevier.
60. R. Giuntini, H. Freytes, G. Sergioli (2016). Quantum logic associated to finite dimensional intervals of modular ortholattices. *JOURNAL OF SYMBOLIC LOGIC*, 81-02, 629-640, ISSN: 0022-4812, Cambridge University Press.
61. M.L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli (2016). Holistic logical arguments in quantum computation. *MATHEMATICA SLOVACA*, 66-2, ISSN: 0139-9918, Springer.
62. M.L. Dalla Chiara, R. Giuntini, R. Leporini, E. Negri, G. Sergioli (2015). Quantum information, cognition and music. *FRONTIERS IN PSYCHOLOGY*, 6-1583, ISSN: 1664-1078, Frontiers.
63. F. Ervas, E. Gola, A. Ledda, G. Sergioli (2015). Lexical ambiguity in elementary inferences: an experimental study. *DISCIPLINE FILOSOFICHE*, 25-1, ISSN: 1591-9625, Quodlibet.
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66. M.L. Dalla Chiara, R. Leporini, G. Sergioli (2015). Entanglement and quantum logical gates. Part II. *INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS*, 54-12, 4530-4545, ISSN: 0020-7748, Springer.
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- 68.** M. Giunti, G. Sergioli, G. Vivinet (2014). L'ontologia BIA-Net: una base per la ricerca di informazioni secondo rapporti di rilevanza nella Bibliotheca Iuris Antiqui. Cap. 5, Proceedings of the First Annual Conference of the Humanistic Informatics and Digital Education, Florence 13-14 December 2012, Quaderni Digilab, Digital Humanities, ISBN: 978-88-98533-27-5.
- 69.** A. Hagar, G. Sergioli (2014). Counting Steps: A Finitist Approach to Objective Probability in Physics. EPISTEMOLOGIA, 2, 262-275, ISSN 0392-9760.
- 70.** E. Beltrametti, M.L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli (2014). A quantum computational semantics for epistemic logical operators. Part II: semantics. INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS, Vol. 53-10, 3293-3307, ISSN: 0020-7748, Springer.
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- 72.** E. Beltrametti, M.L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli (2013). A quantum computational semantics for epistemic logical operators. Part I: epistemic structures. INTERNATIONAL JOURNAL OF THEORETICAL PHYSICS, 53-10, 3279-3292, ISSN: 0020-7748, Springer.
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- 74.** H. Freytes, A. Ledda, G. Sergioli, R. Giuntini (2013). Probabilistic logics in quantum computation. In: New Challenges to Philosophy of Science (proceedings of the workshops held in 2011), edited by Hanne Andersen, Dennis Dieks, Wenceslao J. Gonzalez, Thomas Uebel, Gregory Wheeler, Vol. 4, 49-57, ISBN: 978-94-007-5844-5, Springer.
- 75.** R. Giuntini, F. Paoli, H. Freytes, A. Ledda, G. Sergioli (2013). What is Fuzzy Logic – And Why it Matters to Us. In: On Fuzziness -- A Homage to Lotfi A. Zadeh, 298, 211-215, ISBN: 978-3-642-35640-7, Springer.
- 76.** E. Beltrametti, M.L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli (2012). Epistemic Quantum Computational Structures in a Hilbert-space Environment. FUNDAMENTA INFORMATICAE, 115, 1-14, ISSN: 0169-2968, IOS press.
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- 78.** E. Beltrametti, R. Giuntini, M.L. Dalla Chiara, G. Sergioli (2012). Quantum teleportation and quantum epistemic semantics. MATHEMATICA SLOVACA, 62-6, 467-481, ISSN: 0139-9918, Springer.
- 79.** M.L. Dalla Chiara, A. Ledda, G. Sergioli, R. Giuntini (2012). The Toffoli-Hadamard gate: an algebraic approach. JOURNAL OF PHILOSOPHICAL LOGIC, 42-2, 467-481, ISSN: 0022-3611, Springer.
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- 81.** G. Sergioli (2012). Irreversibility and Universality in Quantum Computation. LAP Lambert Academic Publishing AG & Co KG , ISBN: 978-3846551004 (Ph.D. Thesis).
- 82.** G. Sergioli, R. Giuntini, F. Paoli (2011). Irreversibility in Quantum Computational Logics. APPLIED MATHEMATICS & INFORMATION SCIENCES, 5-2, 171-191, ISSN: 1935-0090, Natural Science Publishing.
- 83.** R. Giuntini, A. Ledda, G. Sergioli, F. Paoli (2011). Some Generalizations of Fuzzy

Structures in Quantum computational Logic. INTERNATIONAL JOURNAL OF GENERAL SYSTEMS, 40-1, 61-83, ISSN: 0308-1079, Taylor & Francis.

