

CURRICULUM DIDATTICO E SCIENTIFICO

Amedeo Altavilla

Anagrafica

Nome Amedeo

Cognome Altavilla

Posizione Attuale Assegnista di Ricerca presso Università Politecnica delle Marche (dal 01/2019)

Nazionalità Italiana

Indirizzo lavorativo Dipartimento di Ingegneria Industriale e Scienze Matematiche (DIISM) - Università Politecnica delle Marche, Via Brece Bianche, 12, 60131 Ancona, Italy

Webpage <https://sites.google.com/site/amedeoaltavilla/>

Studi

- 11/2011 - 19/12/2014, Ph.D. in Matematica; Dipartimento di Matematica, Università di Trento (Italy). Titolo della tesi: “**Quaternionic slice regular functions on domains without real points**”; relatore: Prof. **Alessandro Perotti**.
- 10/2009 - 10/2011, Laurea Magistrale (punteggio: 110/110 *cum laude*) in matematica; Università di Parma (Italy). Titolo della tesi: “**Potenziali algebro-geometrici per l’equazione di Korteweg-deVries**”; relatore: Prof. **Lorenzo Nicolodi**.
- 09/2005 - 4/2009, Laurea Triennale (punteggio: 98/110) in Matematica; Università di Parma (Italy). Titolo della tesi: “**Omologia singolare ed applicazioni**”; relatore: Prof. **Claudio Arezzo**.
- 06/2005 Diploma, “Liceo Scientifico E. Fermi”, Brindisi (Italy) (punteggio: 100/100).

Posizioni precedenti

- 01/2017 – 12/2018
Assegno di Ricerca presso Dipartimento di Matematica – Università di Roma 2 “Tor Vergata”. Finanziato da SIR2014 “New methods in holomorphic iteration”.
- 02/2016 – 12/2016
Assegno di Ricerca presso DIISM – Università Politecnica delle Marche.
- 10/2015 – 01/2016
Coadiutore presso DIISM – Università Politecnica delle Marche

Finanziamenti e riconoscimenti scientifici

- 09/2019
GNSAGA, INdAM Supporto economico, con Cinzia Bisi e Chiara de Fabritiis, per l’organizzazione del convegno “**Quaternioni sul Conero – II**”, Università Politecnica delle Marche, Ancona, Italy, 12–13 Settembre 2019, (1500 euro).
- 05/2019 (two weeks)
Research in Pairs at C.I.R.M. of F.B.K. con Chiara de Fabritiis, Trento (Italy).
- 01/2019
INdAM fellowship “3 mensilità di borse di studio per l’estero a.a. 2018–2019” da spendere presso **Ghent University (Belgium)** (6000 euro).
- 07/05/2018 – 18/05/2018
Research in Pairs at C.I.R.M. of F.B.K. con Chiara de Fabritiis, Trento (Italy).

- 01/2018
Qualification aux fonctions de Maître de Conférence, Section 25 - Mathématiques, N. de qualification: 18225316076D, France.
- 09/2017
GNSAGA, INdAM Supporto economico, con Cinzia Bisi e Chiara de Fabritiis, per l'organizzazione del convegno "Quaternions sul Conero", Università Politecnica delle Marche, Ancona, Italy, 7–8 Settembre 2017, (1000 euro).
- 14/07/2014 – 18/07/2014
GNSAGA, INdAM Supporto economico per la partecipazione al convegno "30th International Colloquium on Group Theoretical Methods in Physics"; Ghent University (Belgium), (650 euro).
- 05/08/2013 – 09/08/2013
GNSAGA, INdAM Supporto economico per la partecipazione al convegno "9th International ISAAC Congress" sessione "Clifford and Quaternion Analysis"; Pedagogical University Krakow (Poland), (500 euro).
- 11/2011 – 10/2014
Borsa di dottorato presso il Dipartimento di Matematica, Università di Trento.
- 09/2005 – 06/2008
Borsa di studio finanziata da "Azienda Regionale per il Diritto agli Studi Universitari".

Attività di ricerca (sezione in inglese)

My research activity is mainly devoted to the study of slice regularity: the most recent attempt to generalize the concept of holomorphicity to quaternions in order to have that polynomials $\sum_{n=0}^N q^n a_n$, with $\{a_n\} \subset \mathbb{H}$ turn out to be regular. Other generalizations of the concept of holomorphy are the object of my research as the theory of monogenic functions. I am also interested in the harmonicity aspects of these theories. Moreover I am interested in the field of differential geometry with particular emphasis on algebraic twistor spaces and on calibrations and their stabilizer.

