

CURRICULUM VITAE ET STUDIORUM

- Name and Surname: FABIO VLACCI
- Born in Trieste (ITALY) on June, 9th 1969
- Addresses:
via Goito, 13, 50133 FIRENZE
via Pietà, 39 34142 TRIESTE
- Email: `vlacci@math.unifi.it`
- Current position: Associate Professor in Mathematics (Geometry) at the Math Department “U. Dini” of the University of Florence (Italy) and (temporary) position at the Mathematics Section of the International Centre for Theoretical Physics “Abdus Salam” (ICTP), Trieste, for the Post Graduate Diploma Programme in Mathematics.
- Previous positions: “Ricercatore” (Assistant Professor) Full-time position in Mathematics (Geometry) at the Math Department “U. Dini” of the University of Florence (Italy) since 1997

DEGREES

- “Laurea” in Mathematics (15/3/1993) at the University of Trieste under the supervision of Prof. Graziano Gentili.
- PHD in Functional Analysis and Applications – Activity of Geometry (27/11/1997) at International School for Advanced Studies – Scuola Internazionale Superiore di Studi Avanzati (S.I.S.S.A) in Trieste. Title of the Dissertation
“Iteration theory and commuting holomorphic maps”.
Supervisors: Prof. G. Gentili and Prof. E. Vesentini.

MAJOR RESEARCH FIELDS

Complex Dynamics, Geometric Properties of Conformal and Regular Functions, Rigidity properties of Conformal and Regular Functions, Boundary behaviour of Conformal and Regular Functions. Hypercomplex Analysis and Geometry. Quaternionic Geometry and Dynamics.

OTHER SCHOOLS

- Summer School in Mathematics organized by S. M. I. (Scuola Matematica Interuniversitaria) in Perugia (25/7– 28/8/1993) in Differential Geometry (Prof. F. Mercuri) and Algebraic Geometry (Prof. R. Varley)
- Summer School in Mathematics organized by S. M. I. (Scuola Matematica Interuniversitaria) in Cortona (30/7– 20/8/1996) in Complex Analysis (Prof. M. Abate e Prof. E. L. Stout)
- Workshop (10–15/5/1999) organized by Scuola Normale Superiore di Pisa in “Continuous and discrete Holomorphic Dynamics”
- C.I.M.E. Course in “Real methods in Complex and CR Geometry”, Martina Franca (30/6 – 6/7/2002)
- “The International Summer School in Several Complex Variables”, Szczyrk (Poland), 19–23/6/2006
- C.I.R.M. Course “Rigidity in dynamics and geometry”, Luminy (France), 21–25/5/2007
- “School in Several Complex Variables”, Ljubljana (Slovenia), September 2012

TALKS AND CONFERENCES GIVEN AS INVITED SPEAKER

- “Iteration and commuting analytic maps in the unit disk Δ ” al Convegno INDAM su “Invariant metrics and questions related to differential geometry and complex analysis” Cortona, 26–30/4/1993

- “Commutazione di funzioni olomorfe nel disco unitario di \mathbb{C} ” at Scuola Normale Superiore di Pisa, 16/3/1995
- “Iterazione e commutazione di funzioni olomorfe nel disco unitario di \mathbb{C} ” at the Maths Department Ulisse Dini, Firenze, 26/5/1995
- “La ricerca in Matematica come professione” at the Maths Department of Trieste, May 1999
- “Principi d’Identità per funzioni olomorfe del disco che commutano” at the Maths Department Ulisse Dini, Firenze, 22/6/1999
- “Rigidity at the boundary for holomorphic self–maps of the unit disc” at INDAM Conference on “Complex Dynamics and Geometry” Cortona, 5–9/6/2000
- “Rigidity at the boundary for holomorphic self–maps of the unit disc” at the Maths Department of Padova, 12/12/2000
- “Un nuovo concetto di rigore matematico”, Settimana della Scienza, Firenze, March 2001
- “Su alcuni risultati di rigidità al bordo di funzioni olomorfe” at the Maths Department University of Roma — Tor Vergata, 18/4/2002
- “Rigidity results for holomorphic maps” UBA – Buenos Aires, 17/12/2002
- “Proprietà caratterizzanti di tipo geometrico-analitico al bordo per funzioni olomorfe” at the Department of Mathematics and Computer Science of the University of Trieste, 20/4/2005
- “La Matematica come strumento antitruffa” at the High School “G. Oberdan” in Trieste, 19/5/2005
- “Caratterizzazione geometrica di funzioni analitiche univalenti” at the Department of Mathematics and Computer Science of the University of Trieste, 15/5/2006
- “Alcuni risultati sugli zeri di funzioni regolari sui numeri di Cayley e di Hamilton” at the Maths Department of the University of Calabria (Arcavacata - COSENZA), 20/10/2006