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89. H. Freytes, R. Giuntini, G. Sergioli, A. Aric. (2010). Representing fuzzy structures in quantum computation with mixed states. In: Proceedings of ISMVL 2010 - IEEE 40th International Symposium on Multiple-Valued Logic. University of Barcelona, 162-166, ISBN: 978-1-4244-6752-5.
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92. G. Sergioli, A. Ledda, F. Paoli, R. Giuntini, T. Kowalski, F. Montagna, H. Freytes, C. Marini (2009). Two cooperative versions of the Guessing Secrets problem. INFORMATION SCIENCES, 179-20, 3645-3658, ISSN: 0020-0255, Elsevier.

BIBLIOMETRIC INDEXES

Scopus: Citations: > 500; h-index: 13.

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SCIENTIFIC EXPERIENCES AND CERTIFICATIONS

Research interests

- Foundations of Quantum Mechanics.
- Quantum Computation, Quantum Information and Quantum Logic.
- Quantum Machine Learning.
- Logic and Argumentation Theory.

PROJECTS

- 2009: Member of Project (supported by Regione Sardegna): Regional program (POR Sardegna 2000-2006, Misura 3.6, Azione 3.6.a) against high school wastage.
- 2010- 2012: Principal Investigator for the project: “Logical-Algebraic Approach to Quantum Computing: Theoretical Aspects and Possible Implementations” (120.000 euro), sponsored by Regione Sardegna.
- 2012: Fellowship for the National research project P.R.I.N. 2009: “Non-classical Logics for the

ontology representation in the informatics archives”, University of Cagliari.

- 2013: Member of the project: “Modeling the uncertainty: Quantum Theory and Imaging Processing”, supported by Regione Sardegna (Legge Regionale 7 Agosto 2007, n.7, Promozione della ricerca scientifica e dell’innovazione tecnologica in Sardegna).
- 2013: Member of the P.R.I.N. Project: “From Models to Logic: Structures Logification and the Equivalence between Logics”, sponsored by Italian Ministry of Education.
- 2014-2016: Researcher at the University of Cagliari, for the F.I.R.B. project: “Structures and Dynamics of Knowledge and Cognition” (M.I.U.R. code: RBFR126ZA6) funded by M.I.U.R.
- 2015: Member of the European project "Syntax Meets Semantics: Methods, Interactions, and Connections in Substructural logics" (H2020-MSCA-RISE-2015 code: 689176) funded by the European Commission.
- 2017-2018: Principal Investigator for the Project: "Logical-time evolution of correlated microscopic systems", Funded by Regione Autonoma della Sardegna (50.000 euro).
- 2017-2021: Principal Investigator for the Project: "Strategies and Technologies for Scientific Education and Dissemination", Funded by Fondazione Sardegna (64.500 euro).
- 2018-2021: Member of the project: "Superposiciones cu. n. ticas en el procesamiento de informatica cuantica: un enfoque logico, categorial y computacional". Project number 80020170100058UJ (Resolucione: N. 148/18 de fecha 29/06/2018), principal investigator Dr. de Ronde. Funded by UNAJ (Universidad Nacional Arturo Jauretche).
- 2018-2021: Member of the project: "For a semantic extension of the Quantum Computational Logic", funded by Regione Sardegna.
- 2019-2022: Member of the PRIN project: "Logic and Cognition. Theory, experiments, and applications", funded by Italian Ministry of Education (MIUR).
- 2019-2022: Local Coordinator of the POT project: "For an interdisciplinary dialogue among Logic, Philosophy and Communication Science", funded by Italian Ministry of Education (MIUR) (130.000 euro).
- 2022, September- 2024, September: Principal Investigator for the project "Ubiquitous Quantum Reality (UQR): understanding the natural processes under the light of quantumlike structures", funded by Fondazione di Sardegna (euro 49.230).
- 2023, May: Sponsor for the project "Quantum Information Theory: through a new interpretation for the evolution of the natural processes", Visiting Professor program 2022 – University of Cagliari.
- 2023: Local Coordinator for the National project (PRIN 2022) "CORTEX The COst of Reasoning: Theory and EXperiments" (euro 312.000).
- 2023: Principal Investigator for the National project (PRIN-PNRR 2022) "Quantum Models for Logic, Computation and Natural Processes (Qm4Np)" (euro 299.970).
- 2023: Local Coordinator for the National project (POT) "University, Schools, and Region Networking for Material and Immaterial Cultural Heritage: Participation, Inclusion, Enhancement" (euro 905.973).
- 2023: Member of the International Project PLEXUS: Philosophical, Logical, and Experimental Routes to Substructurality). Marie Sklodowska-Curie action funded by the EU under the Horizon Europe Research and Innovation Programme.