Slice regular functions defined on domains without real points

In [1; 2; 4; 5] I generalize several global results, differential properties and geometric applications for slice regular functions defined on domains that intersect the real line, to functions defined on general domains. All these results are obtained using the approach of *stem functions* introduced by R. Ghiloni and A. Perotti.

In particular, in [2] I obtain a number of global results analogous to identity principle, minimum and maximum principle and open mapping theorem for slice regular functions defined on domains without real points. The main idea is that, since the restrictions of a slice regular function to any complex line are holomorphic function, then, if the domain does not contain the real line its intersection with any of these complex line is not connected. Therefore, all these well known results in complex analysis are modified keeping in mind this particular issue on the domain.

In [4] I study the behaviour of the real differential of a slice regular function. The main result proven in this paper is the fact that any injective slice regular function is non-singular everywhere on its domain. This statement is a generalization of a theorem due to G. Gentili, S. Salamon and C. Stoppato. In order to obtain it I show firstly that an injective slice regular function has slice derivative and spherical derivative that are never-vanishing. Then, using the representation formula for slice regular functions and some new equalities between the slice derivative and the spherical derivative, I am able prove the mentioned result. The techniques and the strategy of proof are different and more general than the original ones.

Thanks to the results obtained in [2] and [4], in [5] I generalize a geometric construction originally due to G. Gentili, S. Salamon and C. Stoppato. In this construction they prove that any slice regular function defined on a domain that intersects the real line, defines an orthogonal complex structure (OCS) on its image. This is obtained by interpreting slice regularity in the language of twistor spaces, lifting a generic slice regular function to a holomorphic map of the twistor space of \mathbb{H} . After the generalization in the more ample realm of slice regular functions defined on domains without real points, I show some qualitative properties of the OCS's that may be defined in this way and I also give some coarse classification of algebraic surfaces of degree 2 and 3 inside the twistor space of \mathbb{H} which fit into this construction.

From the study of the geometric applications of the theory of slice regularity, it is natural to consider the family of slice polynomials. In [9], together with G. Sarfatti we investigate this class of functions that naturally

emerges from the study of the possible algebraic surfaces inside the twistor space of \mathbb{H} that are reached by the twistor lift of a slice regular function. These functions become polynomials if restricted to any complex line inside \mathbb{H} but are not, in general, polynomials. Given a slice polynomial we define its companion which is a dual function that strongly interacts with the original one. We prove that the union of the images of a slice polynomial and of its companion is the whole algebra \mathbb{H} . Moreover, for any point in \mathbb{H} , we are able to describe its pre-image by a slice polynomial. We find that the sum of cardinalities of the pre-images of a point in $q \in \mathbb{H}$ via a slice polynomial P and via its companion is generically constant and equal to a suitable notion of degree of the slice polynomial.

Global results on slice regular functions

In [10], in collaboration with C. Bisi, the bi-harmonicity of a quaternionic slice regular function and some differential relation proved by A. Perotti, we define the Riesz measure of a slice preserving function and of a PQL function. A slice preserving function is a slice regular function which preserves all the complex lines in \mathbb{H} while a PQL function is a finite product of quaternionic linear functions. Moreover, for these two classes of functions we show some Jensen type formulas and we apply it to give an upper bound to the number of zeros of a slice regular function and to compute some interesting integrals.

In [7] and [6] in collaboration with C. de Fabritiis we study some global behaviour of slice regular functions starting from a new interpretation of the $*$ -product which is a particular product of functions that preserves regularity. In particular in [7] we study the $*$ -exponential of a slice-regular function, which can be seen as a generalization of the complex exponential to quaternions. We give an explicit expression for $\exp_*(f)$ also in terms of suitable sine and cosine functions. We completely classify under which conditions the $*$ -exponential of a function is either slice-preserving or \mathbb{C}_J -preserving for some $J \in \mathbb{S}$ and show that $\exp_*(f)$ is never-vanishing. Then we give sharp necessary and sufficient conditions in order that $\exp_*(f+g) = \exp_*(f) * \exp_*(g)$. We also discuss the existence of a square root of a slice-preserving regular function.

In [6] we characterize the property of being one-slice preserving in terms of the projectivization of the vectorial part of the function. We also define a ‘‘Hermitian’’ product on slice regular functions which gives us the possibility to express the $*$ -product of two slice regular functions in terms of the scalar product of suitable functions constructed starting from f and g . Afterwards we determine, under different assumptions, when the sum, the $*$ -product and the $*$ -conjugation of two slice regular functions preserve a complex slice. We also study when the $*$ -power of a slice regular function has this property or when it preserves all complex slices. To obtain these results we prove two factorization theorems: in the first one, we are able to split a slice regular function into the product of two functions: one keeping track of the zeroes and the other which is never-vanishing; in the other one we give necessary and sufficient conditions for a slice regular function (which preserves all complex slices) to be the symmetrized of a suitable slice regular one.