- “Su una versione del Teorema Fondamentale dell’Algebra per i numeri di Hamilton e di Cayley” XVIII U.M.I. (Unione Matematica Italiana) Congress, Bari, 24/9/2007
- “Mappe Regolari su \mathbb{H} e \mathbb{O} ” at the Department of Mathematics and Computer Science of the University of Trieste, 5/10/2007
- “Alcuni risultati su zeri e punti critici di polinomi in \mathbb{C} ”, at the Maths Department “U. Dini” of the University of Firenze, 25/1/2008
- “Proprietà geometriche e sottolivelli di Busemann del polidisco simmetrizzato”, at the Maths Department “U. Dini” of the University of Firenze, 31/3/2008
- “Some results (on the zero sets) of regular functions of hypercomplex variable”, SISSA, Trieste, 4/2/2009
- “Rigidity Results for Regular Functions”, Naharia (Israel), Complex Analysis & Dynamical Systems IV, May 2009
- “Some Results on Multiplicities of Zeroes and Poles for Regular Functions ” Imperial College, London, ISAAC 2009, 16/7/2009
- “Zero sets for regular functions of hypercomplex variables”, ICTP, Trieste, 29/1/2010
- “First Steps towards Dynamics for Slice Regular Functions” 18th IC-FIDCAA Congress, Macau SAR, (China), August 2010
- “A reinterpretation of the definition of Slice Regular Functions ” INdAM Workshop, Rome (Italy), September 2010.
- “A new approach to quaternionic dynamics for slice regular functions” Complex Analysis & Dynamical Systems V, Akko (Israel), May 2011
- “Some results on fixed points for regular functions”, ICCA9 Weimar (Germany) July 2011
- “Un approccio alla composizione e iterazione di funzioni slice regolari”, Workshop di Analisi Ipercomplessa, Trento, December 2011

- “Introduction to basic properties of a new class of regular functions of (hypercomplex) quaternionic variable”, Famnit, UPR, Koper (Slovenia), May 2012
- “A new approach to Quaternionic Dynamics for Slice-Regular Functions”, “ICTP-ESF School and Conference in Dynamical Systems”, ICTP, Trieste, June 2012
- “On the zero sets of regular functions over quaternions”, 9th ICNPAA Conference, TU, Wien (Austria), July 2012
- “New developments in the theory of slice-regular functions”, Fakulteta za matematiko in fiziko, Univerza v Ljubljani, Ljubljana (Slovenia), November 2012
- “From Complex to HyperComplex Analysis”, AlbertoFest, Universidad Nacional Autónoma de México, UNAM Cuernavaca (Mexico) January 2013
- “On a decomposition of some subgroups of quaternionic transformations” Workshop “Non-commutative Algebras and Applications Goslar (Germany) June 2015
- ”Some properties of subgroup actions of quaternionic transformations” Workshop “Hypercomplex Analysis and Geometry” Ferrara, December 2015
- “Discrete Actions over the Hyperbolic Quaternionic Space”, Famnit, UPR, Koper (Slovenia), March 2016