EDITORIAL ACTIVITY

- Associate Editor for “Soft Computing” (Springer).
- Associate Editor for “Quantum Machine Intelligence” (Springer).
- "Quantum, Logic and Music" - Guest Editor Special Issue of Soft Computing (Springer), with M.L. Dalla Chiara, R. Giuntini, E. Negri, S. Smets.

- "Logic, Pluralism and Translation" - Guest Editor Special Issue of Topoi (Springer), with F. Ervas, A. Ledda, F. Paoli.
- "Quantum Structures & Quantum Information Theory" - Guest Editor Special Issue of Soft Computing (Springer), with M. Bosyk, H. Freytes, F. Holik.
- "Logic & Philosophy of Science" - Guest Editor Special Issue of Foundations of Science (Springer), with R. Giuntini, P. Graziani, S. Sozzo.
- "Quantum and Quantum-inspired Machine Learning: from foundations to theoretical advances" - Guest Editor Special Issue of Quantum Machine Intelligence (Springer), with R. Giuntini, and D.K. Park.
- Topical Advisory Panel Member of Electronics (MDPI) ISSN 2079-9292.
- Member of the Scientific Committee of APhEx (Analytical and Philosophical Explanation) ISSN: 2036-9972.

AFFILIATIONS

- 2005: Member of S.I.F. (Italian Physics Society).
- 2008: Member of I.Q.S.A. (International Quantum Structures Association).
- 2009: Member of the Alophis research group (Applied Logics, Philosophy and History of Science, University of Cagliari).
- 2010: Member of S.I.L.F.S. (Italian Society of Logic and Philosophy of Science).
- 2012 : Member of S.I.F.A. (Italian Society of Analytic Philosophy).
- 2019 : Member of S.I.S.F.A. (Italian Society of History of Physics and Astronomy).
- 2023 : Member of the European Society for the Philosophy of Mathematics.
- 2023 : Member of AILA (Italian Association of Logic and Applications).

REVIEWING ACTIVITY

- Reviewer for ERC - Horizon Europe Programme.
- Reviewer for the Research Fund Flanders (FWO) Foundation (Brussel).
- Reviewer for the "Fonds de la Recherche Scientifique - FNRS" (Belgium).
- Reviewer for "Mathematical Reviews" (American Mathematical Society).
- Reviewer for "ZbMath" (Zentralblatt MATH) – Springer.

REFEREING ACTIVITY (Journals)

- "Journal of Physics A: Mathematical and Theoretical" - IOP Science.
- "Physics Letters A" - Elsevier.
- "Synthese" – Springer.
- "Fuzzy Sets and Systems" – Elsevier.
- "Quantum, Science and Technology" - IOP Science.
- "Machine Learning, Science and Technology" - IOP Science.
- "Artificial Intelligence Review" - Springer.
- "Quantum Information Processing" – Springer.
- "Annals of Physics" – Elsevier.
- "Theoretical Computer Science" – Elsevier.
- "Quantum Machine Intelligence" – Springer.
- "Physica A" – Elsevier.
- "Physica Scripta" - IOP Science.
- "Discover Artificial Intelligence" – Springer.
- "Advanced Quantum Technologies" - Wiley online library.
- "IEEE Transactions on Evolutionary Computation".

- "IEEE Transactions on Information Forensics & Security".
- "Proceedings of the Royal Society A - Mathematical, Physical and Engineering Sciences".
- "Scientific Reports" – Nature.
- "International Journal of Quantum Information" - World Scientific.
- "Information Science" – Elsevier.
- "Soft Computing" – Springer.
- "Foundations of Physics" – Springer.
- "Natural Computing" – Springer.
- "SN Computer Science" – Springer.
- "Frontiers in Physics" – Frontiers.
- "International Journal of Theoretical Physics" – Springer.
- "The European Physical Journal Plus" – Springer.
- "European Journal for Philosophy of Science" – Springer.
- "Quanta" - Danko Georgiev Publisher.
- "International Journal of Approximate Reasoning" - Elsevier.
- "Theoria. An International Journal for Theory, History and Foundations of Science" - UVP EHU.
- "Logic and Logical Philosophy" - Nicolaus Copernicus University.
- "Aphex (Analytical and Philosophical Explanation)".
- "Philosophical Transactions A" - Royal Society Publishing.
- "Journal of Zhejiang University Science C (Computer & Electronics) – Springer".
- Conference proceedings by LNCS (CIE-2013, Computability in Europe) – Springer.
- "Philosophy Study" - David Publishing Company.
- "Argumenta" - Journal of the Italian Society for Analytic Philosophy.

