

Curriculum

April 5, 2024

Alessandro Perotti

Position:

Associate Professor Department of Mathematics, University of Trento
SSD: MAT/03 – Geometria

Past Positions:

From 01/11/2012 to 30/9/2014 Assistant Professor Department of Mathematics, University of Trento
From 01/11/2001 Assistant Professor Faculty of Engineering, University of Trento
From 01/11/1998 Assistant Professor University of Milano-Bicocca
From 16/02/1989 Assistant Professor University of Milan

National Scientific Qualification ('Abilitazione Scientifica Nazionale')

Full Professor ('I fascia') - ASN 2016 - Settore Conc. 01/A2 Geometria e Algebra (from 28/03/2017)

Education:

1/1/1985 – 1/3/1989: PhD courses ('Perfezionamento') Scuola Normale Superiore Pisa
November – December 1984: Grant INdAM a.y. 1984/85
October 1984: Laurea in matematica University of Trento

Research

My main research interests are in the fields of *complex, quaternionic and Clifford analysis in one and several variables*.

Several Complex Variables

In the early stages of my career I studied several classical questions of the theory of several complex variables. I studied *generalized Levi problems* on Stein manifolds and Stein spaces [Master Thesis], questions of *extendibility of analytic objects* and *CR objects* [38], the *Cauchy-Riemann problem on piecewise smooth domains* in complex manifolds [36, 37, 39]. These works were partly developed during a research period at the Max Planck Institute in Bonn. I also explored algebraic applications of integral representations. In particular, *multidimensional logarithmic residues* associated to a zero-dimensional polynomial ideal [35]. The papers [33, 34] considered again questions of *extendibility of analytic objects*. In particular, the characterization of the traces of *pluriharmonic functions* on the boundary of a bounded domain in \mathbb{C}^n . In [34] the *Neumann problem* for pluriharmonic functions and the *Cauchy-Riemann problem* for $(0, 1)$ -forms with assigned real part on the boundary were studied. In [32] a characterization of the boundary L^2 -orthogonal space to the subspace of traces of pluriharmonic functions was given by means of a tangential differential condition. In the 2-complex-dimensional

case, an interesting link between these spaces and the class of *Fueter-regular functions of a quaternionic variable* was found. This relation gave a hint to explore further new function theories, as described in the next section.

Hypercomplex Analysis and Geometry

The papers [29–31] began a research program on *Fueter-regular functions of a quaternionic variable*. The relations with the theory of holomorphic functions of two complex variables have been analysed in more detail. The theory of quaternionic regular functions and its generalization to the theory of solutions of *Dirac* or *Cauchy-Riemann operators* with values in a *Clifford algebra*, is an active research field (named *Clifford analysis* in the literature), with interesting links with real and complex analysis and manifold applications.

The isomorphism of the skew field of quaternions with \mathbb{C}^2 allows to obtain new boundary *holomorphy conditions* in two complex variables. In [29, 30], the regularity condition has been linked with the $\bar{\partial}$ -Neumann problem in \mathbb{C}^2 . Differential conditions which characterize regular homogeneous polynomials have been found and algorithms for the construction of bases of *regular spherical harmonics* have been implemented in Mathematica. In [52], the relation between regular functions and the *hyperkähler structure* of \mathbb{H} has been studied, proving that every holomorphic map w.r.t. a complex structure J_p compatible with the hyperkähler structure, induces a quaternionic regular function. It was found a criterion, based on the *energy minimizing property* of holomorphic maps, that permits to distinguish holomorphic maps in the class of regular functions.

In [26] it has been proved that the *biregular functions* (with regular inverse) are always (pseudo) biholomorphic on a dense subset of the domain w.r.t. a (not necessarily constant) almost complex structure. In the papers [28, 47], the results obtained in [32–34] and new conditions on the traces L^2 of regular functions, have been applied to analyse the problem of the traces of *pluriholomorphic* functions of two complex variables.