Volume properties of groups that fixes a calibration

Given a calibration in the Euclidean space \mathbb{R}^n , it is a natural question to investigate the properties of the group of linear transformations that fix it from the point of view of measure theory.

In [3], with L. Nicolodi, we prove an analogous of the Gromov non-squeezing theorem for the group $Sp(n) \cdot Sp(1)$ of quaternionic unitary transformations. To be more precise we show the following result: let $F : \mathbb{R}^{4n} \rightarrow \mathbb{R}^{4n}$ be an element of the quaternionic unitary group $Sp(n) \cdot Sp(1)$, let K be a compact subset of \mathbb{R}^{4n} , and let V be a $4k$ -dimensional quaternionic subspace of $\mathbb{R}^{4n} \simeq \mathbb{H}^n$. The $4k$ -dimensional shadow of the image under F of K is its orthogonal projection $P(F(K))$ onto V . We show that there exists a $4k$ -dimensional quaternionic subspace W of \mathbb{R}^{4n} such that the volume of the shadow $P(F(K))$ is the same as the volume of the section $K \cap W$.

Algebraic geometry of the twistor fibration

In [8] we study algebraic surfaces in $\mathbb{C}\mathbb{P}^3$ containing a finite or an infinite number of twistor lines, i.e.: fibers for the standard twistor projection on the 4-sphere

$$\mathbb{C}\mathbb{P}^1 \rightarrow \mathbb{C}\mathbb{P}^3 \xrightarrow{\pi} \mathbb{S}^4.$$

A twistor line can be identified with a projective line $\ell \in \mathbb{C}\mathbb{P}^3$ such that $\ell = j(\ell)$, $j : \mathbb{C}\mathbb{P}^3 \rightarrow \mathbb{C}\mathbb{P}^3$ being the natural fixed-point-free anti-holomorphic involution underlying the projection π . A projective transformation that commutes with j can be seen as a map induced, via π^{-1} , by a Möbius transformation (and viceversa). Therefore the natural geometry of this fibration is the one described by the conformal group of \mathbb{S}^4 suitably embedded in $PGL(4, \mathbb{C})$.

It is easy to see that the number of twistor lines contained in a given algebraic surface is a conformal invariant of the surface itself. For this reason the analysis of such lines in particular cases is the object of several recent researches. In our paper we give, under several hypotheses, first general results on the number of twistor lines that can be contained in an algebraic surface of degree d . Moreover we also study surfaces that contains infinite twistor lines. In the first part of the paper we discuss the space of surfaces containing a finite, but fixed, number of disjoint lines (not twistor, in general). We are able to compute the dimension of this space and to give regularity properties on its general element.

Afterwards we explain what a general set of twistor lines is by means of what we call *Density Lemma*. In this lemma we prove that the set of twistor lines Λ is a Zariski dense of the Grassmannian of lines in the complex projective space denoted by $Gr(2, 4)$. The Density Lemma has a number of direct consequences and it is a fundamental tool to state (and prove) our results. In our first main theorems, for any fixed $d \geq 4$, we prove the existence of an algebraic surface of degree d containing a certain number $\nu(d)$ of twistor lines. In this setting we are also able to control the singular locus and, accordingly with the additional hypotheses we assume on the surface (i.e. irreducibility, smoothness, j -invariance), we are able to suitably update the number $\nu(d)$ of twistor lines (see *Theorems 1.3, 1.4 and 1.5*).

In [12] we prove that a reduced and irreducible algebraic surface in $\mathbb{C}\mathbb{P}^3$ containing infinitely many twistor lines cannot have odd degree. Then, exploiting the theory of quaternionic slice regularity and the normalization map of a surface, we give constructive existence results for even degrees.

In the third work in collaboration with E. Ballico [11] we exploit techniques from classical (real and complex) algebraic geometry for the study of the standard twistor fibration $\pi : \mathbb{C}\mathbb{P}^3 \rightarrow S^4$. We prove three results about the topology of the twistor discriminant locus of an algebraic surface in $\mathbb{C}\mathbb{P}^3$. First of all we prove that, with the exception of two special cases, the real dimension of the twistor discriminant locus of an algebraic surface is always equal to 2. Secondly we describe the possible intersections of a general surface with the family of twistor lines: we find that only 4 configurations are possible and for each of them we compute the dimension. Lastly we give a decomposition of the twistor discriminant locus of a given cone in terms of its singular locus and its dual variety.

