

CURRICULUM VITAE

FABRIZIO COLOMBO

Education.

1989: Laurea in Fisica, Università degli Studi di Milano,
1990/92: scholarship at Politecnico di Milano (Campus of Lecco)
1997: PhD in Mathematics at Università degli Studi di Milano.
1998: Post Doc scholarship at Università degli Studi di Milano.

Academic positions at the Politecnico di Milano.

1999–2004: researcher of Mathematical Analysis.
2004– 2016: associate professor of Mathematical Analysis.
2016– Today: full professor of Mathematical Analysis.

Research interests

General interests.

Operator theory
Functional analysis
Hypercomplex analysis
Inverse problems for integrodifferential equations
Elliptic and parabolic equations
Quantum Mechanics

Actual research interests.

Spectral theory on the S -spectrum
Schrödinger evolution of Aharonov-Berry superoscillations
Theory of slice hyperholomorphic functions
Schur analysis in the slice hyperholomorphic setting
Fractional powers of quaternionic operators and applications

Cozzarelli Prize (PNAS)

The paper: Quantum violation of the pigeonhole principle and the nature of quantum correlations (Yakir Aharonov, Fabrizio Colombo, Sandu Popescu, Irene Sabadini, Daniele C. Struppa, and Jeff Tollaksen) published in 2016 got the Cozzarelli Prize (PNAS).

PhD Students

Jonathan Gantner and Denis Deniz Gonzales.

Editorial activities

Co-editor-in-Chief of Quantum Studies: Mathematics and Foundations (QSMF).

Editors-in-Chief of QSMF are Y. Aharonov (Chapman University, USA); F. Colombo (Politecnico di Milano, Italy); A. Jordan (University of Rochester, Rochester, NY, USA)

Section Editor: Spectral Theory and Operators in Mathematical Physics (CAOT).

In Complex Analysis and Operator Theory (CAOT) (Birkhäuser) Section Editors of Spectral Theory and Operators in Mathematical Physics are: Jussi Behrndt (Graz, Austria), Fabrizio Colombo (Milan, Italy) Sergey Naboko (St. Petersburg, Russia)

Member of the editorial board of the journals.

Mathematical Methods in the Applied Sciences (M2AS) (John Wiley & Sons)
Montes Taurus Journal of Pure and Applied Mathematics (MTJPAM).

Springer-Reference in Operator Theory, Editors: Alpay, Daniel (Ed.) Co-Editor with I. Sabadini and M. Shapiro of Springer-Reference in Operator Theory:

- (I) General aspects of quaternionic and Clifford analysis
- (II) Further developments of quaternionic and Clifford analysis

Co-editor of the volumes.

- (1) Operator Theory: Advances and Applications Volume 252, 2016: "Noncommutative Analysis, Operator Theory and Applications" Editors: Daniel Alpay, Fabio Cipriani, Fabrizio Colombo, Daniele Guido, Irene Sabadini, Jean-Luc Sauvageot.
- (2) Special issue in CAOT: Past and Future directions in Hypercomplex and Harmonic Analysis, Festschrift in honor of F. Sommen. Vol. 11 n.5, 977–1268 pp (2017). Editors: P. Cerejeiras, F. Colombo, U. Kaeler, I. Sabadini.
- (3) Advances in Complex Analysis and Operator Theory. Trends in Mathematics. Festschrift in Honor of Daniel Alpay (60th Birthday) Editors: Colombo, F., Sabadini, I., Struppa, D.C., Vajiac, M.B.
- (4) Special Issue in Quantum Studies: Mathematics and Foundations: Advances In Operator Theory With Applications To Mathematical Physics Issue Editors: Daniel Alpay, Jussi Behrndt, Fabrizio Colombo, Daniele C. Struppa. Volume 6, Issue 3, September 2019
- (5) Co Editor of the Special Issue: Superoscillations-Theoretical Aspects and Applications Symposium, Cetraro, Italy, 2019. Volume 7 · Number 3 · September 2020 in Quantum Studies: Mathematics and Foundations (Guest Editors: Fabrizio Colombo · Irene Sabadini · Giuseppe Strangi · Daniele C. Struppa · Jeff Tollaksen)

Member of international Mathematical societies

Member of the Institute of Quantum Studies, Chapman University.

Elected member of the board of ISAAC from January 2020 (International Society for Analysis its Applications and Computation).

Member of the board of ICCA from August 2020 (International Conference in Clifford Algebras and their applications in Mathematical Physics).

Member of research projects with financial support

PRIN 2019: Direct and inverse problems for partial differential equations: Theoretical aspects and applications (national coordinator A. Cianchi).

PRIN 2011: Varietà reali e complesse: geometria, topologia e analisi armonica (national coordinator: F. Ricci).

PRIN 2008 Calcolo delle variazioni con scale multiple (national coordinator: G. Dal Maso).

PRIN 2006: Calcolo delle variazioni con scale multiple (national coordinator: G. Dal Maso).

PRIN 2004: Calcolo delle variazioni (national coordinator: L. Ambrosio).

COFIN 2002: Calcolo delle variazioni (national coordinator: L. Ambrosio).