In [25, 48], the techniques introduced in [28] and [47] allowed to define a *quaternionic Hilbert operator*, that generalizes the classical Hilbert transform of complex analysis. Here an essential role is played by the CR_p -structure of the boundary defined w.r.t. the complex structure J_p . A *directional Hilbert operator* H_p is defined, dependent on the direction p , linked to the Szegő projector S_p . In [27] the behaviour of regular functions w.r.t. conformal transformations of \mathbb{R}^4 has been studied. In the papers [24, 53] some applications of the theory of regular functions to the *Lagrange interpolation* have been proposed. See also [17] for a different approach.

Slice analysis of one or several variables In real dimensions higher than two several function theories introduced during the last century have met with success in matching many analytic features of the theory of holomorphic functions of one complex variable. The search for an approach better adapted to algebraic requirements, e.g. the inclusion of the classical theory of polynomials, led to developing, over the last fifteen years, a new function theory. Born in the quaternionic setting, the theory of *slice-regular functions*, also called *slice analysis*, has been then extended to the octonions, to the Clifford algebra setting, and more generally to real alternative $*$ -algebras.

The articles [1, 2, 5–14, 16, 18, 19, 21–23, 42, 46] deal with the theory of *slice-regular functions* of one variable. In [4, 49, 51], a novel approach to the theory of *slice-regular*

functions of several variables has been proposed, based on the theory of several complex variables and on the construction of a family of commuting complex structures on \mathbb{R}^{2^n} .

We now give some more details about the main results concerning slice analysis. The paper [22] developed a theory of slice regular functions over an arbitrary real alternative $*$ -algebra. We proved a version of the Fundamental Theorem of Algebra valid for a large class of polynomials with coefficients in the algebra, thus unifying known and unknown results over, e.g., the quaternions, the octonions and Clifford algebras. Further algebraic aspects of the theory have been developed in [11, 13].

In [19] a characterization of slice-regularity in terms of *analyticity*, i.e. of convergent developments in series of functions, was given. The paper [14] studied *singularities* of slice-regular functions in the general $*$ -algebra setting. The articles [1, 16, 21] proved *Cauchy integral formulas* in slice analysis.

In [42, 45], some meeting points between the two quaternionic/Clifford function theories, the one defined by means of Fueter/Dirac differential operators and the one of slice-regular functions, were investigated. In particular, in [42] some new formulas relating the Cauchy-Riemann operators, the *spherical Dirac operators* and the spherical derivative of a slice function have been found. In the four-dimensional case, these results are related to *zonal harmonics* and to the *Poisson kernel* of the unit ball. These formulas have been applied in [5] for the study of *eigenvalue problems* with applications to time-harmonic Helmholtz and stationary Klein-Gordon equations.

The papers [6, 7] dealt with *differential topological* properties of slice-regular functions. Through the study of their Jacobian, sense-preserving properties and versions of the Open Mapping Theorem are proved. These results open the path for a possible use of slice regular functions in the study of almost-complex structures in four and eight dimensions.

The papers [15, 20, 43, 44] dealt with applications of the theory of slice and slice-regular functions to the *quaternionic functional calculus* and to the *spectral theory* of operators on quaternionic Hilbert spaces. These new developments have possibly applications to Mathematical Physics (mathematical foundations of Quantum Mechanics).

PhD supervisions

I have been the advisor of the PhD thesis of Amedeo Altavilla (“Quaternionic Slice Regular Functions on Domains Without Real Points”, 2014), now Associate Professor at University of Bari, formerly post-doc researcher at Università Politecnica delle Marche and Roma Tor Vergata.

I am currently the PhD advisor of Giulio Binosi (XXXVI cycle), who is the recipient of a Research fellowship (Assegno di ricerca) of the MIUR project “Dipartimenti di Eccellenza” for the PhD school in Mathematics in Trento.

