

Curriculum vitae

Address

Name: Paolo Giordano
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Present position: Senior researcher, Faculty of Mathematics, University of Vienna

Present research interests

- Nonlinear theories of generalized functions
- Non-Archimedean geometry and analysis
- Foundation of differential geometry
- Mathematical theories of complex systems
- Mathematical modeling of complex systems and their applications
- Transportation modeling and related decision support systems
- Mathematical modeling of urban growth and housing markets

Education

- *University of Bonn*, Ph.D. in Mathematics awarded in December 2009. The thesis (329 pages, see arXiv 0907.1872) is based on my own ideas and has been developed autonomously. Title: “Fermat reals: nilpotent infinitesimals and infinite dimensional spaces”. Supervisor Prof. S. Albeverio. Degree ”Very good + (0.7)”; overall grade of the promotion ”magna cum laude”.
- *Università degli Studi di Milano*, M.Sc. in Mathematics. The thesis is based on my own ideas and has been developed autonomously. Title: “A model of extended line with actual infinitesimals”. Supervisor Prof. L. Galgani. Degree 110/110 Cum laude.

Academic experiences

Main research activities as principal investigator and awards

- December 2012 - present: project leader of FWF (Austrian Fund for the Promotion of Scientific Research) stand alone research project *Analysis and Geometry based on generalized numbers*, Dep. of Mathematics,

University of Vienna. Co-applicant and collaborator of the project is Prof. M. Kunzinger (Dep. of Mathematics, University of Vienna, Austria).

- The four years project concerns the development of a new theory of generalized functions (distributions) as set-theoretical maps on a ring of generalized numbers, and its applications to differential geometry and mathematical physics.
- The project funding from FWF was of 321'000 Euro.
- June 2013 - May 2016: project leader of FWF stand alone research project *Non-Archimedean Geometry and Analysis*, Dep. of Mathematics, University of Vienna (AT). Co-applicants of the project are Prof. M. Kunzinger (Dep. of Mathematics, University of Vienna, Austria) and Prof. V. Benci (Dep. of Mathematics, University of Pisa, Italy).
 - The three years project concerns the development of the theory of Fermat reals and its applications and the relationships with other branches of Non-Archimedean mathematics.
 - In this project I employed two senior post-docs: L. Luperi Baglini and E. Wu.
 - The project funding from FWF was of 349'000 Euro.
- October 2010 - September 2012: project leader of the research project *Nilpotent Infinitesimals and Generalized Functions*, Dep. of Mathematics, University of Vienna, supported by an FWF Lise Meitner grant. Co-applicant of the project: Prof. M. Kunzinger (Dep. of Mathematics, University of Vienna, Austria).
 - The project concerned the application of nilpotent infinitesimal methods to differential geometry and generalized functions.
 - The project funding from FWF was of 115'200 Euro.
- June 2006 - July 2009: director, together with A. Vancheri, of the research project *Supporto alle decisioni basato su modello matematico per il problema dei "grandi generatori di traffico"*, Dep. of Mathematics, University of Italian Switzerland.
 - The project concerned the development and application of a mathematical model based decision support system, used by the public administration of Canton Ticino (CH) for the master plan rules, concerning the placement of new shopping malls. Project's main steps has been: interdisciplinary definition and construction of the model (together with public administration and city planners), mathematical formalization within the theoretical framework of Interaction Spaces theory, programming in MATLAB, calibration and validation, simulations, interdisciplinary analysis of simulations, final reports and public presentation of simulations' results.
 - The project funding from Canton Ticino's administration was of 89'577 Euro.
- June 2005 - May 2006: Marie Curie European Reintegration grant MERG-CT-2005-014906, *Continuum State Cellular Automata and Random Equations - Applications to urban growth and traffic models*.
 - The project funding from EU was of 40'000 Euro.
- March 2002 - February 2004: Marie Curie individual fellowship of the European Commission HPMF-CT-2002-01792, *A new approach to differential geometry of spaces of mappings and its applications*, Institute of Applied Mathematics, University of Bonn.
 - The project funding from EU was of 140'200 Euro.
- June 2001 - November 2001: DAAD (Deutscher Akademischer Austausch Dienst, German academic exchange service) fellowship at the University of Bonn.