VISITING

- 2010 (first semester): Visiting Scholar at the Department of History and Philosophy of Science, Indiana University, Bloomington.
- 2023 (December): one week visiting at the IAS (Institute for Advanced Study) of the TUM (Technische Universität München).

PRIZES

- 2005: Awarded with the prize S. Notarrigo, by S.I.F. (Italian Physics Society) for the Master thesis: "Historical and Epistemological aspects of Quantum Mechanics and "Non-locality" consequences" (1000 euro).
- 2017: Winner of the "funding of basic research activities" (Ffabr) (3000 euro).

MEETINGS AND CONFERENCES

- 2004: 13-17 September. VII summer school on Philosophy of Physics University research center on Philosophy and Foundation of Physics. Cesena.
- 2004: National conference: "Foundation of Quantum Mechanics. State of art and further developments". University of Lecce.
- 2005: National conference: "Natural Processes and Models of Computation". University of Bologna. Bologna.
- 2005: National conference: XCI National Conference of S.I.F. (Italian Physics Society). University of Catania.
- 2005: International conference: "Second Florence-Vienna workshop on Logic and Computation". University of Florence.

- 2006: June. International conference: "Ordered Structures in Many-Valued Logic". Massa Lubrense (Sorrento). Naples.
- 2007: 5-6 October. Organizer of the International meeting: "First Catalan-Sardinian Workshop on Algebraic and Fuzzy Logic". Title of my talk: "Algebras and logics from quantum computation". University of Cagliari.
- 2008: May. International conference: "ManyVal '08: Applications of Topological Dualities to Measure Theory in Algebraic Many-Valued Logic". Title of my talk: "Stone -Weierstrass Type Theorem for Density Operators". University of Milan.
- 2008: 6-12 June. Invited Speaker, International conference: "9th Biannual IQSA Meeting, Quantum Structures, Brussels-Gdansk". Title of my talk: "Approximation in Quantum Computational Logics". University of Danzig.
- 2008: 24-29 October. International conference: "Italian Quantum Information Science Conference". University of Camerino.
- 2008: 11-12 December. International conference: "Studia Logica International Conference, Trends in Logic VI". Title of my talk: "Reversibility and Irreversibility in the Logic of Quantum Computation". University of Bruxelles.
- 2009: 10-11 September. Italian Conference: Research on "Logic in Italy". Title of my talk: "Logic and Quantum Computation". University of Milan.
- 2010: 6 October. Invited Speaker at the Logic Seminar, Mathematics Department. Title of my talk: "Irreversibility and Universality in Quantum Computation". Indiana University, Bloomington.
- 2010: 8 October. Invited speaker at the Colloquium Series, Spring 2010. Department of History of Philosophy of Science. Title of my talk: "Entanglement - From an Embarrassment to an Asset". Indiana University, Bloomington.
- 2010: 1 December. Invited speaker at the Logic Seminar, Mathematics Department. Joint talk with Amit Hagar. Title of the talk: "Counting your steps: A New, Finitist and Objective Interpretation of Probability in Physics". Indiana University, Bloomington.
- 2010: 15-17 December. Italian Society for Logic and Philosophy of Science International Conference (SILFS 2010). Title of the talks: "Representing continuous t-norms in quantum computation with mixed states" and (joint talk with Amit Hagar) "Counting your steps: A New, Finitist and Objective Interpretation of Probability in Physics". University of Bergamo.
- 2012: 19-21 April. Invited speaker at the "First joint Bochum-Cagliari workshop on Non-Classical Logic". Title of the talk: "Epistemic Quantum Computational Structures". Ruhr University of Bochum.
- 2012: 12-14 June. Cagliari/Urbino Workshop "Metafora e Argomentazione". Title of the talk: "Metaphor and equivocation fallacy" (joint talk with C. Ternullo). University of Cagliari.
- 2012: 23-27 July. Member of the organizing committee for the 11th Biennial IQSA Meeting Quantum Structures. University of Cagliari.
- 2012: 13-14 December. Florence. First Annual Conference of the Humanistic Informatics and Digital Education. Title of the talk: "L'ontologia BIA-Net: una base per la ricerca di informazioni secondo rapporti di rilevanza nella Bibliotheca Iuris Antiqui." (joint talk with M.Giunti, G. Vivanet). University of Florence.
- 2012: 12-15 September. S.I.F.A. (Analytic Philosophy Italian Society) 20th anniversary conference. Title of my talk: "How Do Metaphors Influence Quaternio Terminorum Comprehension?" (Joint talk with F. Ervas). Alghero. University of Sassari.
- 2012: 26-28 September. Italian Quantum Information Science (I.Q.I.S.) conference 2012. Title of my talk: "Knowledge Operations as Quantum Channels". University of Padua.
- 2013: 27-28 May. Metaphor, analogy, reasoning. Title of my talk: "Entanglement and holistic

structures in quantum computation". University of Urbino.