COFIN 2000: Calcolo delle variazioni (national coordinator: G. Dal Maso).

BOOKS

- (1) **Analysis of Dirac Systems and Computational Algebra** (with I. Sabadini, F. Sommen, D. C. Struppa), Progress in Mathematical Physics, 39. Birkhäuser Boston, Inc., Boston, MA, 2004. xiv+332 p. ISBN: 0-8176-4255-2.
- (2) **Noncommutative Functional Calculus. Theory and Applications of Slice Hyperholomorphic Functions**, (with I. Sabadini, D. C. Struppa), Progress in Mathematics, Vol. 289, Birkhäuser, 2011, VI, 222 p., ISBN: 978-3-0348-0109-6.
- (3) **The mathematics of superoscillations** (with Y. Aharonov, I. Sabadini, D.C. Struppa, J. Tollaksen), Memoirs of the American Mathematical Society, (2017) 247, Number 1174.
- (4) **Slice Hyperholomorphic Schur analysis**, (with D. Alpay, I. Sabadini), Slice hyperholomorphic Schur analysis. Operator Theory: Advances and Applications, 256. Birkhäuser/Springer, Cham, 2016. xii+362.
- (5) **Entire Slice Regular Functions**, (with D.C. Struppa, I. Sabadini) Entire slice regular functions. SpringerBriefs in Mathematics. Springer, Cham, 2016, v+118.
- (6) **Spectral Theory on the S -spectrum for quaternionic operators** (with J. Gantner, D. P. Kimsey), Operator Theory: Advances and Applications, 270. Birkhäuser/Springer, Cham, 2018. ix+356 pp.
- (7) **Quaternionic closed operators, fractional powers and fractional diffusion processes** (with J. Gantner), Operator Theory: Advances and Applications, 274. Birkhäuser/Springer, Cham, 2019, VIII, vi+322 pp.
- (8) **Quaternionic de Branges spaces and characteristic operator function**, (with D. Alpay, I. Sabadini) SpringerBriefs in Mathematics, Springer, Cham, 2020.
- (9) **Michele Sce's Works in Hypercomplex Analysis. A Translation with Commentaries**, (with I. Sabadini, D.C. Struppa), Birkhäuser, 2020, Hardcover ISBN 978-3-030-50215-7.

Exercise book

- (1) **Esercitazioni di Geometria con richiami teorici** (with I. Sabadini), Edizioni Spiegel, Milano 1998 (second edition).

Research periods abroad

- 1995 February–April: George Mason University, Fairfax, Va, USA.
1996 August: George Mason University, Fairfax, Va, USA.
1997 January 20–February 5: George Mason University, Fairfax, Va, USA.
2001 February 22– March 10: George Mason University, Fairfax, Va, USA.
2002 February 18–March 5: State University of Gent, Belgium.
2002 June 2–10: State University of Gent, Belgium.
2002 November 17–24: Charles University of Prague, Czech Republic.
2003 March–April: George Mason University, Fairfax, Va, USA.
2004 February 23–27: State University of Gent, Belgium.
2004 May 16–27 : George Mason University, Fairfax, Va, USA.
2005 August 3–31 : George Mason University, Fairfax, Va, USA.
2006 April 3–13 : George Mason University, Fairfax, Va, USA.
2006 November 20–26: Charles University of Prague, Czech Republic.
2007 April–May: Chapman University, Orange, CA, USA.
2007 September 6–7: State University of Gent, Belgium.
2008 July 17– August 29: Chapman University, Orange, CA, USA.
2008 November 9–14 : State University of Gent, Belgium.
2009 August 02–07: State University of Gent, Belgium.
2009 October 08– November 28: Chapman University, Orange, CA, USA.
2010 April 02–08: Charles University of Prague, Czech Republic.
2010 October 15-22: Instituto Politecnico Nacional, Mexico City, Mexico.
2010 October 22–November 20: Chapman University, Orange, CA, USA.
2011 October 12–December 3: Chapman University, Orange, CA, USA.
2012 January 6–14: Tel Aviv University, Israel.
2012 January 15–22: Ben-Gurion University of the Negev, Israel.
2012 April 29 – May 6: Charles University Prague.
2012 August 1–31: Chapman University, Orange, CA, USA.
2012 October 20– November 2: Chapman University, Orange, CA, USA.
2013 January 6–13: Tel Aviv University, Israel.
2013 January 14-20: Ben-Gurion University of the Negev, Israel.
2013 March 28– April 3: visiting professor at the State University of Gent, Belgium.
2013 September 28 –October 8: University of Macau, Cina
2013 November 1 – December 15: Chapman University, Orange, CA, USA.
2014 February 2–9: Ben-Gurion University of the Negev, Israel.
2014 February 10-16: Tel Aviv University, Israel.
2014 April 21–26 : Charles University, Prague.
2014 April 21-26: Charles University, Prague.
2014 Septembr 27 – October 31: Chapman University, Orange, CA, USA.
2015 January 11-18: Ben-Gurion University of the Negev, Israel.
2015 August 8–13: University of Macau, China.
2015 October 1– November 6: Chapman University, Orange, CA, USA.
2016 January 28 – February 4: Tel Aviv University, Israel.
2016 February 5-10: Ben-Gurion University of the Negev, Israel.
2016 August: Chapman University, Orange, CA, USA.
2016 November: Chapman University, Orange, CA, USA.
2017 February 19-25: Charles University, Prague.
2017 October 28–November 29: Chapman University, Orange, CA, USA.