Results in harmonic analysis with hypercomplex techniques

In [13], by exploiting the Fueter theorem, we give new formulas to compute zonal harmonic functions in any dimension. We first give a representation of them as a result of a suitable *ladder operator* acting on the constant function equal to one. Then, using techniques from slice regularity, we derive explicit expressions for zonal harmonics starting from the 2 and 3 dimensional cases. It turns out that all zonal harmonics in any dimension are related to the real part of powers of the standard Hermitian product in \mathbb{C} . At the end we compare formulas, obtaining interesting equalities involving the real part of positive and negative powers of the standard Hermitian product.

Publicazioni e Preprints

- [1] A. Altavilla. Quaternionic Slice Regular Functions on Domains Without Real Points. Ph.D. Thesis, supervisor A. Perotti, University of Trento, 2014, <http://eprints-phd.biblio.unitn.it/1089>.
- [2] A. Altavilla. Some Properties for Quaternionic Slice-Regular Functions on Domains Without Real Points. *Complex Var. Elliptic Equ.* 60, No. 1, 59-77 (2015).
- [3] A. Altavilla, L. Nicolodi. On the volume of the $Sp(n) \cdot Sp(1)$ shadow of a compact set. *Comptes Rendus Mathematique*, Volume 354, Issue 3, March 2016, Pages 307–311, ISSN 1631-073X.
- [4] A. Altavilla. On the real differential of a slice regular function. *Adv. Geom.* 18 (2018), no. 1, 5–26.
- [5] A. Altavilla. Twistor Interpretation of Slice Regular Functions, *Journal of Geometry and Physics* 123C (2018) pp. 184–208, <https://doi.org/10.1016/j.geomphys.2017.09.007>.
- [6] A. Altavilla, C. de Fabritiis. s-Regular Functions which Preserve a Complex Slice, *Annali di Matematica Pura e Applicata*, Vol. 197, N. 4, p. 1269–1294, 2018. <https://doi.org/10.1007/s10231-018-0724-1>.
- [7] A. Altavilla, C. de Fabritiis. *-Exponential of Slice Regular Functions, *Proceedings of the American Mathematical Society*, Vol. 147, p. 1173–1188, 2019.
- [8] A. Altavilla, E. Ballico. Twistor lines on algebraic surfaces, to appear in *Annals of Global Analysis and Geometry*, <https://doi.org/10.1007/s10455-018-9640-2>.

- [9] A. Altavilla, G. Sarfatti. Slice-Polynomial Functions and Twistor Geometry of Ruled Surfaces in \mathbb{CP}^3 , to appear in *Mathematische Zeitschrift*, <https://doi.org/10.1007/s00209-018-2225-8>.
- [10] A. Altavilla, C. Bisi. Log-Biharmonic and a Jensen Formula in the Space of Quaternions, *Annales Academiae Scientiarum Fennicae - Mathematica*, 2019 (44) 2, <https://doi.org/10.5186/aasfm.2019.4447>.
- [11] A. Altavilla, E. Ballico, Three topological results on the twistor discriminant locus in the 4-sphere, to appear in *Milan Journal of Mathematics*, <https://doi.org/10.1007/s00032-019-00292-5>.
- [12] A. Altavilla, E. Ballico, Algebraic surfaces with infinitely many twistor lines, to appear in *Bulletin of the Australian Mathematical Society*.
- [13] A. Altavilla, H. De Bie, M. Wutzig, Implementing zonal harmonics with the Fueter principle, *submitted*, preprint available at [arXiv:1903.08914](https://arxiv.org/abs/1903.08914).
- [14] A. Altavilla, L. Arosio, L. Guerini, Canonical models on strongly pseudoconvex domains via the squeezing function, *in preparation*.

Esperienze all'estero

- 1/2019 – 4/2019 Ospitato da *Ghent University*. Supervisor: Prof. **Hendrik De Bie**.
- 1/2018 – 3/2018 Ospitato da *Ghent University*. Supervisor: Prof. **Hendrik De Bie**.
- 4/2014 – 5/2014 Ospitato da *King's College London*. Supervisor: Prof. **Simon Salamon**.
- 18/06/2012 - 6/07/2012 Institut Fourier Grenoble (France). Summer school "Foliations, Pseudoholomorphic curves, Applications".