- 2013: 29-31 May. Silfs2013 Postgraduate Conference. Title of my talk (joint talk with E. Gola, F. Ervas, A. Ledda): "The Persuasive Force of Metaphors in Argumentation". University of Urbino.
- 2013: 15-17 June. Logic, Quantum and Music. International Conference. Title of my talk (joint talk with E. Beltrametti, R. Leporini): "Quantum Entanglement and Logical Semantics". University of Florence.
- 2013: 16-18 September. Language, Logic and Mind. 3rd SIFA Graduate Conference. Organization Committee. University of Cagliari.
- 2014: 17-20 December. Vagueness via Nonclassical Logics. International Conference. Title of the accepted abstract (joint abstract with A. Ledda): "Vagueness, uncertainty and fuzziness in quantum computational logics". Talk introduced by A. Ledda. University of Sydney.
- 2014: 8-9 January. Invited speaker at the "FoPim - Foundations of Physics" meeting. Title of my talk: "Holistic structures in Quantum Computation. An application to Werner and Isotropic States". Department of Physics and Astronomy, University of Florence.
- 2014: 18-22 February. Graded Logical Approaches and their Applications. 35th Linz Seminar on Fuzzy Set Theory. Title of the accepted abstract (joint abstract with M.L. Dalla Chiara, R. Giuntini, R. Leporini): "An approach to first-order quantum computational semantics". Talk introduced by M.L. Dalla Chiara and R. Leporini. Johannes Kepler Universitat, Linz.
- 2014: 31 March-2 April. Invited speaker at the Amsterdam Quantum Logic Workshop (joint talk with H. Freytes): "Fuzzy Structures in Quantum Computation with Mixed States". Univesiteit Van Amsterdam.
- 2014: 18-21 June: SILFS triennial conference 2014. Title of my talk: "Entanglement and Holistic Conjunctions in Quantum Computation". University of Roma3, Rome.
- 2014: 23-27 June: 12th biennial IQSA meeting. Title of my talk: "Entanglement and Holistic Conjunctions in Quantum Computation". University of Olomouc.
- 2014: 23-25 July: Member of the organizing committee of the International Meeting "Quantum Mechanics and Quantum Information. Physical, Philosophical and Logical approaches". Title of my talk: "Quantum Computation with qutrits. A work in progress". University of Cagliari.
- 2015: 30-31 January: International Meeting "Quantum Computation, Quantum Information and the Exact Sciences". Title of my talk: "Non-separability in the representation of Fuzzy Structures in Quantum Computation". Munich Center for Mathematical Philosophy, Ludwig-Maximilians Universitat, Munchen.
- 2015: 20-21 February. Invited speaker at the "FoPim2 - Foundations of Physics" meeting. Title of my talk: "Non-separability in the representation of Fuzzy Structures in Quantum Computation". Department of Physics and Astronomy, University of Florence.
- 2015: 10-13 June. International Symposium "Quantum Theory: Advances and Problems - QTAP". Title of my talk: "Quantum Turing machines, quantum computational logics and cognitive processes" (talk introduced by M.L. Dalla Chiara). International Center for Mathematical Modeling in Physics, Engineering, Economics, and Cognitive Science Linnaeus University, V.xj.- Kalmar.
- 2015: 23-24 July. Organizing Committee of the II International Workshop Quantum Mechanics and Quantum Information: Physical, Philosophical and Logical perspectives. Titles of my talks: "Non-separability in Quantum Computation: representing continuous t-norm" and "Quantum Pattern Recognition", VUB Brussels free University.
- 2015: 24-26 September. SIFA Conference: Truth and Persuasion. Titles of my talk: "Does Expertise Favour the Detection of the Metaphoric Fallacy?" (join talk with F. Ervas, E. Gola, A. Ledda; talk introduced by F. Ervas), University of Sassari.