2018 January 14 - January 21: Tel Aviv University, Israel.
2018 October 24– November: Chapman University, Orange, CA, USA.
2019 January 15-23 : Tel Aviv University, Israel.
2019 April 22-27: Gent University.
2019 September 29 - October 5: Charles University, Prague.
2019 October 24– November 28: Chapman University, Orange, CA, USA.
2020 January 12 - January 20: Tel Aviv University, Israel.

Teaching experience

PhD course at the Politecnico di Milano.

2001: Equazioni Differenziali alle Derivate Parziali (in collaboration with R. Serapioni).

Courses at the Politecnico di Milano.

2001/02: Elementi di Analisi Matematica e Geometria.
2002/03: Elementi di Analisi Matematica e Geometria & Analisi Matematica II
2003/04: Elementi di Analisi Matematica e Geometria & Analisi Matematica II.
2004/05: Elementi di Analisi Matematica e Geometria & Metodi Analitici e Numerici.
2005/06: Elementi di Analisi Matematica e Geometria & Metodi Analitici e Numerici.
2006/07: Elementi di Analisi Matematica e Geometria & Analisi Matematica A.
2007/08: Elementi di Analisi Matematica e Geometria & Analisi Matematica A.
2008/09: Elementi di Analisi Matematica e Geometria & Analisi Matematica A.
2009/10: Analisi e Geometria 2.
2010/11: Analisi e Geometria 2 & Metodi Analitici e Numerici.
2011/12: Analisi e Geometria 2 & Metodi Analitici e Numerici.
2012/13: Analisi e Geometria 2 & Metodi Analitici e Numerici.
2013/14: Analisi e Geometria 2 & Metodi Analitici e Numerici.
2015/16: Analisi e Geometria 2 & Metodi Analitici e Numerici.
2016/17: Analisi 2 & Metodi Analitici e Numerici.
2017/18: Analisi 2 & Metodi Analitici e Numerici.
2018/19: Analisi 2 & Analisi 2.
2019/20: Analisi 2.

A course at the Università degli Studi di Verona.

1997/98: Analisi Matematica II.

Exercise courses at Politecnico di Milano.

1989/90: Geometria.
1990/91: Analisi Matematica I & Ripasso delle Matematiche Elementari.
1991/92: Analisi Matematica I & Ripasso delle Matematiche Elementari.
1996/97: Analisi Matematica I (2 corsi) & Geometria (2 corsi) & Ripasso delle Matematiche Elementari.
1997/98: Analisi Matematica I & Analisi Matematica II & Geometria (2 corsi) & Ripasso delle Matematiche Elementari.
1998/99: Analisi Matematica II & Analisi Matematica III & Geometria (2 corsi) & Ripasso delle Matematiche Elementari.
1999/00: Analisi Matematica II (2 corsi) & Analisi Matematica III & Geometria, Ripasso delle Matematiche Elementari.
2000/01: Analisi Matematica II (2 corsi) & Analisi Matematica III & Elementi di Analisi Matematica B & Ripasso delle Matematiche Elementari.

2001/02: Analisi Matematica III & Elementi di Analisi Matematica B & Ripasso delle Matematiche Elementari.

2003/04: Analisi Matematica D.

Organization of conferences and workshops

- (1) Co-organizer with I. Sabadini of: Seconda giornata di analisi ipercomplessa, Politecnico di Milano, 17/12/2010.
- (2) Co-organizer with S. Bernstein, U. Kaehler, P. Leopardi of the session: "Continuous and discrete Clifford analysis nel convegno International Workshop on Operator Theory and Applications (University of New South Wales), Sydney, Australia, July 16 –20, 2012.
- (3) Co-organizer with Daniel Alpay, Uwe Kaehler and Frank Sommen of the session: Clifford Analysis and Operator Theory in the International Workshop on Operator Theory and Applications, (VU University in Amsterdam), Holland, July 14–18, 2014.
- (4) Co-organizer with F. Cipriani and I. Sabadini of the international conference: "Noncommutative Analysis, Operator Theory, and Applications" at the Politecnico di Milano, June 23–27, 2014.
- (5) Co-organizer with P. Cerejeiras and J. Ryan of the session : "Clifford Analysis, Dirac Operators, and Operator Theory" joint meeting of the American, European, and Portuguese mathematical societies in Porto, Portugal, June 10-13, 2015.
- (6) Co-organizer with P. Cerejeiras, Uwe Kaehler, I. Sabadini of the: International conference: Past and Future Directions in Hypercomplex and Harmonic Analysis, Aveiro, March 29 to April 2, 2016.
- (7) Co-organizer with D. Alpay, J. Behrndt and D. Struppa of the International conference: Advances in Operator Theory with Applications to Mathematical Physics, Chapman University, Orange, California November 12-16, 2018.
- (8) Co-organizer with Daniel Alpay and Uwe Kaehler of the session: Hypercomplex Analysis and Operator Theory nel convegno International Workshop on Operator Theory and Applications, July 22-26, 2019 Instituto Superior Tecnico, Lisbon, Portugal.
- (9) Co-organizer with Irene Sabadini, Giuseppe Strangi, Daniele Struppa and Jeff Tollaksen of the international Conference: Superoscillations - Theoretical Aspects and Applications Symposium June 15 and 16, 2019 in Grand Hotel San Michele in Cetraro (CS), Italy.
- (10) The 12th International Conference on Clifford Algebras and Their Applications in Mathematical Physics <http://www.smartchair.org/hp/ICCA2020> Hefei 3 - 7 August, 2020 (on Line) Session organizer with P. Cerejeiras.
- (11) Co-organizer with D. Alpay, J. Behrndt and D. Struppa II Advances in Operator Theory with Applications to Mathematical Physics, Chapman University, Orange, California November, 2021.