I have been member of the Examination Board for the defence of PhD-theses at the Universities of Ghent and Florence.

Publication List

Alessandro Perotti

All my recent publications are available on arXiv.

Articles in journals

- [1] Alessandro Perotti. A local Cauchy integral formula for slice-regular functions. *Computational Methods and Function Theory*, 24, 185–203 (2024). Published online: 30 May 2023 DOI: <http://doi.org/10.1007/s40315-023-00485-5>.
- [2] Alessandro Perotti. A quaternionic Bernstein theorem. *Mediterranean Journal of Mathematics*. (2023) 20:154. Published online: 9 March 2023. DOI: <http://doi.org/10.1007/s00009-023-02362-w>.
- [3] Alessandro Perotti. Cauchy-Riemann operators and local slice analysis over real alternative algebras. *J. Math. Anal. Appl.*, 516 (2022) 126480. DOI: <http://doi.org/10.1016/j.jmaa.2022.126480>.
- [4] Riccardo Ghiloni and Alessandro Perotti. Slice regular functions in several variables. *Math. Z.*, 302(1):295–351 (2022). Published online: 23 June 2022. DOI: <http://doi.org/10.1007/s00209-022-03066-9>.
- [5] Rolf Sören Krausshar and Alessandro Perotti. Eigenvalue problems for slice functions. *Ann. Mat. Pura Appl.*, 201:2519–2548 (2022). Published online: 31 March 2022. DOI: <http://doi.org/10.1007/s10231-022-01208-8>.
- [6] Riccardo Ghiloni, Alessandro Perotti, and Caterina Stoppato. Slice regular functions and orthogonal complex structures over \mathbb{R}^8 . *J. Noncommut. Geom.* 16 (2022), no. 2, pp. 637–676. DOI: <http://dx.doi.org/10.4171/JNCG/452>.
- [7] Riccardo Ghiloni and Alessandro Perotti. On a class of orientation-preserving maps of \mathbb{R}^4 . *J. of Geom. Anal.*, 31:2383–2415 (2021). Published online: 24 January 2020. DOI: <http://dx.doi.org/10.1007/s12220-020-00356-8>.
- [8] Alessandro Perotti. Almansi Theorem and Mean Value Formula for Quaternionic Slice-regular Functions. *Adv. Appl. Clifford Algebras*, 30, 61 (2020). DOI: <http://dx.doi.org/10.1007/s00006-020-01078-4>.
- [9] Alessandro Perotti. Almansi-type theorems for slice-regular functions on Clifford algebras. *Complex Variables and Elliptic Equations*, 66:8, 1287–1297 (2020) DOI: <http://dx.doi.org/10.1080/17476933.2020.1755967>.
- [10] Alessandro Perotti. A four dimensional Jensen formula. *Riv. Math. Univ. Parma (N.S.)*, 11(1):139–152 (2020). <http://arxiv.org/abs//1902.06485>.