Research activities as co-director

- May 2007 - December 2009: co-director of the SNSF research project *Effects of Neighborhood Choice on Housing Markets: a model based on the interaction between microsimulations and revealed/stated preference modeling*, Dep. of Mathematics, Accademia di architettura, University of Italian Switzerland (CH). Director of the project: Prof. Dr. R. Maggi, Istituto di Ricerche Economiche, University of Italian Switzerland.
 - The project concerned the mathematical modeling of Lugano’s urban growth, of the corresponding housing markets and the study of related segregation phenomena of non-Swiss people.
 - In this context I was PhD co-advisor of M. Esmaeili.
 - The project funding from SNSF was of 241’650 chf.
- September 2006 - December 2009: co-director of the Swiss National Science Foundation research project *Mathematical modeling of on-line communities*, Dep. of Mathematics, University of Italian Switzerland. Director of the project: Prof. Dr. A. Vancheri.
 - The project concerned a first development of a mathematical theory of complex systems (Interaction Spaces theory) and a mathematical modeling of on-line collaborations like Wikipedia.
 - In this context I was PhD co-advisor of G.L. Ciampaglia.
 - The project funding from SNSF was of 120’800 chf.

Main invited lectures

1. Invited talk at Institute for Scientific Interchange (ISI), Turin, 30 November 2016, “MaTryCS - A mathematical theory of complex systems”.
2. Invited plenary lecture at the conference “Algebra, Geometry and Mathematical Physics”, Brno, Czech Republic, September 12-14, 2012; title: “Infinitesimal without Logic”.
3. Invited talks at the University of Pisa, January 21, 2015: title: “Generalized smooth functions”, “Fermat reals”.
4. Invited opening talk at the workshop “Workshop on diffeologies etc”, Aix en Provence, France, June 25 - 27, 2014. Title: “Theory of infinitely near points in smooth manifolds: the Fermat functor”.
5. Invited speaker at the colloquium of the Interdiziplinäre Zentrum für Komplexe Systeme (IZKS, Bonn, Germany), June 2009; title: “Dynamics of cities: A mathematical planning tool for shopping malls”.
6. Invited speaker at the conference VIIth AESOP workshop, Thematic Group on Planning and Complexity, Milan, 22 - 23 February 2008; title: “Interaction Spaces Theory: modeling complex systems with the details of MAS and the mathematics of Synergetics”.

Reviewing activities

I am reviewer for: Advances in Complex Systems, Environmental modelling and software, Physics Letters A, American Mathematical Monthly, Topology proceedings, Arabian Journal of Mathematics.

Teaching activities

- 2012 - 2015: research supervisor of 2 senior post-docs, Faculty of Mathematics, University of Vienna, AT.
- 2010 - 2014: teaching of the 1st year master course *Metodi quantitativi per l’analisi del territorio*, Accademia di architettura di Mendrisio, University of Italian Switzerland.
- 2009: co-teaching of the 1st year master course *Metodi quantitativi per l’analisi del territorio*, Accademia di architettura di Mendrisio, University of Italian Switzerland, together with A. Vancheri.
- 2006 - 2009: PhD co-advisor of M. Esmaeili and G.L. Ciampaglia.

- 2004 - 2005: lecturer of the courses MATLAB I and Probability I for the researchers of the SNSF research project *Mathematical modeling of urban growth processes: a cellular automata and statistical mechanical based approach*.
- 1999: lecturer of the course *Programming language MATLAB* at the Politecnico di Milano, Italy, Mechanics and Aeronautics Engineering courses.
- 1999 - 2003: teaching assistant, Dep. of Mathematics, Università della Svizzera Italiana.
- 1997 - 1999: lecturer of the 1st year course of Mathematics, Dep. of Economics of the II facoltà di Economia di Novara, Italy.

Publications

In my publications, the order of authors always corresponds to the amount of contribution given in the work. Exceptions to this rule are: 24, 27, 28, 29, 30, which follow the alphabetical order and an equal contribution can be estimated for each author.

All the following publications have been peer-reviewed and listed in ISI Web of Science, Scopus or DOAJ. Non indexed publications are: 11, 14, 15, 24.