Invited lectures at conferences

- (1) 18–21 March 1998: Workshop: Advances in Inverse Problems and Applications, Milano–Gargnano: *An inverse problem in the theory of combustion of materials with memory.*
- (2) 28 September – 3 October 1998: International Conference on Inverse Problems. IIASS, Vietri sul Mare: *An identification problem related to a parabolic integrodifferential equation with non commuting spatial operators.*
- (3) Gargnano, 2–6 April 2001: Second meeting on inverse and direct problems and applications: *An inverse problem for the phase–field model with memory.*

- (4) 25–29 June 2001: Workshop: Modelli Matematici e Problemi Analitici per Materiali Speciali, Cortona: *Alcuni problemi inversi relativi all'equazione del calore con memoria in domini non regolari*.
- (5) 8–12 April 2002: Workshop: Equazioni di Evoluzione e Semigrupperi, Palazzone di Cortona (Arezzo): *Identification problems for integrodifferential equations of parabolic type*.
- (6) 19–20 April 2002: Workshop: Recenti sviluppi nella teoria delle equazioni differenziali, Bologna: *Problemi inversi per equazioni integrodifferenziali paraboliche*.
- (7) 29 May 2003: Workshop: Giornata di Studio, Politecnico di Milano– Università di Pavia, Equazioni differenziali e Calcolo delle Variazioni, Pavia: *Alcune applicazioni della teoria dei semigrupperi analitici a problemi inversi*.
- (8) 3–5 July 2003: Workshop: Materiali Speciali e Memorie: Problemi Modellistici e Analitici. Salò (BS): *Alcuni problemi inversi integrodifferenziali parabolici*.
- (9) 6–10 September 2004: Workshop: Dissipative Models in Phase Transitions. Presso il Palazzone di Cortona (Arezzo): *Some recent results on parabolic inverse problems for phase-field models with memory*.
- (10) 17–19 March 2005: Workshop: Direct and Inverse Problems in Evolution Equations. Rimini (Italy): *The identification problem for kernels depending on time and on space variables*.
- (11) 13–17 March, 2006: Workshop: Inverse and Control Problems for PDE's, Roma: *Some global in time results for parabolic integro-differential inverse problems*.
- (12) 25–28 June 2007: Workshop: Direct, Inverse and Control Problems For PDE's, Roma: *Global in time results for some semilinear integrodifferential identification problems*.
- (13) 13–18 August 2007: 6th International ISAAC Congress in Ankara, Turkey: *Global in time results for some semilinear integrodifferential identification problems*.
- (14) 3–5 September 2007: Workshop: Clifford Analysis and Applications, Gent, Belgio: *Slice-regularity and its functional calculus*.
- (15) 18 October 2007: Workshop: Sesta Giornata di Studio Università di Pavia–Politecnico di Milano su Equazioni Differenziali e Calcolo delle Variazioni: *Problemi di identificazione parabolici e iperbolici*. (Main speaker).
- (16) 13–18 July 2009: 7th International ISAAC Congress in London, UK: *Some consequences of the quaternionic functional calculus*.
- (17) 13–18 July 2009: 7th International ISAAC Congress in London, UK: *Global in time existence and uniqueness results for some integrodifferential identification problems*.
- (18) 12–16 July, 2010: International Workshop Operator Theory and Applications, presso Technische Universität, Berlin, Germany: *Recent notions of spectra for n -tuples of operators in Clifford Analysis*.
- (19) 13–17 August 2010: 18th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications, Macao, Cina: *An introduction to the quaternionic evolution operator*. (Main speaker).
- (20) 13–17 September 2010: INdAM Workshop on Different Notions of Regularity for Functions of Quaternionic Variable, Roma: *The quaternionic evolution operator for bounded and for unbounded operators*. (Main speaker).
- (21) 11–15 October 2010: International Symposium on Complex and Hypercomplex Analysis, Mexico City, Messico: *The Fueter mapping theorem and the F -functional calculus*. (Main speaker).
- (22) 24–29 May 2010: 5th International Conference on Inverse Problems: Modeling and Simulation, Antalya, Turchia. (Main speaker). Declinato per mancanza di fondi.
- (23) 25–26 March 2011: 13th Workshop on Applications and Generalizations of Complex Analysis, Aveiro, Portugal: *Hypercomplex methods for spectral theory*. (Main speaker).