Esperienze didattiche

- 09/2018 - 01/2019
Titolare del corso "**Geometria (BIO)**" (6 CFU; 48 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Biomedica".
- 10/2016 - 01/2017
Titolare del corso "**Geometria (CA)**" (9 CFU; 72 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Civile e Ambientale".
- 10/2016 - 01/2017
Esercitatore per il corso "**Geometria (MECC) (A/L)**" (9 CFU; 20 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Meccanica"; docente responsabile prof. **Chiara de Fabritiis**.
- 10/2015 - 01/2016
Esercitatore per il corso "**Geometria (CA)**" (9 CFU; 20 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Civile e Ambientale"; docente responsabile dr. **Maria Chiara Brambilla**.
- 10/2015 - 01/2016
Esercitatore per il corso "**Geometria (EL)**" (6 CFU; 20 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Elettronica"; docente responsabile prof. **Chiara de Fabritiis**.
- 10/2015 - 01/2016
Esercitatore per il corso "**Algebra Lineare e Geometria**" (6 CFU; 20 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Informatica e dell'Automazione"; docente responsabile prof. **Chiara de Fabritiis**.
- 10/2015 - 01/2016
Esercitatore per il corso "**Geometria (MECC) (A/L)**" (9 CFU; 20 ore frontali), Facoltà di Ingegneria, Università Politecnica delle Marche; Laurea Triennale in "Ingegneria Meccanica"; docente responsabile dr. **Agnese Telloni**.

8. 02/2015 - 09/2015
Tutor per il corso “**Analisi matematica 2**” (9 CFU; 20 ore), Dipartimento di Matematica, Università di Trento; docente responsabile: prof. **Silvano Delladio**.
9. 10/2014 - 09/2015
Esercitatore per il corso “**Geometria 1**” (9 CFU; 90 ore frontali), Dipartimento di Fisica, Università di Trento; docente responsabile: prof. **Claudio Fontanari**.
10. 09/2014 - 01/2015
Tutor per il corso “**Analisi matematica 2**” (9 CFU; 60 ore), Dipartimento di Ingegneria Civile, Ambientale e Meccanica, Università di Trento; docente responsabile: prof. **Gabriele Anzellotti**.
11. 10/2013 - 2/2014
Tutor per il corso “**Analisi matematica 2**” (9 CFU; 50 ore), Dipartimento di Ingegneria Civile, Ambientale e Meccanica, Università di Trento; docente responsabile: prof. **Gabriele Anzellotti**.
12. 9/2012 - 12/2012
Esercitatore per il corso “**Analisi 3**” (9 CFU; 18 ore frontali), corso di laurea in Matematica, Facoltà di Scienze, Università di Trento; docente responsabile : prof. **Gabriele Anzellotti**.
13. 9/2012 - 12/2012
Tutor per il corso “**Analisi matematica con elementi di algebra**” (9 CFU; 50 ore), corso di laurea in Interfaces and Communication Technology and Science and Technology of Cognitive Psychology, Facoltà di Scienze Cognitive, Università di Trento; docente responsabile: prof. **Anneliese Defranceschi**.
14. 9/2010 - 6/2011
Esercitatore per il corso “**Geometry 2**” (12 CFU; 30 ore frontali), corso di laurea in Matematica, Facoltà di Scienze, Università di Parma; docente responsabile: dr. **Fabio Zuddas**.
15. 9/2009 - 6/2010
Tutor per il corso “**Laboratory of Mathematics**” (12 CFU, 2 moduli: analisi, algebra e geometria; 150 ore), corso di laurea in Tecniche delle Costruzioni, Facoltà di Architettura, Università di Parma; docente responsabile: dr. **Fiorenza Morini**.

Seminari e contributi orali presso conferenze (internazionali)

1. 15/02/2019 “*Implementing zonal harmonics with Fueter theorem*” – Ghent University – (Ghent, Belgium).
2. 08/01/2019 “*Spazi di twistor algebrici*” – Università Politecnica delle Marche – (Ancona, Italy).
3. 06/09/2018 “*Nuove tecniche nella teoria degli spazi di twistor (algebrici)*” – During the conference: “Workshop Ipercomplesso TN018”, Università degli Studi di Trento – (Trento, Italy).
4. 18/06/2018 “*Slice regularity and twistor geometry*” – During the conference: “JADE @ Bicocca 2018”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
5. 15/05/2018 “*Il problema dell’esponenziale per funzioni regolari quaternioniche*” – Università degli Studi di Trento – (Trento, Italy).
6. 26/01/2018 “*More on Slice Regularity – Around Harmonicity*” – Ghent University – (Ghent, Belgium).
7. 22/01/2018 “*New techniques in slice regularity*” – Ghent University – (Ghent, Belgium).
8. 20/12/2017 “*Analisi e geometria usando i quaternioni*” – Università di Roma 2, Tor Vergata – (Roma, Italy).
9. 05/12/2017 “*Slice polynomials and twistor geometry of ruled surfaces in $\mathbb{C}\mathbb{P}^3$* ” – Università degli Studi di Trento – (Trento, Italy).
10. 24/10/2017 “*Un’introduzione all’angolo quaternionale*” – Università degli Studi “Gabriele d’Annunzio” – (Pescara, Italy).
11. 05/04/2017 – 07/04/2017 “*A quaternionic analogous of linear non-squeezing theorem.*” – During the conference: “Differential Geometry Days”; Dipartimento di matematica “G. Peano”, Università di Torino (Italy).

