

CURRICULUM VITAE

PROF. DR. MARCELLA PALESE, PHD

PERSONAL DATA

Born: 1969

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EDUCATION

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| 1982–1987 | Scientific High School, with final marks 60/60 |
| 1987–1992 | <i>Laurea</i> Studies (Master Degree) in Theoretical and Nuclear Physics at the University of Lecce, Italy, with final marks 110/110 <i>cum Laude</i>
Specialization: geometric methods in Physics, prolongation structures, integrable nonlinear equations |
| 26/04/1993 | Thesis: <i>Strutture di prolungamento di equazioni di campo non lineari</i> ; Supervisors: Profs. R. A. Leo and G. Soliani |
| 1996–2000 | Ph.D. Studies in Mathematics at the Consortium University of Genova (leading), University of Torino, Polytechnic of Torino Italy (based at University of Torino).
Specialization: Geometric Methods in Mathematical Physics, Variational Sequences, Noether Theorems
PhD Thesis: <i>Geometric Foundations of the Calculus of Variations, Variational Sequences, Symmetries and Jacobi Morphisms</i> ; Supervisors: Profs. M. Francaviglia and M. Ferraris
The title of <i>Dottore di Ricerca in Matematica</i> was conferred by the Rector of the University of Genova on 24 February 2000 (the examination board was formed by Profs. R. Monaco, G. Stefani, A. Verra, G. Lolli, G. Mauceri). |

CAREER

- 01/03/2022 Associate Professor of Mathematical Physics at the Department of Mathematics, University of Torino, Italy
- 2007–2022 Adjunct Professor of Mathematical Physics at the Faculty of Sciences, Department of Mathematics, University of Torino, Italy
- 11/1999– 02/2022 Assistant Professor of Mathematical Physics at the Faculty of Sciences, Department of Mathematics, University of Torino, Italy
- 04/2000–10/2000 Research Fellow, Italian Council of Researches (CNR) as visiting Researcher at the Mathematical Institute, Opava University, Czech Republic (on leave).
- 1996–1999 Ph.D. grant Consortium University of Genova, University of Torino, Polytechnic of Torino Italy (based at University of Torino)
- 03/1995–12/1995 Research Fellow, Italian Council of Researches (CNR) at the Institute of Mathematical Physics J.-L. Lagrange, University of Torino, Italy
- 1994–1995 Research collaboration (Theoretical Physics Group) at the Department of Physics and INFN, University of Lecce, Italy

AFFILIATIONS

- 2023–today **Member of the COST ACTION CA21109 - Cartan geometry, Lie, Integrable Systems, quantum group Theories for Applications - CaLISTA - Working Group 4 “Vision models”**
- 2018–2023 **Member of the COST ACTION CA17139 - EUROpean TOPOlogy Interdisciplinary Action - EUTOPIA - Working Group 1 “Theory of topological entanglement in polymers and fibres”**
- 1999–today Member of the Department of Mathematics, University of Torino
- 01/10/2022–today Member of the Board for the Scientific Library of the Department of Mathematics, University of Torino
- 04/2019–08/2021 Member of the Board for the Scientific Research of the Department of Mathematics University of Torino (elected)
- 2013–2015 Member of the Board for the Scientific Research of the Department of Mathematics University of Torino (elected)

2000-2013	Member of the section <i>Relativity and Field Theory</i> of the National Group of Mathematical Physics (GNFM) of the National Institute of High Mathematics (INdAM)
2015-today	Member of the section <i>Differential Geometry</i> of the National Group for Algebraic, Geometric Structures and their Applications (GNSAGA) of the National Institute of High Mathematics (INdAM)
2016-today	Departmental coordinator Erasmus+ Programme Key Action 1 - Mobility for learners and staff - Higher Education Student and Staff Mobility Inter-institutional agreement 2017/18-2020/21 Università di Torino, Dipartimento di Matematica <-> Università di Ostrava, Repubblica Ceca.
***	past Member (per year) of the SIGRAV (Italian society of General Relativity and Gravitation)
***	past Member (per year) of the SISFA (Italian society of History of Physics and Astronomy)

RESEARCH ACTIVITY

Lectures

- **Invited Plenary Lecturer on Invariant variational problems and cohomology** at International Summer School on Global Analysis and its Applications General Relativity: 100 years after Hilbert Stará Lesná, Slovakia, 17th - 21st August 2015.
- **Invited Lecturer mini-course Cohomology and the Calculus of Variations** at XVIII Summer Diffiety School: School on Geometry of PDEs Lizzano in Belvedere (BO) Italy, July 20 - August 04, 2015.