For the links to these publications, see my home page: www.mat.univie.ac.at/~giordap7/

1. Luperi Baglini L., Giordano P., The category of Colombeau algebras. Monatshefte für Mathematik. 2016 DOI 10.1007/s00605-016-0990-1.
2. Giordano P., Kunzinger M. "Inverse Function Theorems for Generalized Smooth Functions". Invited paper for the Special issue ISAAC - Dedicated to Prof. Stevan Pilipovic for his 65 birthday. Eds. M. Oberguggenberger, J. Toft, J. Vindas and P. Wahlberg, Springer series "Operator Theory: Advances and Applications", Birkhaeuser Basel, 2016. See arXiv 1602.00013.
3. Giordano P., Kunzinger M., A convenient notion of compact set for generalized functions. Accepted in Proceedings of the Edinburgh Mathematical Society. See arXiv 1411.7292.
4. Giordano P., Wu E., Calculus in the ring of Fermat reals. Part I: Integral calculus. Advances in Mathematics 289 (2016) 888–927. DOI: 10.1016/j.aim.2015.11.021
5. Giordano P., Luperi Baglini L., Asymptotic gauges: Generalization of Colombeau type algebras. Math. Nachr. Volume 289, Issue 2-3, pages 247–274, 2016. See arXiv 1408.1585v1.
6. Giordano P., Nigsch E., Unifying order structures for Colombeau algebras. Math. Nachr. 288, No. 11–12, 1286–1302, 2015. DOI 10.1002/mana.201400277. See arXiv 1408.1242.
7. Giordano P., Wu E., Categorical framework for generalized functions. Accepted for publication in Arabian Journal of Mathematics, 2015. DOI:10.1007/s40065-015-0126-9.
8. Giordano P., Kunzinger M., Vermaeve H., Strongly internal sets and generalized smooth functions. Journal of Mathematical Analysis and Applications, volume 422, issue 1, 2015, pp. 56-71. DOI: 10.1016/j.jmaa.2014.08.036
9. Vancheri A., Giordano P., Andrey D., Fuzzy logic based modeling of traffic flows induced by regional shopping malls. Advances in Complex Systems Vol. 17, N. 3 & 4, 2014, (39 pages). DOI: 10.1142/S0219525914500179.
10. Giordano P., Caputo P., Vancheri A., Fuzzy evaluation of heterogeneous quantities: measuring urban ecological efficiency. Ecological Modelling 288, 2014, pp. 112–126. DOI: 10.1142/S0219525914500179
11. Giordano P., Which numbers simplify your problem?. Invited contribution for the volume: Mathematics without boundaries: surveys in pure mathematics. T. Rassias and P. Pardalos (Eds.), Springer 2014, XIII, pp. 181-220. See www.springer.com/mathematics/analysis/book/978-1-4939-1105-9

12. Giordano P., Fermat reals: infinitesimals without Logic. *Miskolc Mathematical Notes*, Vol. 14 (2013), No. 2, pp. 407–422. See mat76.mat.uni-miskolc.hu/~mnotes/index.php?page=contents&volume=14&number=2
13. Giordano P., Kunzinger M., New topologies on Colombeau generalized numbers and the Fermat-Reyes theorem. *Journal of Mathematical Analysis and Applications* 399 (2013) 229–238.
DOI: 10.1016/j.jmaa.2012.10.005
14. Vancheri A., Giordano P., Caputo P., A 2009 European index of urban metabolism efficiency, in *A new urban metabolism*, J.A. Acebillo, A. Martinelli (eds), Actar, 2013. See searchworks.stanford.edu/view/10196912
15. Esmaeili M., Vancheri A., Giordano P., Modeling housing market dynamics using a multi-agent simulation of participants' cognitive behavior. In L. Diappi (editor) *Emergent phenomena in housing markets: gentrification, housing search, polarization*. Physica-Verlag, 2012, pp. 43-83.
See www.springer.com/economics/regional+science/book/978-3-7908-2863-4
16. Giordano P., Kunzinger M., Topological and algebraic structures on the ring of Fermat reals. *Israel Journal of Mathematics*, January 2013, Volume 193, Issue 1, pp. 459-505. DOI: 10.1007/s11856-012-0079-z
17. Giordano P., Fermat-Reyes method in the ring of Fermat reals. *Advances in Mathematics* 228, pp. 862-893, 2011. DOI: 10.1016/j.aim.2011.06.008
18. Giordano P., Infinite dimensional spaces and Cartesian closedness. *Journal of Mathematical Physics, Analysis, Geometry*, vol. 7, No. 3, pp. 225-284, 2011.
See www.mathnet.ru/php/archive.phtml?wshow=paper&jrnid=jmag&paperid=514&option_lang=eng
19. Giordano P., The ring of fermat reals, *Advances in Mathematics* 225 (2010), pp. 2050-2075. DOI: 10.1016/j.aim.2010.04.010
20. Giordano P., Infinitesimals without logic, *Russian Journal of Mathematical Physics*, 17(2), pp.159-191, 2010. DOI: 10.1134/S1061920810020032
21. Esmaeili M., Vancheri A., Giordano P., Mathematical and Computational Modeling of Housing Market Dynamics. *Systems Conference, 2010 4th Annual IEEE*, pp. 29 - 34, 2010. DOI: 10.1109/SYSTEMS.2010.5482468
22. Vancheri A., Giordano P., Andrey D., Albeverio S., A model for urban growth processes with continuous state cellular automata, multi-agents and related differential equation. Part 1: Theory. *Environment and Planning B: Planning and Design* 2008, volume 35, issue 4, pages 723-739. DOI: 10.1068/b31080a
23. Vancheri A., Andrey D., Giordano P., Albeverio S., A model for urban growth processes with continuous state cellular automata, multi-agents and related differential equation. Part 2: Computer Simulations. *Environment and Planning B: Planning and Design* 2008, volume 35, pages 863-880. DOI: 10.1068/b31080b
24. Albeverio S., Giordano P., Minazzi F., *Introduzione a Matematica e Filosofia, il problema dei fondamenti oggi*. Atti del convegno di Mendrisio, 16 novembre 2001. PRISTEM/Storia 14-15, 2006. See matematica-old.unibocconi.it/publicazioni/notestoria14-15.htm
25. Giordano P., Infinitesimal Differential Geometry, *Acta Mathematica Universitatis Comenianae*, 2004, LXIII, 2, pp. 235-278. See www.emis.de/journals/AMUC/_vol-73/_no-2/_giordano/giordano.html
26. Giordano P., Nilpotent infinitesimals and synthetic differential geometry in classical logic. In Berger, Oswald, and Schuster, editors, "Reuniting the Antipodes - Constructive and Nonstandard Views of the Continuum". Peer reviewed conference paper: see proceedings of the Symposium in Venice, May 17-22, 1999. Vol. 306 of *Synthese Library*, Kluwer Academic Publishers, Dordrecht, 2001, pp. 75-92. DOI 10.1007/978-94-015-9757-9_7
27. Bussotti F., Ferretti M., Giordano P. and Mazzali C., A synthetic index to estimate tree condition in the Permanent Monitoring Plots of the CONECOFOR programme, *Annali dell'Istituto Sperimentale per la Selvicoltura*, volume 30, pp. 67-72, 1999.