12. 08/10/2016 – 11/10/2016 “*Log-biharmonic and a Jensen formula in the space of quaternions*” – During the conference: “Recent Progress in Real and Complex Geometry - X”; C.I.R.M. Levico Terme, Trento (Italy).
13. 01/12/2015 “*Misura dell’ombra di un insieme compatto trasformato da un’ applicazione quaternionale unitaria*” – During the conference: “Hypercomplex analysis and geometry”; Dipartimento di Matematica e Informatica, Università degli Studi di Ferrara (Italy).
14. 23/01/2015 “*Strutture complesse ortogonali e funzioni slice regolari*” – During the conference: “Incontro Nazionale di Analisi Ipercomplessa”; Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Italy).
15. 24/04/2015 “*On the singular set of a slice regular function.*” – Dipartimento di Matematica, Politecnico di Milano (Milano, Italy).
16. 21/10/2014 – 24/10/2014 “*Funzioni quaternioniche slice-regolari che non si estendono a \mathbb{R} .*” – During the conference: “Progressi recenti in geometria reale e complessa”; C.I.R.M. Levico Terme, Trento (Italy).
17. 14/07/2014 – 18/07/2014 “*On the real differential of a slice regular function.*” – During the conference: “30th International Colloquium on Group Theoretical Methods in Physics”; Ghent University (Belgium).
18. 23/06/2014 – 27/06/2014 “*On the real differential of a slice regular function: a “contact” aspect of complex and algebraic geometry via quaternionic functions*” – During the conference: “Asymptotic aspects of complex and algebraic geometry”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
19. 16/06/2014 – 20/06/2014 “*The real differential of a slice regular function.*” – During the conference: “Complex Geometry and Lie Groups”; Dipartimento di matematica “G. Peano”, Università di Torino (Italy).
20. 17/12/2013 “*Una forma esplicita dei coefficienti sferici e del differenziale reale di una funzione slice regolare.*” – Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Firenze, Italy).
21. 05/08/2013 - 09/08/2013 “*Some properties for slice regular functions on circular domains without real points*” – During the conference: “9th International ISAAC Congress” session “CLIFFORD AND QUATERNION ANALYSIS”; Pedagogical University Krakow (Poland).
22. 02/05/2013 “*Alcune proprietà delle funzioni slice regolari su domini privi di punti reali.*” – Dipartimento di Matematica e Informatica, Università di Parma (Italy)
23. 30/04/2013 “*Alcune proprietà delle funzioni slice regolari su domini privi di punti reali.*” – Seminari dei Baby-Geometri (http://www.dm.unipi.it/~angella/doku.php?id=seminario_dei_baby-geometri_2012_2013) 2012/2013 - Pisa (Italy).
24. 21/03/2013 – 23/03/2013 “*Some properties for slice-regular functions on circular domains without real points*” – During the conference: “New Approaches to HyperComplex Analysis and Geometry”; I.C.T.P. Grignano, Trieste (Italy).
25. 21/09/2012 “*Spazi vettoriali quaternionali e deviazione (pseudo) - caratteristica.*” – Dipartimento di Matematica, Università di Trento (Italy).
26. 24/07/2012 “*Alcuni aspetti della teoria del differenziale di Clarke.*” – Dipartimento di Matematica, Università di Trento (Italy).
27. 31/05/2012 “*Gruppi di ologonomia.*” Informal seminar for the PhD school – Dipartimento di Matematica, Università di Trento (Italy).
28. 09/01/2012 – 12/01/2012 “*KdV generalizzate e proprietà di Painlevé per potenziali algebro-geometrici*”- During the conference: “Seminario degli ex-studenti di Matematica di Parma” – Dipartimento di Matematica e informatica, Università di Parma (Italy).