VISITS IN FOREIGN INSTITUTION

- Visiting Professor at the Department of Mathematics of the State University of New York (SUNY) at Stony Brook for the entire academic year 1996/1997
- Visiting Lecturer for a Minicourse in Complex and HyperComplex Analysis at the Univerza na Primorskem (University of Primorska), Koper–Capodistria, Slovenia (April 2014). (within the agreement for the Teaching Staff Mobility of Lifelong Learning Programme in Higher Education (ERASMUS))
- Visiting Fellow at the Instituto de Matemáticas, Universidad Nacional Autónoma de México, UNAM, Unidad de Cuernavaca (Mexico) (Summer 2014)

Fabio Vlacci has been long-term visitor and Lecturer in Complex Analysis for the PostGraduate Diploma Course at the Math Group of the International Center for Theoretical Physics “A. Salam” (ICTP) since 2010.

LANGUAGES:

- Italian (mothertongue)
- English
- Russian (basic)

TEACHING ACTIVITY:

The applicant has a long experience in teaching for undergraduate courses in Linear Algebra, Calculus, Differential Geometry, Real Analysis, Probability and Statistics especially for students enrolled in studies of Chemistry, Computer Science, Natural Sciences, Pharmacy and Earth Sciences.

In particular a dedicated three-volume collection in Mathematics for Earth Science Students and Experts¹

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- Metodi matematici e statistici nelle scienze della terra. Volume primo. Argomenti Istituzionali (with Antonella Buccianti and Fabio Rosso) Liguori Editore, Napoli

has been written (in collaboration) by the applicant; another text-book (“Istituzioni di Matematica: problemi svolti, esercizi e test” (with Fabio Rosso) Pitagora Editrice srl, Bologna 1999) was written for a wider class of undergraduate students from the experience of having given such courses for more than 10 years.

Furthermore, Fabio Vlacci gave postgraduate courses in Differential Geometry, Topology, Algebraic Topology, Complex Analysis in one and in several complex variables. Minicourses in Riemannian Geometry, Modular Functions, Chaos and strange attractors, Fuzzy Logic.

Finally the applicant supervised several theses in Mathematics, mainly in the area of Complex Differential Geometry and Dynamics; some of the theses brought new research results (published in collaboration with the students, see [6], [7], [9] in the list of publications).

Other supervised theses are “experiments” of new topics in modern Mathematics brought to the attention of High School teachers and taught to High School students as a complementary part of their studies. They mainly focussed on Fractals, Mathematics and Music, Geometry of Curves and Surfaces, Topology.

OTHER ACTIVITIES

Referee for *Rivista di Matematica della Università di Parma*, *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* *Rendiconti del Seminario Matematico-Universit e Politecnico di Torino* *Computers and Mathematics with Applications*, *Complex Variables and Elliptic Equations* and *Transactions of the American Mathematical Society*

Member of EMS and UMI.

Member for the Faculty Commission on Teaching and Research (2005) at the University of Florence.

Lecturer for an advanced course in Complex Analysis for the Postgraduate

2000

- Metodi matematici e statistici nelle scienze della terra. Volume secondo. Sviluppi e applicazioni (with Antonella Bucciante and Fabio Rosso) Liguori Editore, Napoli 2001
- Metodi matematici e statistici nelle scienze della terra. Volume terzo. Tecniche Statistiche (with Antonella Bucciante and Fabio Rosso) Liguori Editore, Napoli 2003

Diploma Course at ICTP

Selected Researcher in Selection Procedure: EPSO/CAST/S/5/2013 - Researcher (FG IV) Quantitative Sciences by European Personnel Selection Office (EPSO)

Furthermore Fabio Vlacci has participated and contributed to the administration of many Italian National Grants and has been