See www.corpoforestale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/D.c8dc2e20c6ec76375728/P/BLOB%3AID%3D1017

28. Ferretti M., Giordano P. and Mazzali C., Methods of analysis of the Integrated and Combined (I&C) evaluation system. *Annali dell'Istituto Sperimentale per la Selvicoltura*, volume 30, pp. 33-42, 1999.
See www.corpoforestale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/D.c8dc2e20c6ec76375728/P/BLOB%3AID%3D1017
29. Ferretti M., Giordano P. and Mazzali C., Definitions of risk, status and changes in the Permanent Monitoring Plots in Italy – A preliminary attempt. *Annali dell'Istituto Sperimentale per la Selvicoltura*, volume 30, pp. 135-149, 1999.
See www.corpoforestale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/D.c8dc2e20c6ec76375728/P/BLOB%3AID%3D1017
30. Ferretti M., F. Alianiello, S. Allavena, T. Amoriello, E. Amorini, F.A. Biondi, A. Buffoni, F. Bussotti, G. Campetella, R. Canullo, A. Costantini, A. Cutini, G. Fabbio, C. Ferrari, P. Giordano, E. Magnani, A. Marchetto, G. Matteucci, C. Mazzali, G. Mecella, R. Mosello, R. Nibbi, B. Petriccione, E. Pompei, F. Riguzzi, G. Scarascia-Mugnozza, M. Tita, The Integrated and Combined (I&C) Evaluation System – Achievements, Problems and Perspectives. *Annali dell'Istituto Sperimentale per la Selvicoltura*, volume 30, pp. 151-156, 1999.
See www.corpoforestale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/D.c8dc2e20c6ec76375728/P/BLOB%3AID%3D1017

Books

1. Albeverio S., Andrey D., Giordano P., Vancheri A. (Eds.) (2007) *The Dynamics of Complex Urban Systems. An Interdisciplinary Approach*. Springer, Berlin Heidelberg New York. Proceedings of the conference held in Monte Verità (Ascona) 4-6 November 2004, 350 pages, Physica-Verlag Heidelberg.
2. Albeverio S., Giordano P., Vancheri A. (2017) *Modelli e metodi matematici per la dinamica urbana*. To appear in the Unitext series of Springer Verlag Italy.