Organizatorial activities

- **co-Organizer of the Workshop "Calculus of variations and field theories"**, Dipartimento di Matematica Università di Torino May, 31st 2023
- **co-Organizer of the Workshop 'Geometric Methods in Physics'** Torino, 1 June 2022
- **co-Organizer of the Workshop 'A Century of Noether Theorems' [100 years after Noether's 'Invariante Variationsprobleme']** Torino, 9 May 2018
- **co-Organizer of the Workshop Causality in General Relativity and related topics [100 years after Hilbert's 1917 "Die Grundlage der Physik (Zweite Mitteilung)"]** Torino, 29 May 2017

- **co-Organizer of the Workshop Variational Principles and conservation laws in General Relativity, Torino, 25-26 June 2015**
- **Organizer of the Satellite Thematic Session "Geometric methods in calculus of variation"**, 6 luglio Cracovia 2012,
<http://www.6ecm.pl/en/satellites-exhibitions/satellite-thematic-sessions-sts>,
(selected on the base of the program and topics by the Scientific Committee of the 6th European Congress of Mathematics, 2-7 luglio Cracovia 2012,
<http://www.6ecm.pl/>, formed by Eduard Feireisl (chair), Joan Bagaria, Brian Davies, Corrado De Concini, Gerhard Frey, Sara van de Geer, Sabir Gusein-Zade, Helge Holden, Jean-Francois Le Gall, Philip K. Maini, Marian Mrozek, Felix Otto, Jesus Sanz-Serna, Jan H. van Schuppen, Misha Sodin, Claire Voisin).
- **Member of the Scientific and Organizing Committee** of The International Conference "Differential Geometry and Dynamical Systems - 2011" (DGDS-2011)
- **Member of the Scientific and Organizing Committee** of The International Conference "Differential Geometry and Dynamical Systems - 2013" (DGDS-2013)
- **Member of the Scientific and Organizing Committee** of The International Conference "Differential Geometry and Dynamical Systems - 2015" (DGDS-2015)
- **Member of the Scientific and Organizing Committee** of The International Conference "Differential Geometry and Dynamical Systems - 2016" (DGDS-2016)
- **Member of the Scientific and Organizing Committee** of The International Conference "Differential Geometry and Dynamical Systems - 2016" (DGDS-2017)

EDITORIAL ACTIVITY

2015 - 2016 Int. J. Geom. Meth. Mod. Phys. - **Guest Editor** Special Issue on "Variational Principles and conservation laws in General Relativity" in memory of M. Francaviglia.

07/2012 - 11/2012 Communication in Mathematics - **Guest Editor** Special Issue on "Geometric methods in calculus of variation" vol. 20(1) (2012)

Referee for Physics Letters A, Journal of Differential Equations, Il Nuovo Cimento B, Reports on Mathematical Physics, International Journal of Mathematics and Mathematical Sciences, SIGMA, International Journal of Geometric Methods in Modern Physics, Geometry, Mathematical Methods in the Applied Sciences, Differential Geometry and its Applications.

Author of 54 reviews for American Mathematical Society - MathSciNet

Author of 31 reviews for Zentralblatt-Math

RESEARCH ADVISOR

- 2009-2013 **Scientific Advisor** for the research fellow project: Aspetti Geometrici delle Teorie Alternative della Gravitazione, Dr. M. Capone.
- 2012 **Advisor** PhD thesis in Mathematics: Cohomology of local variational problems and conservation laws, Dr. E. Garrone
- 2022 Member of an Examination Board for an Associate Professor at the University of Genova
- Examination Board of PhD in foreign Countries:**
- 2011 Z. Urban, Variational Sequences in Mechanics on Grassmann Fibrations, University of Ostrava, Czech Republic 2011
- 2010 J. Vondra, Natural Prolongation of Principal connections, University of Brno, Czech Republic 2010
- 2011 **Referee for Research Foundation Flanders (FWO) (BELGIUM) for post-doc fellows positions 2011.**
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RESEARCH PROJECTS