- [11] Riccardo Ghiloni, Alessandro Perotti, and Caterina Stoppato. Division algebras of slice functions. *Proceedings of the Royal Society of Edinburgh: Section A Mathematics*, 150(4):2055–2082 (2020). Published online: 15 March 2019. DOI: <http://dx.doi.org/10.1017/prm.2019.13>.
- [12] Riccardo Ghiloni and Alessandro Perotti. The quaternionic Gauss–Lucas theorem. *Ann. Mat. Pura Appl. (4)*, 197(6):1679–1686 (2018). DOI: <http://dx.doi.org/10.1007/s10231-018-0742-z>.
- [13] Riccardo Ghiloni, Alessandro Perotti, and Caterina Stoppato. The algebra of slice functions. *Trans. Amer. Math. Soc.*, 369(5):4725–4762 (2017), electronically published on November 28, 2016. DOI: <http://dx.doi.org/10.1090/tran/6816>.
- [14] Riccardo Ghiloni, Alessandro Perotti, and Caterina Stoppato. Singularities of slice regular functions over real alternative $*$ -algebras. *Adv. Math.*, 305:1085–1130 (2017), electronically published on October 13, 2016. DOI: <http://dx.doi.org/10.1016/j.aim.2016.10.009>.
- [15] Riccardo Ghiloni, Valter Moretti, and Alessandro Perotti. Spectral representations of normal operators via Intertwining Quaternionic Projection Valued Measures. *Rev. Math. Phys.*, 29(10):1750034, 73 (2017). DOI: <http://dx.doi.org/10.1142/S0129055X17500349>.
- [16] Riccardo Ghiloni, Alessandro Perotti, and Vincenzo Recupero. Noncommutative Cauchy integral formula. *Complex Anal. and Oper. Theory*, 11(2):289–306 (2017). DOI: <http://dx.doi.org/10.1007/s11785-016-0543-6>.
- [17] Riccardo Ghiloni and Alessandro Perotti. Lagrange polynomials over Clifford numbers. *J. Algebra Appl.*, Vol. 14(5):1550069 (11 pages) (2015). DOI: <http://dx.doi.org/10.1142/S0219498815500693>.
- [18] Riccardo Ghiloni and Alessandro Perotti. Global differential equations for slice regular functions. *Math. Nachr.*, 287(5-6):561–573 (2014). DOI: <http://dx.doi.org/10.1002/mana.201200318>.
- [19] Riccardo Ghiloni and Alessandro Perotti. Power and spherical series over real alternative $*$ -algebras. *Indiana Univ. Math. J.*, 63(2):495–532 (2014). DOI: <http://dx.doi.org/10.1512/iumj.2014.63.5227>.
- [20] Riccardo Ghiloni, Valter Moretti, and Alessandro Perotti. Continuous slice functional calculus in quaternionic Hilbert spaces. *Rev. Math. Phys.*, 25(4):1350006, 83 (2013). DOI: <http://dx.doi.org/10.1142/S0129055X13500062>.
- [21] Riccardo Ghiloni and Alessandro Perotti. Volume Cauchy formulas for slice functions on real associative $*$ -algebras. *Complex Var. Elliptic Equ.*, 58(12):1701–1714 (2013). DOI: <http://dx.doi.org/10.1080/17476933.2012.709851>.
- [22] Riccardo Ghiloni and Alessandro Perotti. Slice regular functions on real alternative algebras. *Adv. Math.*, 226(2):1662–1691 (2011). DOI: <http://dx.doi.org/10.1016/j.aim.2010.08.015>.