- 2015: 21 October. Model of explanation: logic, science and cognition. Titles of my talks: “A nonstandard application of Quantum Theory: modeling the uncertainty”, University of Bologna.
- 2016: 2-6 February. Linz Seminar on Fuzzy Set Theory - Functional Equations and Inequalities. Titles of my talks: “Equations and Inequalities in Quantum Logics”, (join talk with M.L. Dalla Chiara, R. Giuntini, A. Ledda, R. Leporini; talk introduced by M.L. Dalla Chiara), Johannes Kepler University Linz.
- 2016: 13-16 June. International Symposium "Quantum and Beyond". Title of my talk: “Quantum Pattern Recognition”. International Center for Mathematical Modeling in Physics, Engineering, Economics, and Cognitive Science Linnaeus University, Vaxjo.-Kalmar.
- 2016: 16-18 June. Invited speaker, III International Workshop on Quantum Mechanics and Quantum Information. Title of my talk: “Quantum Pattern Recognition”. Physical, Philosophical and Logical Perspectives. Sadaf - UBA, Universidad de Buenos Aires.
- 2016: 22 June. Invited speaker, Seminarios y Coloquios. Title of my talk: “Quantum Pattern Recognition”. Instituto de Fisica, Universidad Nacional de La Plata.
- 2016: 11-15 July. Biennial Meeting of the International Quantum Structures Association “QS Leicester 2016”. Title of my talks: “Qudit-spaces and a many-valued approach to quantum computational logics” (join talk with M.L. Dalla Chiara, R. Giuntini, R. Leporini; talk introduced by M.L. Dalla Chiara) and "Fuzzy representation of Fredkin gate for a conservative quantum computational logic with mixed states" (join talk with R. Venkatrama; talk introduced by R. Venkatrama). University of Leicester.
- 2016: 3-4 November. Organizer of the International Workshop on Applied Mathematics & Quantum Information . Title of my talk: “A Quantum-inspired version of the Nearest Mean Classifier”. University of Cagliari.
- 2016: 12-14 December. Invited speaker at the VI Conference on Quantum Foundations. Title of my Skype-talk: “Quantum Computational Logic with Qutrits”. Science and Technology Center - Conicet, La Plata.
- 2017: 21 March. Invited to introduce the book "I Modelli nelle teorie scientifiche". Scuola Superiore Catania, University of Catania.
- 2017: 3-7 July. QPL/IQSA meeting 2017 (Quantum, Physics & Logic / International Quantum Structures Association meeting 2017). Title of my talks: "Entanglement, Holism and Contextuality in the Logic of Quantum Computation" (with M.L. Dalla Chiara, R. Giuntini and R. Leporini) and "An Operational Approach to Quantum Circuits", Radboud University, Nijmegen.
- 2017: 25-26 September. Invited speaker: BuCal2017 - First Bucharest-Cagliari Logical meeting. Title of my talk: "A Block-matrix representation of Quantum Circuits. Towards a new approach to the Quantum Computational Logic", Faculty of Mathematics and Computer Science, University of Bucharest.
- 2017: 29-30 September. Invited Speaker at the Worlds of Entanglement Symposium. Title of my talk: "A Quantum approach for Pattern Recognition", Free University of Brussels.
- 2017: 6-8 November. QTML2017 - Quantum Technology in Machine Learning. Title of my talk: "A Quantum inspired version of the Nearest Mean Classifier", Department of Computer Science, University of Verona.
- 2017: 6-8 December. Invited Speaker at the International workshop of Quantum Mechanics and Quantum Information - Physical, Philosophical and Logical perspectives. Title of my talk: "Towards a multi-target quantum computational logic", Federal University of Santa Catarina, Florianopolis.
- 2018: 16-20 July. 14th Biennial IQSA Conference. Title of my talk: "A Block-Matrix representation of Quantum Circuits: towards a Multi Target Quantum Computational Logic", Kazan

Federal University, Kazan.