- (24) 27–30 June 2011: Conference: Function theory and operator theory: infinite dimensional and free setting, Ben-Gurion University of the Negev, Israel. *The quaternionic functional calculus and the evolution operator*. (Main speaker).
- (25) 15–20 June 2011: The 9th International Conference on Clifford Algebras and their Applications (ICCA9) at the Bauhaus-University Weimar, Germany: *Functional calculi for n -tuple of operators*, (Plenary Speaker).
- (26) 22–27 August 2011: 8th International ISAAC Congress, Moscow: *Some recent results on the S -spectral theory*.
- (27) 12–17 September 2011: XIX Congresso UMI, Bologna: *Un nuovo calcolo funzionale per n -uple di operatori non necessariamente commutanti*.
- (28) 19–25 September 2011: ICNAAM 2011 (9th International Conference of Numerical Analysis and Applied Mathematics), Halkidiki, Greece: *Comparison of the Various Notions of Slice Monogenic Functions and Their Variations*.
- (29) 16–20 June 2012: International Workshop on Operator Theory and Applications. University of New South Wales, Sydney, Australia: *On some notions of spectra for n -tuples of operators*.
- (30) 19–25 September 2012: ICNAAM 2012 (10th International Conference of Numerical Analysis and Applied Mathematics), Kos, Greece: *An overview on the Inverse Fueter Mapping Theorem*.
- (31) 22–26 October 2012: Workshop on Function Theories for Bicomplex and Hyperbolic Numbers, Chapman University, Orange, CA, USA: *The bicomplex holomorphic functional calculus*. (Main speaker).
- (32) 5–9 August, 2013: 9th International ISAAC Congress in Krakow, Poland: *Recent results on the F -functional calculus*.
- (33) 7–11 Novembre 2013: Workshop on Results in Mathematics and in Physics obtain by Methods of Hypercomplex Analysis, Chapman University, Orange, CA, USA: *Recent results on the slice hyperholomorphic functional calculi*. (Main speaker).
- (34) 21–22 March 2014: 16th Annual Workshop on Applications and generalizations of complex analysis, Aveiro, Portugal: *The spectral theorem for unitary operators based on the S -spectrum*.
- (35) July 14–15, 2014: International Workshop on Operator Theory and Applications, VU University in Amsterdam, Holland: *The new resolvent equations of the slice hyperholomorphic functional calculi*.
- (36) 16–18 July 2014: The 30th International Colloquium on Group Theoretical Methods in Physics (Group30) at Ghent University in Ghent, Belgium: *Spectral properties of quaternionic operators*.
- (37) 4–9 August 2014: 10th International Conference on Clifford Algebras and their Applications in Mathematical Physics (ICCA), Tartu, Estonia: *Some results on the F -functional calculus*.
- (38) 17– 21 October, 2014 Chapman University, Orange, CA, USA: Workshop on Integral transforms, boundary values and generalized functions: *The Fueter-Sce mapping and its inverse* (Main speaker).
- (39) 23 January 2015: Incontro Nazionale di Analisi Ipercomplessa, Firenze, Italy: *Inversione della mappa di Fueter-Sce*.
- (40) 20–21 March 2015: 17th Annual Workshop on Applications and Generalizations of Complex Analysis, Aveiro, Portugal: *Quaternionic spectral analysis*.
- (41) 1–7 August, 2015: 10th International ISAAC Congress in Macau (Macau): *Quaternionic groups and semigroups of operators*.
- (42) 01 December 2015: "Hypercomplex Analysis and Geometry" Ferrara (Italy): *The H^∞ functional calculus based on the S -spectrum*.