Partecipazioni a scuole e conferenze (internazionali)

1. 06/09/2018 – 07/09/2018 “Workshop Ipercomplesso TN018”; Università degli Studi di Trento – (Trento, Italy).
2. 09/07/2018 – 13/07/2018 CIME School “Complex non-Kähler geometry”; Cetraro, CS (Italy).
3. 18/06/2018 “JADE @ Bicocca 2018”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
4. 09/05/2018 – 10/05/2018 “Introduction to Hodge structures and Grothendieck’s standard conjectures”, held by Claire Voisin; Trento (Italy).
5. 07/09/2017 – 08/09/2017 “Quaternioni sul Conero”; Ancona (Italy).
6. 07/08/2017 – 11/08/2017 “ICCA 11”; Ghent University (Belgium).
7. 11/06/2017 – 15/06/2017 “Complex Analysis and Geometry - XXIII”; C.I.R.M. Levico Terme, Trento (Italy).
8. 30/04/2017 – 06/05/2017 SMI course “Kaehler-Einstein metrics”; Palazzone della Scuola Normale Superiore, Cortona (AR, Italy).
9. 05/04/2017 – 07/04/2017 “Differential geometry days”; Dipartimento di matematica “G. Peano”, Università di Torino (Italy).
10. 26/01/2017 – 28/01/2017 “Perspectives in geometry”; Università degli Studi di Firenze (Italy).
11. 08/10/2016 – 1/10/2016 “Recent Progress in Real and Complex Geometry - X”; C.I.R.M. Levico Terme, Trento (Italy).
12. 11/07/2016 – 15/07/2016 “Differential geometry in the large”; Università degli Studi di Firenze (Italy).
13. 29/05/2016 – 17/06/2016 “Spring 2016 School - INdAM Intensive Period Hypercomplex Function Theory and Applications”; Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Italy).
14. 20/04/2016 – 22/04/2016 “Special Hermitian metrics on non-Kähler manifolds”; Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Italy).
15. 25/02/2016 – 26/02/2016 “Complex Geometry BiDay”; Dipartimento di Matematica e Informatica, Parma (Italy).
16. 21/01/2016 – 23/01/2016 “Workshop su varietà reali e complesse: geometria, topologia e analisi armonica”; Scuola Normale Superiore, Pisa (Italy).
17. 01/12/2015 “Hypercomplex analysis and geometry”; Dipartimento di Matematica e Informatica, Università degli Studi di Ferrara (Italy).
18. 16/11/2015 – 20/11/2015 “New perspective in differential geometry”; INdAM, Roma (Italy).
19. 01/06/2015 – 05/06/2015 “Complex Analysis and Geometry - XXII”; C.I.R.M. Levico Terme, Trento (Italy).
20. 23/03/2015 – 28/03/2015 “Komplex Analysis Weeklong School-KAWA 6”; Centro De Giorgi, Pisa (Italy).
21. 05/03/2015 – 07/03/2015 “Terzo workshop su varietà reali e complesse: geometria, topologia e analisi armonica”; Scuola Normale Superiore, Pisa (Italy).
22. 23/02/2015 – 26/02/2015 “A workshop in memory of our colleague and friend Sergio Console”; Dipartimento di matematica “G. Peano”, Università di Torino (Italy).
23. 23/01/2015 “Incontro Nazionale di Analisi Ipercomplessa”; Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Italy).
24. 21/10/2014 – 24/10/2014 “Progressi recenti in geometria reale e complessa”; C.I.R.M. Levico Terme, Trento (Italy).