- scientific responsible of a National Grant “Progetto Giovani Ricercatori” (2001);
- local organizer, scientific committee member and financial responsible for the INdAM Workshop-ICTP Co Hosted Activity (H329) “New Approaches to HyperComplex Analysis and Geometry” held at ICTP in March 2013
(see <http://www.math.unifi.it/users/vlacci/ictp-2013/menu.htm>) and supported by Gruppo Nazionale Strutture Algebriche Geometriche e loro Applicazioni (GNSAGA) of Istituto Nazionale di Alta Matematica (INdAM) “F. Severi”;
- scientific director during the visit of Juan Pablo Diaz González (May-June 2013), which has been funded by Gruppo Nazionale Strutture Algebriche Geometriche e loro Applicazioni (GNSAGA) of Istituto Nazionale di Alta Matematica (INdAM) “F. Severi”;
- Contact person for the Bilateral Agreement in Mathematics of the Lifelong Learning Programme in Higher Education (ERASMUS) between Univerza na Primorskem (University of Primorska), Koper–Capodistria, Slovenia and Università di Firenze (University of Florence), Florence–Firenze, Italy.

SHORT DESCRIPTION OF THE MAJOR SCIENTIFIC RESULTS:

Fabio Vlacci has started his research activity in Complex Dynamics and has recently focused his interests on the Theory of functions of hypercomplex variable, he can combine the techniques of the two major fields of his research; a concrete example of a possible fruitful interaction of the two points of view is represented by the paper [11] where, starting from some classical results in Complex Dynamics (like the Julia-Wolff-Caratheodory Theorem, a boundary version of Schwarz’ Lemma) and after obtaining interesting geometric

properties on boundary behavior of holomorphic maps (which appeared in [4], [5] and [6]) their adaptations to the hypercomplex case turn out to be extremely powerful and play the key role in the Hypercomplex setting.

Similarly in [10], using only topological tools and following the main idea of one of the proofs by Gauss, a unified and somehow universal version of the celebrated result is obtained in the general setting of Quaternions and Octonions which clearly also applies to the Complex case. The study of zeros of polynomials (and of functions) gave important tools for other new results, such as the ones in [15] which generalize the analogous results for holomorphic polynomial in the hypercomplex setting and in [13], where the notions of (generalized) index and logarithmic derivative of a slice-regular function are introduced. Other extensions or generalizations of known results in Complex Analysis are expected.

RECENT PAPERS
BY FABIO VLACCI

1. *Pseudo-iteration semigroups and commuting holomorphic maps.*, (with Graziano Gentili) *RENDICONTI DELL'ACCADEMIA NAZIONALE DEI LINCEI - Classe di Scienze Matematiche, Fisiche e Naturali - Serie IX* Volume V, pp. 33–42 (1994)
2. *On commuting holomorphic maps in the unit disc of \mathbb{C} .*, *COMPLEX VARIABLES: THEORY AND APPLICATIONS*, vol. **30**, pp. 301–313 (1996)
3. *Iteration theory in hyperbolic domains*, *JOURNAL D'ANALYSE MATHÉMATIQUE*, vol. **74**, pp. 51–66 (1998)
4. *Rigidity at the boundary for holomorphic self-maps of the unit disk*, (with Roberto Tauraso) *COMPLEX VARIABLES: THEORY AND APPLICATIONS*, vol. **45**, pp. 151–165 (2001)
5. *Identity principles for commuting holomorphic self-maps of the unit disc*, (with Filippo Bracci e Roberto Tauraso) *JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATION*, vol. **270**, pp. 451–473 (2002)
6. *A new rigidity result for holomorphic maps* (with Serena Migliorini) *INDAGATIONES MATHEMATICAE*, vol. **13** (4), pp. 537–549 (2002)
7. *Some remarks on Schwarz–Cristoffel transformations from the unit disk to a regular polygon and their numerical computation*, (with Damiano Bonciani), *COMPLEX VARIABLES: THEORY AND APPLICATIONS*, vol. **49** (4), pp.271–284 (2004)
8. *Some remarks on rigidity results for holomorphic maps of domains in \mathbb{C}^n* , *Quaderni di Matematica del Dipartimento di Scienze Matematiche dell'Università degli Studi di Trieste, II serie*, n. 550 (2004).
9. *The Fundamental Theorem of Algebra for Hamilton and Cayley numbers* (with G. Gentili and D.C. Struppa), *MATHEMATISCHE ZEITSCHRIFT*, **259**, pp. 895–902, (2008)