- (43) 21–23 January 2016, workshop on Varietà reali e complesse: geometria, topologia e analisi armonica, Scuola Normale, Pisa (Italy): *Teoria spettrale quaternionic*.
- (44) February 8, 2016, Ben-Gurion University, Israel. Conference: A day of new aspects of (hyper)complex analysis and applications: *Quaternionic Spectral Theory*.
- (45) 20–23 June 2016, MOIMA - Symposium on Mathematical Optics, Image Modelling and Algorithms, Hannover, Germany: *An introduction to Aharonov-Berry superoscillations*.
- (46) September 12–16, 2016, Rome, Complex function theory, its generalizations and applications: *Quaternionic Spectral Theory*.
- (47) November 4–7, 2016, International Conference on Complex Analysis and Operator Theory, Celebrating Daniel Alpay’s 60th Birthday Chapman University, Orange, CA, USA: *Spectral theory for quaternionic operators*.
- (48) 2017 May 29– June 2, 2017 Hilbert Function Spaces, Gargnano, Italy: *Quaternionic spectral theory an applications to diffusion processes* (Invited Speaker).
- (49) ICCA11 International Conference on Clifford Algebras and Their Applications in Mathematical Physics, Ghent University (Belgium) from August 7th till August 11th, 2017, (Plenary speaker): Quaternionic spectral theory and applications.
- (50) 11th International ISAAC Congress, 14–18 August 2017, the 11th ISAAC congress at Linnaeus University, Sweden: *Generalizations of the the H^∞ -functional calculus and applications to fractional diffusion processes*.
- (51) International Conference: Mathematics, Signal Processing and Linear Systems: New Problems and Directions Chapman University, November 14–19, 2017: *An introduction to Aharonov-Berry superoscillations*.
- (52) International Workshop on Operator Theory and Applications (IWOTA), July 23–27, 2018 North Zhongshan campus of East China Normal University in Shanghai, In the Special Session: Spectral Theory and Differential Operators (Organizers: Jussi Behrndt, Olaf Post, Carsten Trunk): *The S -spectrum approach to fractional diffusion processes*.
- (53) Workshop on Clifford Analysis, Hefei, China 30–31 July 2018 at University of Science and Technology of China: *The S -spectrum approach to fractional diffusion processes*.
- (54) 2018 August 10–13. Clifford- Harmonic Analysis week at the University of Macau: *The S -spectrum approach to fractional diffusion processes*.
- (55) International Conference on Hypercomplex Analysis and Applications, University of Erfurt, Germany, September 24th – 26th 2018: *On the theory of evolution of superoscillations*.
- (56) A scientific day in honor of Michele Sce (1929–1993), October 11, 2018, Università degli Studi di Milano (Plenary speaker): *Un’applicazione del teorema della mappa di Fueter-Sce-Qian ad un calcolo funzionale monogenico*.
- (57) 16th International Conference of Numerical Analysis and Applied Mathematics ICNAAM 2018 Sheraton Hotel, Rhodes, Greece, 13–18 September 2018: *The S -spectrum approach to fractional diffusion processes*.
- (58) Advances in Operator Theory with Applications to Mathematical Physics, Chapman University, Orange, California November 12–16, 2018: *The S -spectrum approach to fractional diffusion processes*.
- (59) Conference: Superoscillations - Theoretical Aspects and Applications Symposium June 15 and 16, 2019 in Grand Hotel San Michele in Cetraro (CS), Italy: *An introduction to the mathematics of superoscillations*.
- (60) 30th International Workshop on Operator Theory and its Applications, IWOTA 2019. July 22–26, 2019 Instituto Superior Técnico Lisbon, Portugal. In the Special Session: Spectral Theory and Differential Operators (Organizers: Andrii Khrabustovskiy, Olaf Post, Carsten Trunk) *Applications of Spectral theory on the S -spectrum to fractional diffusion problems*.

- (61) 12th International ISAAC Congress, at the University of Aveiro, Portugal, from July 29 to August 02, 2019 *Some applications of the Spectral Theory on the S-spectrum.*
- (62) Sixth Najman Conference on Spectral Theory and Differential Equations, September 8–13, 2019 in Sveti Martin na Muri, Croatia (Plenary speaker): *Some applications of the Spectral Theory on the S-spectrum.*
- (63) New Directions in Function Theory: From Complex to Hypercomplex to Non-Commutative November 21–26 2019, Chapman University, Orange, CA: *Direct and Inverse Fueter-Sce-Qian Mapping Theorem and Spectral Theories.*
- (64) Workshop "Analysis Day at Holon Institute of Technology" at HIT (Conference Hall, bldg. 3) on January 19, 2020, *Direct and inverse Fueter-Sce-Qian mapping theorem and spectral theories.*
- (65) International conference on hypercomplex analysis in mathematics and in the applied sciences 19-21 February 2020. Weimar, Germany, 19-21 February 2020 (celebration of the 65th birthday of Klaus Gürlebeck and his contribution to the field of hypercomplex analysis): *Direct and Inverse Fueter-Sce-Qian Mapping Theorem and Spectral Theories.*
- (66) 20th Annual Workshop on Applications and Generalizations of Complex Analysis Aveiro, March 20–21, 2020 *Direct and Inverse Fueter-Sce-Qian Mapping Theorem and Spectral Theories.* (invited speaker) Postponed for COVID.
- (67) The 12th International Conference on Clifford Algebras and Their Applications in Mathematical Physics <http://www.smartchair.org/hp/ICCA2020> Hefei 3–7 August, 2020 (on Line) *Recent results on fractional powers of vector operators and applications.*
- (68) International Conference on Generalized Functions, August 31 September 4 2020, Ghent University, Ghent, Belgium: *Applications of the Spectral theory on the S-spectrum to fractional diffusion problems.*