Contributions to conferences and invited lectures

1. Invited talk at Institute for Scientific Interchange (ISI), Turin, 30 November 2016, “MaTryCS - A mathematical theory of complex systems”.
2. Speaker at the workshop WING 2016, June 29 – July 3, 2016, University of Innsbruck, Austria. Title: “Some ideas on generalized smooth functions”.
3. Invited speaker at the “Mini-workshop sulle matematiche non-Archimedee”, University of Pisa, January 22, 2015: title: “Reali di Fermat”.
4. Invited talk at the University of Pisa, January 21, 2015: title: “Funzioni lisce generalizzate”.
5. Speaker at the conference “Generalized Functions 2014”, Southampton, UK, September 8 - 12, 2014. Title: “Unifying order structures for Colombeau algebras”.
6. Invited talk at the conference “13th International Conference on p-adic Functional Analysis”, Paderborn, Germany, August 12–16, 2014. Title: “Theory of infinitely near points in smooth manifolds: the Fermat functor”.
7. Invited opening talk at the workshop “Workshop on diffeologies etc”, Aix en Provence, France, June 25 - 27, 2014. Title: “Theory of infinitely near points in smooth manifolds: the Fermat functor”.
8. Speaker at the conference “18th ÖMG Congress and Annual DMV Meeting”, Innsbruck, September 23 – 27, 2013; title: “Theory of infinitely near points in smooth manifolds: the Fermat functor”.

9. Invited speaker at the University of Bonn, May 28, 2013; title: "Generalized functions as a category of smooth set-theoretical maps".
10. Speaker at the conference "9th International ISAAC Congress", August 5-9, 2013, Krakow, Poland; title: "Generalized functions as a category of smooth set-theoretical maps".
11. Speaker at the conference "XXII St. Petersburg Summer Meeting in Mathematical Analysis", St. Petersburg, Russia, June 25-30, 2013; title: "Generalized functions as a category of smooth set-theoretical maps".
12. Invited plenary lecture at the conference "Algebra, Geometry and Mathematical Physics", Brno, Czech Republic, September 12-14, 2012; title: "Infinitesimal without Logic".
13. Speaker at the conference "PDE, Microlocal and Time-frequency Analysis", Novi Sad, Serbia, September 3-8, 2012; title: "Generalized functions as a category of smooth set-theoretical maps".
14. Speaker at the conference "Mathematical Logic and General Topology", Novi Sad, Serbia, September 5-8, 2012; title: "Ultrafilter sets smaller than their complements".
15. Speaker at the conference "XVII Geometrical Seminar", Zlatibor, Serbia, September 3-8, 2012; title: "Theory of infinitely near points in smooth manifolds: the Fermat functor".
16. Invited speaker at the symposium "Theories of Continua: Logical and Philosophical Reflections" as part of the 14th *Congress of Logic, Methodology and Philosophy of Science* in Nancy, France, July 2011; title: "Knowledge comes from the dialectic between two worlds: the case of Fermat reals".
17. Speaker at the conference "Generalized functions 2011", Fort de France, Martinique, April 2011; Title: "Interacting worlds: transfer of ideas from Fermat ring to Colombeau's ring".
18. Caputo P., Giordano P., Vancheri A., "Towards sustainable cities. Analysis and improvement of the urban metabolism of Lugano and Barcelona". Presented at the conference PALENC 2010, 20 September - 1 October 2010.
19. Invited lecturer at the course "Metodi matematici per la progettazione" of Prof. E. Marchetti, Polytechnic of Milan. Title: "Evidence based design: ovvero le interazioni tra matematica e urbanistica". Milan, December 2009.
20. Speaker at the conference "Logic and Mathematics", York, August 2009; title: "Fermat reals: An example of dialogue between formalism and intuition".
21. Invited speaker at the colloquium of the Interdiziplinäre Zentrum für Komplexe Systeme (IZKS, Bonn, Germany), June 2009; title: "Dynamics of cities: A mathematical planning tool for shopping malls".
22. Invited speaker at the conference "INPUT08", Lecco, March 2009; title: "Planning of a complex system: the problem of big traffic generators".
23. Invited lecturer at the course "Metodi matematici per la progettazione" of Prof. E. Marchetti, Polytechnic of Milan. Title: "Matematica dei sistemi complessi e decisioni in urbanistica". Milan, November 2008.
24. Invited speaker at the conference "S4 modeling tour", Milan, April 2008; title: "Interaction Spaces: a language for the collaboration between MAS and hard sciences".
25. Speaker at the conference "Innovation for Sustainable Production 2008", i-SUP 2008, April, 22-25, 2008, Bruges, Belgium; title: "A mathematical model of complex mobility patterns for big traffic generators competition and sustainability".
26. Invited speaker at the conference VIIth AESOP workshop, Thematic Group on Planning and Complexity, Milan, 22 - 23 February 2008; title: "Interaction Spaces Theory: modeling complex systems with the details of MAS and the mathematics of Synergetics".