- 2018: 08-10 October. Organizer of the Quantum Cagliari 2018 - Quantum Structures & Quantum Information Theory. Title of my talk: "Quantum-inspired version of the Classification Process", University of Cagliari, Cagliari.
- 2019: 14 March. Invited speaker: V International Workshop on Quantum Mechanics and Quantum Information. Physical, Philosophical And Logical Perspectives. Title of my Skype talk: "Quantum inspired version of Binary Classification", Conicet, Buenos Aires, Argentine.
- 2019: 8-9 May. Invited speaker: AvH-Workshop: Trends in Quantum Computing & Quantum Logic. Title of my talk: "A New Quantum approach to Binary Classification", Technische Universitat, Berlin.
- 2019: 3-7 June. Organizing committee of the 4th post-graduate SILFS conference. University of Urbino.
- 2019: 10-13 June. International Conference "Quantum Information Revolution: Impact to Foundations". Title of my talk: "A New Quantum approach to Binary Classification", Linnaeus University, Vaxjo.
- 2019: 20-24 October. International Conference "Quantum Techniques in Machine Learning 2019". Title of my talk: "A New Quantum-like approach for Binary Classification", KAIST (Korean Advanced Institute of Technology), Daejeon, South Korea.
- 2020: 15-18 September. Invited Lecture at the XXIII Summer school in Philosophy of Physics "Philosophy of Quantum Computation". Title of my on-line talk: "Quantum Information & Machine Learning", CIRFIS - University of Urbino.
- 2020: 16 September. Invited speaker at the "Kaist symposium on Quantum Machine Learning". Title of my on-line talk: "Quantum-like Machine Learning. theoretical reasons and empirical applications", KAIST (Korean Advanced Institute of Technology), Daejeon, South Korea.
- 2021: 15-16 Aprile. Invited speaker at the on-line "VII International Workshop on Quantum Mechanics and Quantum Information". Title of my on-line talk: "Quantum Information Theory - From foundations to no standard applications". Universidade Federal de Santa Catarina, Brasil.
- 2021: 8 September. Invited speaker for a PhD lesson, University of Udine & University of Trieste, PhD program in Storia delle societ., delle istituzioni e del pensiero. Title of my on-line talk: "Quantum Information and Machine Learning – La teoria quantistica a servizio delle tecniche di apprendimento automatico".
- 2021: 30 November - 4 December. Invited speaker at XCQF - X Conference of Quantum Foundations. Title of my on-line talk: "Quantum Information meets Machine Learning. For a quantum-inspired supervised classification" Buenos Aires, Argentine.
- 2022: 27 April - 5 May Invited speaker at the VIII International Workshop on Quantum Mechanics and Quantum Information: Quantum Theory and Reality. Title of my on-line talk: "A quantum-inspired algorithm for direct multi-class classification" Buenos Aires, Argentine.
- 2022: 7-12 November Quantum Techniques in Machine Learning 2022 (QTML2022). Title of my on-line talk: "Multi-class classification based on quantum state discrimination", Naples.
- 2023: 13-16 June Invited speaker at the International Conference "Quantum Information and Probability: from Foundations to Engineering" (QIP23). Title of my talk: "Quantum Information and Machine Learning: a multi-class quantum-inspired classification". Organizer of the Special Section "Quantum Structure and Quantum Information in Machine Learning". Linnaeus University - Vaxjo, Sweden.
- 2023: 27-28 July International Conference "Quantum Artificial Intelligence 2023" (QAI23). Title of my on-line talk: "Multi-class classification based on quantum state discrimination". University Federico II, Naples.
- 2023: 6 December. Invited speaker at the Seminars Series "Quantumness: from Logic to

Engineering and back". Title of my talk: "Quantum States Discrimination for Supervised Classification". IAS (Institute for Advanced Study) of the TUM - Technische Universität München.

- 2024: 25-26 June. Invited speaker at Workshop "Working Group - Soft Computing". Title of my talk: "Quantum Information meets Artificial Intelligence". La Sapienza - University, Rome.
 - 2024: 25-29 November. Quantum Techniques in Machine Learning 2024 (QTML2024). Poster presentation titled "Classification of Quantum Correlations via Quantum inspired Machine Learning". University of Melbourne.
 - 2024: 11 December. Invited talk "Quantum Information and Machine Learning: a multi-class quantum-inspired classification". Department of Mathematics, University of Salerno.
 - 2025: 3-5 April. Organizer of the International Workshop: "The Future of AI in Academic Research", University of Cagliari and TUM - Technische Universität München.
 - 2025: 8-9 May. Invited Speaker at the International Workshop: "Quantum Information, Entanglement and Causality", Department of Mathematics – Politecnico Milan.
 - 2025: 1-5 September. Invited Lecturer at the IV European Summer School of Quantum Artificial Intelligence (EQAI25): "From Quantum Information to Machine Learning: A Quantum-Inspired Approach – Bridging Theory and Applications", organized by University of Udine, University of Verona and the Digital Technologies District of Friuli Venezia Giulia.
- 2024: 16-21 November. Quantum Techniques in Machine Learning 2024 (QTML2024). Poster presentation titled "Classification of Quantum Correlations via Quantum inspired Machine Learning II". National University of Singapore.

NATIONAL SCIENTIFIC QUALIFICATIONS

- 2012: National Scientific Qualification for the position of Associate Professor (Scientific Area 11/C2: Logic and Philosophy of Science).
- 2014: National Scientific Qualification for the position of Associate Professor (Scientific Area 01/A1: Mathematical Logic).
- 2018: National Scientific Qualification for the position of Full Professor (Scientific Area 11/C2: Logic and Philosophy of Science).
- 2019: National Scientific Qualification for the position of Full Professor (Scientific Area 01/A1: Mathematical Logic).