- [23] Riccardo Ghiloni and Alessandro Perotti. Zeros of regular functions of quaternionic and octonionic variable: a division lemma and the camshaft effect. *Ann. Mat. Pura Appl. (4)*, 190(3):539–551 (2011). DOI: <http://dx.doi.org/10.1007/s10231-010-0162-1>.
- [24] Alessandro Perotti. Least energy quaternionic regular Lagrange interpolation. *Math. Methods Appl. Sci.*, 33(4):412–422, 2010. DOI: <http://dx.doi.org/10.1002/mma.1208>.
- [25] Alessandro Perotti. On directional Hilbert operators for regular quaternionic functions on \mathbb{R}^3 . *Adv. Appl. Clifford Algebr.*, 20(3–4):803–817, 2010. DOI: <http://dx.doi.org/10.1007/s00006-010-0223-y>.
- [26] Alessandro Perotti. Every biregular function is a biholomorphic map. *Adv. Appl. Clifford Algebr.*, 19(2):441–451, 2009. DOI: <http://dx.doi.org/10.1007/s00006-009-0161-8>.
- [27] Alessandro Perotti. Regular quaternionic functions and conformal mappings. *Cubo*, 11(1):123–143, 2009.
- [28] Alessandro Perotti. Dirichlet problem for pluriholomorphic functions of two complex variables. *J. Math. Anal. Appl.*, 337(1):107–115, 2008. DOI: <http://dx.doi.org/10.1016/j.jmaa.2007.03.086>.
- [29] Alessandro Perotti. Quaternionic regularity and the $\bar{\partial}$ -Neumann problem in \mathbb{C}^2 . *Complex Var. Elliptic Equ.*, 52(5):439–453, 2007. DOI: <http://dx.doi.org/10.1080/17476930601178392>.
- [30] Alessandro Perotti. On regular harmonics of one quaternionic variable. *Int. J. Pure Appl. Math.*, 26(1):83–92, 2006.
- [31] Alessandro Perotti. A differential criterium for regularity of quaternionic functions. *C. R. Math. Acad. Sci. Paris*, 337(2):89–92, 2003. DOI: [http://dx.doi.org/10.1016/S1631-073X\(03\)00284-X](http://dx.doi.org/10.1016/S1631-073X(03)00284-X).
- [32] Alessandro Perotti. Tangential form of the trace condition for pluriharmonic functions in \mathbb{C}^n . *Complex Var. Theory Appl.*, 48(7):615–623, 2003. DOI: <http://dx.doi.org/10.1080/0278107031000140916>.
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- [34] Alessandro Perotti. Dirichlet problem for pluriharmonic functions of several complex variables. *Comm. Partial Differential Equations*, 24(3–4):707–717, 1999. DOI: <http://dx.doi.org/10.1080/03605309908821439>.
- [35] Alessandro Perotti. Multidimensional residues and ideal membership. *Publ. Mat.*, 42(1):143–152, 1998. DOI: http://dx.doi.org/10.5565/PUBLMAT_42198_07.
- [36] Joachim Michel and Alessandro Perotti. C^k -regularity for the $\bar{\partial}$ -equation on a piecewise smooth union of strictly pseudoconvex domains in \mathbb{C}^n . *Ann. Scuola Norm. Sup. Pisa Cl. Sci. (4)*, 21(4):483–495, 1994. URL: http://www.numdam.org/item?id=ASNSP_1994_4_21_4_483_0.

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URL: http://www.numdam.org/numdam-bin/item?id=RSMUP_1987__77__37_0.
- [39] Alessandro Perotti. The equation $\bar{\partial}u = f$ on the intersection of pseudoconvex domains. *Atti Accad. Naz. Lincei Rend. Cl. Sci. Fis. Mat. Natur. (8)*, 80(7–12):495–500 (1987), 1986.

Preprints

- [40] Alessandro Perotti and Caterina Stoppato. Which Fueter-regular functions are holomorphic? 2023. submitted.
- [41] Alessandro Perotti. Wirtinger operators for functions of several quaternionic variables. 2022. submitted. <https://arxiv.org/abs/2212.10868>.

Articles in books

- [42] Alessandro Perotti. Slice regularity and harmonicity on Clifford algebras. In *Topics in Clifford Analysis – Special Volume in Honor of Wolfgang Sprössig*, Trends Math. Springer, Basel, 2019.
DOI: http://dx.doi.org/10.1007/978-3-030-23854-4_3.
- [43] R. Ghiloni, V. Moretti, and A. Perotti. Slice Functional Calculus in Quaternionic Hilbert Spaces. In Vladimir V. Mityushev and Michael V. Ruzhansky, editors, *Current Trends in Analysis and Its Applications*, Trends in Mathematics, pages 475–484. Springer International Publishing, 2015.
DOI: http://dx.doi.org/10.1007/978-3-319-12577-0_53.
- [44] Riccardo Ghiloni, Valter Moretti, and Alessandro Perotti. Spectral properties of compact normal quaternionic operators. In *Hypercomplex Analysis: New perspectives and applications*, Trends in Mathematics. Birkhäuser, 2014.
DOI: http://dx.doi.org/10.1007/978-3-319-08771-9_9.
- [45] Alessandro Perotti. Fueter regularity and slice regularity: meeting points for two function theories. In *Advances in hypercomplex analysis*, volume 1 of *Springer INdAM Ser.*, pages 93–117. Springer, Milan, 2013.
DOI: http://dx.doi.org/10.1007/978-88-470-2445-8_6.
- [46] Riccardo Ghiloni and Alessandro Perotti. A new approach to slice regularity on real algebras. In *Hypercomplex analysis and applications*, Trends Math., pages 109–123. Birkhäuser/Springer Basel AG, Basel, 2011.
DOI: http://dx.doi.org/10.1007/978-3-0346-0246-4_8.