National Research Projects

- 2005 PRIN 2005 TEORIE DI CAMPO CLASSICO: ENTROPIA E LEGGI DI CONSERVAZIONE (member)
- 2003 PRIN 2003 TEORIE DI CAMPO CLASSICO: ENTROPIA E LEGGI DI CONSERVAZIONE (member)
- 2002 GNFM-INdAM progetto giovani 2002: Formalismo Hamiltoniano in Teoria dei Campi (member)

Local Research Projects at the Department of Mathematics University of Torino:

- 2022-2023 **Scientific Responsible** of the local Research project “Strutture geometriche e algebriche in Fisica Matematica e applicazioni (2022)”
- 2020-2021 **Scientific Responsible** of the local Research project “Strutture geometriche e algebriche in Fisica Matematica e applicazioni (2020)” (delayed because of the pandemic up to 2024)
- 2016-2017 **Scientific Responsible** of the local Research project “Strutture geometriche e algebriche in Fisica Matematica e applicazioni”
- 2009-2013 **Scientific Head** Research project (co-funded by Regione Piemonte and MIUR): Aspetti Geometrici delle Teorie Alternative della Gravitazione, fellow Dr. M. Capone.

- 2003-today **Member** of the local research projects (Dept. Math. Univ. Torino):
- Simmetrie variazionali, leggi di conservazione ed equazioni variazionali linearizzate;
 - Simmetrie variazionali e variazioni di ordine superiore su fibrati gauge-naturali;
 - Metodi gauge-naturali in teoria dei campi: Simmetrie e leggi di conservazione;
 - Leggi di conservazione nelle teorie di campo gauge-naturali;
 - Teorie di campo classiche: entropia e leggi di conservazione;
 - Teorie di campo classiche: calcolo delle variazioni, struttura lagrangiana ed hamiltoniana, leggi di conservazione, modelli cosmologici alternativi;
 - Leggi di conservazione in relativita classica e quantistica;
 - Metodi Geometrici in Fisica Matematica e Applicazioni.
- 2001 **Scientific Head** Progetto Giovani Ricercatori 2001 (Univ. Torino): Variazioni di ordine superiore e morfismi di jacobì generalizzati nelle sequenze variazionali;
- Other grants and acknowledgements (in national or international competitions)**
- 1994/1995 **Qualified** Perfezionamento in Matematica, classe di Scienze, Scuola Normale Superiore di Pisa.
- 1995/1996 **Winner first place** Research Fellow CNR 201.19.1 at Istituto di Fisica Matematica J.-L. Lagrange Università di Torino
- 1996-1999 **Winner second place** PhD Fellow, Dottorato di Ricerca in Matematica Consorzio Università di Genova-Politecnico di Torino-Università di Torino
- dal 28/04/2000 al 28/10/2000 **Winner first place**
Research Fellow CNR 203.01.71 (visiting scholar Silesian University in Opava, Rep. Ceca) on leave from the permanent position of 'Ricercatore' at Università di Torino
- 1999 **Winner** of a Research Fellow CNR 201.01.130 (not used for the overlapping with a tenure researcher position at University of Torino).
- 2012 **Winner** of an *una tantum subsidy* by the University of Torino for research and didactics activities.

International Collaborations and Visiting Seminars funded by local Research projects

2000-today

Department of Mathematics and Informatics, University of Brno, Czech Republic: Prof.s I. Kolar, J. Janyska, J. Musilova, J. Slovak

Department of Mathematics University of Ostrava, Czech Republic: Prof.s D. Krupka, O. Rossi, D.J. Saunders.

Department of Theoretical Physics University of Wroclaw, Poland: Prof. A. Borowiec

Academy of Science, Warsaw, Poland: Prof. J. Kijowski

2007 University of Stuttgart, Germany: Dr. F. Leitner.

2000 Institute of Mathematics, University of Erlangen-Nuernberg, Germany: Dr. E. Winterroth (GNFM short term visits funds)

Research interests

- Applications of differential geometry and sheaf cohomology to mathematical physics, theory of nonlinear phenomena, theoretical physics, ecology, models of visual cortex, etc.