Seminars

- (1) 1998 December 10, Università di Milano, Italy: *Una Panoramica su Problemi di Identificazione per Equazioni Integrodifferenziali di Tipo Parabolico.*
- (2) 2000 March 29, Seminari di Calcolo delle variazioni, Politecnico di Milano, Italy: *Semigrupper ed equazioni della Finanza Matematica.*
- (3) 2001 November 29, Università di Firenze: *Alcuni problemi inversi parabolici integrodifferenziali.*
- (4) 2002 November 22, Charles University of Prague, Czech Republic: *Computational Algebraic Analysis: some applications.*
- (5) 2007 March 28, Università di Firenze, Italy: *Problemi di identificazione per nuclei di memoria.*
- (6) 2007 April 19, Chapman University, Orange, CA, USA: *Identification of convolution memory kernels.*
- (7) 2008 November 12, State University of Gent, Belgium: *Recent results on slice hyperholomorphy and its functional calculus.*
- (8) 2010 April 7, Charles University of Prague, Czech Republic: *The functional calculi associated to slice hyperholomorphic functions.*
- (9) 2010 November 9, Chapman University, Orange, CA, USA: *An introduction to the F-functional calculus.*
- (10) 2012 January 16, Ben-Gurion University of the Negev, Israel: *A Functional calculus for non commuting operators and for quaternionic operators.*
- (11) 2012 May 4, Charles University of Prague: *On some notions of spectra for n-tuples of operators.*

- (12) 2013 October 3 , University of Macau, Cina: *Slice monogenic functions and their functional calculi*.
- (13) 2014 October 7, Chapman University, Orange, CA, USA: *Quaternionic spectral analysis*.
- (14) 2014 October 14, Fullerton College, Fullerton, CA, USA, *Quaternionic spectral analysis*.
- (15) 2016 August: Chapman University, Orange, CA, USA: *Quaternionic Spectral Theory*.
- (16) 2019 October 4: Charles University, Prague: *Applications of the Spectral theory on the S-spectrum to fractional diffusion problems*.

Participation to conferences, schools and seminars

- (1) 24–30 Octobr 1999: International Conference on Differential Equations and Calculus of Variations. Isola d’Elba.
- (2) 27–28 Septembr 2000: Convegno in onore di Brunello Terreni. Dipartimento di Matematica, Università degli Studi di Milano.
- (3) 26–28 Octobr 2000: Mass transport problems, shape optimization and weak geometrical structures. Scuola Normale Superiore, Pisa.
- (4) 30 Octobr - 4 Novembr 2000: Seventh International Conference on Evolution Equations 2000. Levico Terme.
- (5) 25–29 March 2001: Incontro di Lavoro su questioni di Teoria Geometrica della Misura e di Calcolo delle Variazioni. Levico Terme.
- (6) 4-5 July 2001: International workshop on Variational methods for Discontinuous Structure. Villa Erba, Cernobbio.
- (7) 6-8 July 2001: V Conference of the Society for the Advancement of Economic Theory, Ischia.
- (8) 20-25 May 2002: Pisa Spring School on Calculus of Variations. Scuola Normale Superiore di Pisa.
- (9) 27-31 May 2002: VI Congresso Nazionale della SIMAI, Chia, Cagliari.
- (10) 4-6 July 2002: Materiali speciali e memorie: problemi modellistici e analitici, Salò (Bs).
- (11) 9 March 2005: Quarta Giornata di Studio Università di Pavia–Politecnico di Milano su Equazioni Differenziali e Calcolo delle Variazioni.
- (12) 20 December 2002: Mini corso sui problemi inversi, Università degli studi di Milano.
- (13) 18-19 June 2003: Two-Day colloquium in honor of Enrico Magenes, Pavia.
- (14) 26-27 March 2004: EP 2004: Evolution Problems, in memory of Brunello Terreni, Rapallo.
- (15) 22 April 2004: Giornata di Studio Politecnico di Milano - Università di Pavia su Equazioni Differenziali e Calcolo delle Variazioni.
- (16) 17-20 May 2004: A celebration of Carlos Berenstein’s Mathematics: Harmonic Analysis, Signal Processing and Complexity, presso la George Mason University, Fairfax, Va, USA.
- (17) 27 April 2006: Quinta Giornata di Studio Università di Pavia–Politecnico di Milano su Equazioni Differenziali e Calcolo delle Variazioni.
- (18) 03-05 December 2010: Workshop at the State University of Ghent (Belgio).
- (19) March 2012: Trends in Mathematical Analysis, at Politecnico di Milano, Milano.
- (20) 16-18 August 2012: Aharonov 80th Birthday conference: Fundamental aspects of quantum theory: a two-time winner, at Chapman University.
- (21) 13-15 September 2012: Equazioni differenziali alle derivate parziali, Politecnico di Milano, Milano.
- (22) 5-7 March 2015: Workshop: Varietà reali e complesse: geometria, topologia e analisi armonica, Scuola Normale Superiore, Pisa, Italy.
- (23) 8 April 2015: mini-Workshop in Harmonic Analysis, Università degli studi di Milano, Milano, Italy.