TEACHING

- 2006–2010: Cofacilitator for the chair of Logic and Basic Mathematics, at the Department of Education Science - University of Cagliari.
- 2006–2010; 2012-2013: Cofacilitator for the chair of Logic and Critical Thinking, at the Department of Communication Science - University of Cagliari.
- 2009: Creation of a SCORM course on Logic and Methodology of Science for e-learning application.
- 2008–2010; 2012-2013: Cofacilitator for the chair of Logic and Methodology of Science at the Department of Communication Science - University of Cagliari.
- 2012: Logic and Basic Mathematics, at the Political Science Department - University of Cagliari.
- 2013: Creation of a SCORM course on Logic for e-learning application.
- 2014: Basic Mathematics, at the Department of Education, Psychology, Philosophy - University of Cagliari.
- 2014: Physics Laboratory, at the Department of Education, Psychology, Philosophy - University of Cagliari.
- 2015-2021: Laboratory of Didactics of Mathematics, at the Department of Education,

Psychology, Philosophy - University of Cagliari.

- 2016-up to now: Methodology of Applied Sciences, Department of Education, Psychology, Philosophy - University of Cagliari (SSD M-Fil/02 - 30h).
- 2016-2019: Logic and Basic of Mathematics Test, at the Department of Medicine - University of Cagliari.
- 2019-up to now: Logic and Critical Thinking, Department of Education, Psychology, Philosophy - University of Cagliari (SSD M-Fil/02 - 60h).
- 2020-up to now: Philosophy of Science, Methodology of Applied Sciences, Department of Education, Psychology, Philosophy - University of Cagliari (SSD M-Fil/02 - 30h).
- 2021: Ph.D. course "Quantum Information & Machine Learning", Ph.D. program in Philosophy, Epistemology, Human Science - University of Cagliari.
- 2022 – present: Supervisor of the PhD student Andres Camilo Granda Arango, Ph.D program in Philosophy, Epistemology, Human Sciences - University of Cagliari.
- Continuous participation as supervisor for Master thesis at the Department of Education, Psychology, Philosophy at the University of Cagliari.
- 2024 – present: Course "Quantum Information meets Artificial Intelligence. From foundations to applications", IAS (Institute of Advanced Studies) of TUM (Technische Universität München)

MAIN INSTITUTIONAL APPOINTMENTS

- 2017- present: member of the Ph.D program in Philosophy, Epistemology and Cultural history - University of Cagliari.
- 2017-2020: Secretary of the Italian Society of Logic and Philosophy of Science (SILFS).
- 2018 - 2024: Member of the Council of IQSA (International Quantum Structures Association).
- 2018 - present: Member of the Board (Giunta) of the Department of Education, Psychology, Philosophy – University of Cagliari.
- 2020- present: Member of the Council of the Italian Society of Logic and Philosophy of Science (SILFS).
- 2020 - present: Deputy-coordinator of the course in Communication Sciences – University of Cagliari.
- 2020, February - present: Coordinator of the Ph.D program in Philosophy, Epistemology, Human Sciences - University of Cagliari.
- 2021, November - current: Coordinator of the Doctoral Advisor Council (Consulta dei Coordinatori dei Dottorati) - University of Cagliari.
- 2021 – present: Member of the HR Excellence in Research Award Committee - University of Cagliari.
- 2022 – present: Member of the working group on "Training and Skills Development for Doctorates" (CRUI).
- 2022 – Member of the Committee for the final evaluation of the PhD thesis, Ph.D program in Sciences of Interpretations - University of Catania.
- Reviewer for the MIUR (Italian Ministry of Education and Research) for the evaluation of the quality of the research (VQR).
- Consultant for the MUR (Italian Ministry of Education and Research) for the in-itinere evaluation and analysis of ongoing (already funded) national projects.
- Reviewer for the ANVUR (National Agency for the Academic Evaluation) for the evaluation of the ranking of the scientific journals.
- Continuous participation in numerous working committee at the Department of Education, Psychology, Philosophy at the University of Cagliari (in particular: i) "Commissione di

autovalutazione dipartimentale” CAV; ii) “Commissione test di ingresso” corsi di laurea in Scienze della Comunicazione e in Filosofia e Teorie della Comunicazione; iii) “Commissione paritetica” corso di laurea in Filosofia e Teorie della Comunicazione).

- Continuous participation as scientific responsible for research fellows.
- Continuous participation as member of the evaluation committee for postdoctoral fellowships for researchers.
- 2023 – Member of the Committee for the evaluation of National Scientific Qualification (ASN) - Scientific Area 11/C2: Logic and Philosophy of Science.

Not only science... I published a novel titled "Pavel" with Capponi Editore ISBN: 9791256380244 (2024).