- [47] Alessandro Perotti. Boundary values of pluriholomorphic functions in \mathbb{C}^2 . In *Progress in analysis and its applications*, pages 188–194. World Sci. Publ., Hackensack, NJ, 2010. DOI: http://dx.doi.org/10.1142/9789814313179_0025.
- [48] Alessandro Perotti. Directional quaternionic Hilbert operators. In *Hypercomplex analysis*, Trends Math., pages 235–258. Birkhäuser Verlag, Basel, 2009. DOI: http://dx.doi.org/10.1007/978-3-7643-9893-4_15.

Conference Proceedings

- [49] Riccardo Ghiloni and Alessandro Perotti. Slice regular functions of several Clifford variables. In *AIP Conf. Proc.*, volume 1493, pages 734–738. AIP, 2012. 9th International Conference on Mathematical Problems in Engineering, Aerospace and Sciences: ICNPAA 2012, Vienna, Austria, 10–14 July 2012. DOI: <https://doi.org/10.1063/1.4765569>.
- [50] Alessandro Perotti. The full Dirac operator on a Clifford algebra. In *Proceedings of the 9th International Conference on Clifford Algebras and their Applications (ICCA9) 2011*. Gürlebeck, Klaus (ed.) Weimar, Germany, 2011. Proceedings of the 9th International Conference on Clifford Algebras and their Applications (ICCA9), Gürlebeck, Klaus (ed.) Weimar, Germany, 15–20 July 2011.
- [51] R. Ghiloni and A. Perotti, Slice regularity in several variables. Progress in analysis. Proceedings of the 8th congress of the International Society for Analysis, its Applications, and Computation (ISAAC), Moscow, Russia, August 22–27, 2011. Volume 1, ISBN 978-5-209-04582-3/hbk, pages 179–186 (2012) Zbl 1298.30044.
- [52] Alessandro Perotti. Holomorphic functions and regular quaternionic functions on the hyperkähler space \mathbb{H} . In *More Progresses in Analysis: Proceedings of the 5th International Isaac Congress*, Trends Math., pages 1009–1018. World Scientific, Singapore, 2009. DOI: http://dx.doi.org/10.1142/9789812835635_0097.
- [53] Alessandro Perotti. An application of biregularity to quaternionic Lagrange interpolation. In *AIP Conf. Proc.*, volume 1048, pages 691–694. AIP, 2008. DOI: <http://dx.doi.org/10.1063/1.2991022>.

Communications at conferences

I attended several conferences, summer schools and workshops, in Italy and abroad, giving (also invited) communications. In particular, in the last years I delivered the following talks:

- NTQO, Leiria, 2023: *An alternative Fueter Theorem on octonions and Clifford algebras*
- ICCA13, Holon 2023: *A local Cauchy integral formula for slice-regular functions*
- "Incontro Nazionale di Analisi Ipercomplessa", December 18–20, 2022 at University of Florence: *Wirtinger operators for functions of several quaternionic variables*
- "Recent progress in HyperComplex analysis and geometry", September 10–11, 2020 at Politecnico di Milano (via Zoom): *Mean value formula and Poisson formula for slice-regular functions*
- HAMS, Weimar 2020: *On some geometrical properties of slice-regular maps*
- 12th ISAAC Congress, Aveiro 2019: *An Almansi-type decomposition for slice-regular functions on Clifford algebras.*
- Joint meeting UMI-SIMAI-PTM, Wroklaw, 2018: *The analytic structure of the singular set of a slice-regular function*
- "Function Theories in Higher Dimensions", Tampere 2018: *The quaternionic Gauss-Lucas Theorem and some related results about quaternionic polynomials*
- ICCA11, Ghent 2017: *Left and right eigenvalues of quaternionic matrices are not unrelated.*
- Workshop AGACSE 2015, Barcelona: *Slice regularity and harmonicity over Clifford algebras.*
- WORKSHOP 2015 Varietà reali e complesse: geometria, topologia e analisi armonica - Pisa SNS: *Funzioni slice-regolari e armonicità*
- FIRB Meeting Firenze 2015: *Global differential equations for slice-regular functions.*
- IX ISAAC Congress, Krakow 2013: *Continuous slice functional calculus in quaternionic Hilbert spaces.*
- ICNPAA Wien 2012 - Workshop "Clifford algebras, Clifford analysis and their applications": *Slice regular functions of several Clifford variables.*
- VIII ISAAC Congress, Moskow 2011: *Slice regular functions in several variables on real alternative algebras.*
- ICCA9, Weimar 2011: *The full Dirac operator on a Clifford algebra.*
- INdAM Workshop "Different Notions of Regularity for Functions of Quaternionic Variable", Roma 2010: *Slice regularity and Fueter regularity: a 3D-meeting point for two function theories.*

- 18th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications, Macau 2010: *Zero sets of polynomials and slice regular functions on Clifford algebras*.
- VII ISAAC Congress Imperial College London 2009: *A new approach to slice regularity on real algebras*.

Conferences organization

- Recent Progress in HyperComplex Analysis and Geometry - University of Trento (Trento, September 2024).
- Workshops of Hypercomplex Analysis and Geometry - University of Trento (Trento, September 2018).
- Member of the Scientific Committee of the Workshop INdAM "Complex function theory, its generalizations and applications" (Rome, September 12-16 2016).
- 3rd Workshop of Hypercomplex Analysis - University of Trento (Trento, December 2011).

Research Groups and grants

I am a member of the group GNSAGA of INdAM. I have been associated to TIFPA-INFN (Bell Project "Fundamental Problems in Quantum Physics") (see [15, 20, 43, 44] for this research topic). I am a member of the ISAAC interest group on Clifford and Quaternionic analysis.

I took part in several co-financed projects COFIN, PRIN, FIRB of MIUR/MUR:

- Progetto di Ricerca INdAM, Teoria delle funzioni ipercomplesse e applicazioni
- PRIN 2017: *Real and Complex Manifolds: Topology, Geometry and Holomorphic Dynamics*
- PRIN 2015: *Real and Complex Manifolds: Geometry, Topology and Harmonic Analysis*
- FIRB 2012: *Geometria Differenziale e Teoria Geometrica delle Funzioni*
- PRIN 2010/11: *Varietà reali e complesse: geometria, topologia e analisi armonica*
- PRIN 2007: *Proprietà geometriche delle varietà reali e complesse*
- PRIN 2005: *Proprietà geometriche delle varietà reali e complesse*
- PRIN 2002: *Proprietà geometriche delle varietà reali e complesse*
- PRIN 2000: *Strutture speciali sulle varietà complesse. Azioni di gruppi e algebre su varietà*
- PRIN 1998: *Strutture speciali sulle varietà complesse. Azioni di gruppi e algebre su varietà*

Other scientific activities

- I am a reviewer for MathSciNet of AMS and a referee for several international journals.
- I am a member of the Doctoral School committee of the Doctoral School in Mathematics of the University of Trento.
- I served as Vice Head of the Doctoral School for three years (2015-2018).

Trento, April 5, 2024