25. 14/10/2014 – 16/10/2014 “Modular forms and differential equations: an introduction”; school by Prof. Don Zagier; Università di Trento (Italy).
26. 18/09/2014 - 20/09/2014 “New trends in differential geometry”; Villasimius, Cagliari (Italy).
27. 14/07/2014 – 18/07/2014 “30th International Colloquium on Group Theoretical Methods in Physics”; Ghent University (Belgium).
28. 23/06/2014 – 27/06/2014 “Asymptotic aspects of complex and algebraic geometry”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
29. 16/06/2014 – 20/06/2014 “Complex Geometry and Lie Groups”; Dipartimento di matematica “G. Peano”, Università di Torino (Italy).
30. 02/06/2014 – 04/06/2014 “A conference in honor of Pierre Dolbeault”; Université Pierre et Marie Curie, Paris 6 (France).
31. 09/05/2014 “Geometry day V”; Department of Mathematics, King’s College London (England).
32. 22/04/2014 “Celebrating Michael Atiyah”; Mathematical Institute, University of Oxford (England).
33. 24/02/2014 - 27/02/2014 “Carnival differential geometry school”; Dipartimento di Matematica “G. Peano”, Università di Torino (Italy).
34. 20/02/2014 – 22/02/2014 “Secondo workshop su varietà reali e complesse: geometria, topologia e analisi armonica”; Scuola Normale Superiore, Pisa (Italy).
35. 23/10/2013 – 25/10/2013 “Incontro del progetto FIRB 2012-Geometria Differenziale e Teoria Geometrica delle Funzioni”; Dipartimento di Matematica e Informatica “Ulisse Dini”, Università degli Studi di Firenze (Italy).
36. 05/08/2013 – 09/08/2013 “9th International ISAAC Congress” session “CLIFFORD AND QUATERNION ANALYSIS”; Pedagogical University Krakow (Poland).
37. 03/06/2013 – 07/06/2013 “Complex Analysis and Geometry - XXI”; C.I.R.M. Levico Terme, Trento (Italy).
38. 27/05/2013 – 31/05/2013 “Advanced School and Workshop in Real and Complex Dynamics” I.C.T.P. Grignano, Trieste (Italy).
39. 21/03/2013 – 23/03/2013 “New Approaches to HyperComplex Analysis and Geometry”; I.C.T.P. Grignano, Trieste (Italy).
40. 28/02/2013 – 03/03/2013 “Workshop su varietà reali e complesse: geometria, topologia e analisi armonica”; Scuola Normale Superiore, Pisa (Italy).
41. 15/10/2012 – 19/10/2012 “Progressi recenti in geometria reale e complessa”; C.I.R.M. Levico Terme, Trento (Italy).
42. 18/06/2012 – 6/07/2012 “Foliations, Pseudoholomorphic curves, Applications”; Institut Fourier Grenoble (France).
43. 10/05/2012 – 11/05/2012 “Geometria in Bicocca 2012”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
44. 09/01/2012 – 12/01/2012 “Seminario degli ex-studenti di Matematica di Parma” - Dipartimento di Matematica e informatica, Università di Parma (Italy).
45. 12/05/2011 – 13/05/2011 “Geometria in Bicocca 2011”; Dipartimento di matematica e applicazioni, Università degli Studi di Milano Bicocca (Italy).
46. 4/04/2011 – 8/04/2011 “Ricci solitons days”; Centro di ricerca matematica Ennio De Giorgi, Pisa (Italy).

Organizzazione di Conferenze

- Membro del comitato organizzatore del workshop “Quaternioni sul Conero II”, Università Politecnica delle Marche, Ancona, Italy, 12–13 Settembre 2019.
- Membro del comitato organizzatore del workshop “Seminario degli Ex-Studenti” – 3^a edizione, Università di Parma, Parma, Italy, 8–9 Gennaio 2018.
- Membro del comitato organizzatore del workshop “Quaternioni sul Conero”, Università Politecnica delle Marche, Ancona, Italy, 7–8 Settembre 2017.

Partecipazione a gruppi scientifici

- 11/2017 – Attualmente in essere
Collaboratore del progetto SIR2014 “Analytic aspects in complex and hypercomplex geometry”, principal investigator: Prof. Daniele Angella.
- 01/2017 – Attualmente in essere
Collaboratore del progetto SIR2014 “New methods in holomorphic iteration”, principal investigator: Dr. Leandro Arosio.
- 12/2018 – Attualmente in essere
Socio UMI.
- 01/2012 – Attualmente in essere
Membro del gruppo di ricerca GNSAGA of INdAM.
- 10/2013 – 12/2017
Membro del gruppo di ricerca FIRB 2012 “Geometria Differenziale e Teoria Geometrica delle Funzioni”, principal investigator: Dr. Caterina Stoppato.

Attività di *peer review*, revisione ed altro

- Referee per le riviste “Complex Analysis and Operator Theory”, “Proceedings of the American Mathematical Society”, “Advances in Applied Clifford Algebras”.
- Reviewer per “Zentralblatt MATH (zbMATH)”.
- Reviewer per “CittàStudiEdizioni–DeAgostini Scuola” for the book “A. Bernardi, A. Gimigliano, Algebra lineare e geometria, CittàStudiEdizioni, 2014”.
- 09/2012 – 12/2014
Rappresentante degli studenti di dottorato di Matematica, Università di Trento.

Esperienze non accademiche

1. 11/2012 - 04/2013
Collaboratore del progetto “MathEnJeans”. Descrizione in inglese: the collaboration consisted into a coordination of two high school classes in a mathematical research project. My role was to introduce the problem and help in the organization of the work (including a final presentation).
<http://www.mathenjeans.it/>
2. 4/2010
Guida per la mostra “Domus Archimedeae”, evento tenutosi a Parma facente parte di “Parma Scienza”; datore di lavoro: associazione “Parma Casa della Scienza” (www.casadellascienza.it, www.parmascienza.it).

Ancona, April 18, 2019

Amedeo Altavilla