10. *A survey on geometric properties of holomorphic self-maps in some domains of \mathbb{C}^n* , (with C. Frosini) ANNALES POLONICI MATHEMATICI (Proceedings of the Conference in Szczyrk), vol. **91** (2–3), pp. 197–217, (2007)
11. *Rigidity for regular functions over Hamilton and Cayley numbers and a boundary Schwarz' Lemma* (with G. Gentili) INDAG. MATH. (N.S.), 19(4) (2008), 535-545
12. *A survey on recent results for the new theory on regular functions on Hamilton, Cayley and Clifford Algebras* (with G. Gentili, C. Stoppato e D.C. Struppa) *Hypercomplex Analysis*, TRENDS IN MATHEMATICS, pp. 165-186, Birkhauser, Basel (2009)
13. *The Argument Principle for Slice-Regular Functions*, MICH. MATH. J. **60**, pp. 67-77 (2011)
14. *On fixed points of slice regular quaternionic Moebius transformations*, (with G. Gentili) **Contemporary Mathematics**, **553**, pp. 75-82 (2011)
15. *The Gauss Lucas Theorem for Quaternionic Regular Polynomials*, Hypercomplex Analysis and its Applications, TRENDS IN MATHEMATICS, pp. 275-282, Birkhauser, Basel (2011)
16. *A Julia's Lemma for the symmetrized bidisc G_2* , (con C. Frosini), COMPLEX VARIABLES AND ELLIPTIC EQUATIONS **57** (10), pp. 1121–1134 (2012).
17. *Regular Composition for Slice-Regular Functions of Quaternionic Variable*, ADVANCES IN HYPERCOMPLEX ANALYSIS, Springer INDAM Series 1, Springer-Verlag pp. 141–148 (2013).
18. *A survey on quasiconformal functions with application to the case of functions of hypercomplex variable* CONTEMPORARY MATHEMATICS **667** pp. 279–297 (2016)
19. *Vieta Formula for Regular Polynomials of Quaternionic Variable*, to appear in ADVANCES IN GEOMETRY

20. *Starlikeness for Functions of HyperComplex Variable* (with A. Gori) to appear in PROC. AMER. MATH. SOC.

PREPRINT ALREADY SUBMITTED FOR PUBLICATION

1. *Quaternionic Kleinian Modular Group and Arithmetic Hyperbolic Orbifolds over the Quaternions* (with J.P. Diaz González and A.S. Verjovsky) arXiv: 1503.07214

OTHER PREPRINTS

1. *Regularized Iteration for a Class of Regular Functions over Quaternions*
2. *Continuous semigroups and infinitesimal generators in the symmetrized bidisc \mathbb{G}_2* , (with C. Frosini)

BOOKS

1. **Istituzioni di Matematica: problemi svolti, esercizi e test** (with Fabio Rosso) Pitagora Editrice srl, Bologna 1999
2. **Metodi matematici e statistici nelle scienze della terra. Volume primo. Argomenti Istituzionali** (with Antonella Bucciante and Fabio Rosso) Liguori Editore, Napoli 2000
3. **Metodi matematici e statistici nelle scienze della terra. Volume secondo. Sviluppi e applicazioni** (with Antonella Bucciante and Fabio Rosso) Liguori Editore, Napoli 2001
4. **Metodi matematici e statistici nelle scienze della terra. Volume terzo. Tecniche Statistiche** (with Antonella Bucciante and Fabio Rosso) Liguori Editore, Napoli 2003