27. Invited lecturer at the course “Metodi matematici per la progettazione” of Prof. M.S. Vianello, Polytechnic of Milan. Title: “Supporto alle decisioni in urbanistica mediante modello matematico”. Milan, November 2006.
28. Invited speaker at the conference “Systemic approach and microscale urban complexity”, February 2006; title: “Interaction Spaces: cellular automata + multi-agents models with sound mathematical properties”.
29. Invited speaker at the conference “Herbsttagung Schweizerische Mathematische Gesellschaft”, Lugano, 22-24 September 2005; title: “A mathematical model of urban systems”.
30. Speaker at the conference “Computer in Urban Planning and Urban Management”, London, July 2005; title: “Continuous valued cellular automata and decision processes of agents for urban dynamics”.
31. Invited speaker at the Bonn International Graduate School seminars, July 2003; title: “Infinitesimal Differential Geometry”.
32. S. Albeverio, D. Andrey, P. Giordano, M. Simona, A. Vancheri, “Continuum state cellular automata based models of urban growth processes”, contribution presented at the International Congress of Industrial and Applied Mathematics ICIAM, Sydney, 2003.
33. Invited speaker at the conference “I numeri infinitesimi – Aspetti storici, filosofici, scientifici e didattici di una grande controversia”, Pisa November 2002; title: “Infinitesimi nilpotenti: metodo e creatività”.
34. Invited speaker at the Institute of Applied Mathematics of Bonn in October 2002, title “Differential geometry in spaces of mappings”.
35. Invited speaker at the conference “NSA 2002”, satellite conference of the meeting UMI-AMS, Pisa, June 2002. Title “‘Standard infinitesimals’: actual nilpotent infinitesimals in standard analysis”.
36. Invited speaker at the University of Trento (I), March 2001. Title: “Geometria Differenziale con infinitesimi nilpotenti”.
37. Speaker at the conference “Quantitative methods for applied sciences” Siena, June 2000. Title: “Quantifying changes in ecosystem status as measured by multiple indicators”.
38. Invited speaker at the “Workshop multitematico in Fisica e Matematica”, 9th September 2000, CERFIM Locarno (CH). Title: “Nilpotent infinitesimals in differential geometry, analysis and physics”.
39. Invited speaker at the Institute of Applied Mathematics of Bonn in June 1999, title “Nilpotent infinitesimals in infinite dimensional differential geometry”.
40. Speaker at the conference “Reuniting the antipodes: constructive and non-standard views of the continuum”, Venice, 17-23 May 1999, title “Nilpotent infinitesimals and Synthetic Differential Geometry in classical logic”.
41. Speaker at the conference “Non-standard Analysis and Related Methods” (Oberwolfach, Germany), February 1999, title “An extension of the hyperreals with nilpotent infinitesimals”.

Important citations

About the article “Infinitesimal Differential Geometry” 2004, which establishes the starting of a new theory of nilpotent infinitesimals in differential geometry, it was written:

- “This important paper is well written and appealing”, A. Manià, MathSciNet review MR2122211.
- “[...] Paolo Giordano’s important work in which he develops an alternative category-theoretic, nilpotent-infinitesimalist approach to analysis and differential geometry that is compatible with classical logic”, P. Ehrlich, Review in The Bulletin of Symbolic Logic, Volume 13, Number 3, Sept. 2007.

About the article “Infinitesimals without Logic”, 2010, the editor of the RJMP commented:

- “Your mini-book is very impressive, it caused an increasing interest in our surrounding, and we feel that the point of view developed in your (mini-)book we’ve published in this way is promising and, as is shown already by your examples, can be very fruitful.”

About the preprint “Fermat reals: nilpotent infinitesimals and infinite dimensional spaces”, em. Prof. M.J. Greenberg in the foreword of the new edition of Courant’s *Calculus*:

- “Perhaps the new definition of nilpotent infinitesimals via his Fermat Reals by Paolo Giordano within classical logic and set theory will turn out to be more comfortable for “working mathematicians” and physicists to use.”