- (24) 31 March-1 April 2017: 17th Annual Workshop on Applications and Generalizations of Complex Analysis, Aveiro, Portugal.
- (25) The Second joint IMU-INdAM Conference in Analysis, September 16-20, 2019, Napoli, Italy

List of papers

- (1) **Generation of analytic semigroups in $W^{k,p}(\Omega)$ and $C^k(\bar{\Omega})$** , (with V. Vespri), *Differential and Integral Equations*, **9** (1996), 421–436.
- (2) **Quasilinear Parabolic Equations in C^k Spaces**, *Dynamic Systems and Applications*, **6** (1997), 271–296.
- (3) **Identification of time and space dependent relaxation kernels for materials with memory related to cylindrical domains I**, (with A. Lorenzi), *Journal of Mathematical Analysis and Applications*, **213** (1997), 32–62.
- (4) **Identification of time and space dependent relaxation kernels for materials with memory related to cylindrical domains II**, (with A. Lorenzi), *Journal of Mathematical Analysis and Applications*, **213** (1997), 63–90.
- (5) **An inverse problem in the theory of combustion of materials with memory**, (with A. Lorenzi), *Advances in Differential Equations*, **3** (1998), 133–154.
- (6) **Regular functions of biquaternionic variables and Maxwell’s equations**, (with P. Loustaunau, I. Sabadini and D.C. Struppa), *Journal of Geometry and Physics*, **26** (1998), 183-201.
- (7) **Inverse problems, quasilinear equations and analytic semigroups**, (Italian), *Boll. Unione Mat. Ital. Sez. A Mat. Soc. Cult.* (8) 1 (1998), suppl., 97–100.
- (8) **Generation of smoothing semigroups by degenerate elliptic operators arising in financial mathematics**, (with M. Giuli and V. Vespri), *Communications in Applied Analysis*, **3** (1999), 283-202.
- (9) **On Some Equations About European Option Pricing**, (with R. Monte and V. Vespri), in *Proceedings of the 18th IFIP Conference on Systems Modeling and Optimization, (Detroit, MI, 1997)* Addison Wesley Longman, *Research notes in Mathematics*, **396** (1999), 33-41.
- (10) **Dirac equation in the octonionic algebra** (with I. Sabadini and D.C. Struppa), *Contemporary Mathematics A.M.S.*, **251** (2000), 117–134.
- (11) **An identification problem related to a parabolic integrodifferential equation with non commuting spatial operators**, (with Alfredo Lorenzi), *Journal Inverse and Ill-posed Problems*, **8** (2000), 505-540.
- (12) **Continuous dependence results for an inverse problem in the theory of combustion of materials with memory**, *Rendiconti Istituto Matematico Università di Trieste*, **32** (2000), 189-215.
- (13) **A quasilinear parabolic inverse problem in Hölder spaces**, *Differential and Integral Equations*, **14** (2001), 1237-1258.
- (14) **Direct and inverse problems for a phase field model with memory**, *Journal of Mathematical Analysis and Applications*, **260** (2001), 517-545.
- (15) **Elliptic equations in non-smooth plane domains with an application to a parabolic problem**, (with D. Guidetti and A. Lorenzi), *Advances in Differential Equations*, **7** (2002), 695-716.
- (16) **An inverse problem for a generalized Kermack-McKendrick model**, *Journal of Inverse and Ill-Posed Problems*, **10** (2002), 221–241.
- (17) **Automatic control problems for reaction diffusion systems**, (with C. Cavaterra), *Journal of Evolution Equations*, **2** (2002), 241-273.

- (18) **A unified approach to nonlinear integrodifferential inverse problems of parabolic type**, (with D. Guidetti), *Zeitschrift für Analysis und ihre Anwendungen*, **21** (2002), 431–464.
- (19) **Syzygies and conservation laws**, (with I. Sabadini, F. Sommen and D. C. Struppa), *Foundations of Physics Letters*, **15** (2002), 507–522.
- (20) **Some inverse problems related to the heat equation with memory in non smooth spatial domains**, *Series on Advances in Mathematics for Applied Sciences: Mathematical Models and Methods for Smart Materials*. Editors M. Fabrizio, B. Lazzari, A. Morro, **62** (2002), 61–72.
- (21) **On applications of maximal regularity to inverse problems for integrodifferential equations of parabolic type**, (with D. Guidetti and A. Lorenzi), in *Evolution equations*, J. Goldstein, R. Nagel and S. Romanelli editors, Marcel Dekker, Inc., **234** (2003), 77–90, Cap.5.
- (22) **Integrodifferential identification problems for the heat equation in cylindrical domains**, (with D. Guidetti and A. Lorenzi), *Advances in Mathematical Science and Application*, **13** (2003), 639–662.
- (23) **Integrodifferential identification problems for thermal materials with memory in non-smooth plane domains**, (with D. Guidetti e A. Lorenzi), *Dynamic Systems and Applications*, **12** (2003), 533–559.
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- (25) **A Semigroup Approach to No-Arbitrage Pricing Theory: Constant Elasticity Variance Model and Term Structure Models**, (with M. Giuli e V. Vespri), proceedings of “Evolution Equation 2000: Appl. to Phys., Ind., Life Sci. Econ. EVEQ 2000 (2003)
- (26) **A semilinear integrodifferential inverse problem**, (with V. Vespri), in *Evolution equations*, J. Goldstein, R. Nagel and S. Romanelli editors, Marcel Dekker, Inc., **234** (2003), 91–104, Cap 6.
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- (88) **On slice biregular functions and isomorphisms of Bergman spaces** (with J. O. Gonzalez-Cervantes, I. Sabadini), *Complex Variables and Elliptic Equations*, **57** (2012), 825–839.
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