- Study of epistemological foundations of sciences

Details about my research:

- geometric aspects of the formal calculus of variations

- variational sequences

- local variational problems

- symmetries and conservation laws

- Noether Theorems and the second variation

- relationships among symmetries, conservation laws and solutions in nonlinear systems

- applications of differential geometry (contact structures, Cartan connections) to mechanics and to models in neurosciences

- epistemology of Noether theorems and invariants' theory in Physics

Relevant research results:

-> The relation between the Jacobi morphism and the Noether Theorems

-> The relation between the kernel of the Jacobi morphism and the Lie derivative of gauge-natural fields

-> Variational characterization of Higgs fields on (spinor) gauge-natural bundles

- > The relation between the existence of global critical sections and conservation laws in Chern-Simons theories
 - > Symmetries of models for optical fibers, spin models, ecology systems, continuous Toda type models (towers with skeletons).
 - > Partice-like structures in integrable systems.
 - > Higher variations, symmetry transformations of extremals and conservation laws.
 - > Geometric integration by parts and Lepage equivalents, higher order Lepage equivalents.
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Main scientific publications

1. M. Palese, F. Zanello (2023): Second order Lagrangians for $(2 + 1)$ -dimensional generalized Boussinesq equations and an extension of the Krupka-Betounes equivalent, JPCS 2023, 2667(1), 012082
2. M. Palese, O. Rossi, F. Zanello (2022): Geometric integration by parts and Lepage equivalents, Differential Geometry and its Applications Volume 81, April 2022, 101866
3. M. Palese, E. Winterroth (2022): A cohomological obstruction in higher dimensional Chern-Simons gauge theories, INT. J. GEOM. METH. MOD. PHYS.2022, 19(3), 2250032
4. L. Accornero, M. Palese (2021): Symmetry transformations of extremals and higher conserved quantities: Invariant Yang–Mills connections JOURNAL OF MATHEMATICAL PHYSICS 62, 043504 (2021)
5. M. Palese, E. Winterroth (2020): Particle-like, dyx-coaxial and trix-coaxial Lie algebra structures for a multi-dimensional continuous Toda type system, NUCLEAR PHYSICS B 960 (2020) 115187
6. L. Accornero, M. Palese: The Jacobi morphism and the Hessian in higher order field theory; with applications to a Yang–Mills theory on a Minkowskian background, INT. J. GEOM. METH. MOD. PHYS., Vol. 17, No. 08, 2050114 (2020)
7. M. Palese, E. Winterroth (2019) Higgs fields induced by Yang–Mills type Lagrangians on gauge-natural prolongations of principal bundles, INT. J. GEOM. METH. MOD. PHYS. (2019).
8. M. Palese, E. Winterroth (2017) Topological obstructions in Lagrangian field theories, with an application to 3D Chern-Simons gauge theory, J. MATH. PHYS. 58, 023502 (2017).
9. M. Palese, O. Rossi, E. Winterroth, J. Musilova (2016) Variational sequences, Representation Sequences and Applications in Physics, SIGMA 12 (2016), 045, 45 pages.
10. F. Cattafi, M. Palese, E. Winterroth (2016) INT. J. GEOM. METH. MOD. PHYS. 13 (8), 1650067 (2016) [16 pages].

11. M. Palese (2016) Algebraic structures generating reaction-diffusion models: the activator-substrate system, ECOLOGICAL COMPLEXITY (2016), doi:10.1016/j.ecocom.2016.01.003,
12. M. Palese, E. Winterroth (2014) Generalized symmetries generating Noether currents and canonical conserved quantities. JPCS. 563 012023 ISSN: 1742-6596.
13. M. Palese (2013) Towers with skeletons for the (2+1)-dimensional continuous isotropic Heisenberg spin model. JPCS. 411. 012024 ISSN: 1742-6588.
14. Francaviglia M., Palese M., Winterroth E. (2013). Variationally equivalent problems and variations of Noether currents. INT. J. GEOM. METH. MOD. PHYS. 10 (1), p. 1220024 -(10 pages), ISSN: 0219-8878, doi: 10.1142/S02198878122002412012
15. M. Palese, E. Winterroth (2011). A variational perspective on classical Higgs fields in gauge-natural theories. THEORETICAL AND MATHEMATICAL PHYSICS, 168(1), p. 1002-1008, ISSN: 0040-5779
16. M. Palese, E. Winterroth (2011). Infinitesimal algebraic skeletons for a (2+1)-dimensional Toda type system. ACTA POLYTECHNICA, vol. 1, p. 54-58, ISSN: 1210-2709
17. M. Ferraris, M. Francaviglia, M. Palese, E. Winterroth (2011). Gauge-natural Noether currents and connection fields. INTERNATIONAL JOURNAL OF GEOMETRIC METHODS IN MODERN PHYSICS, vol. 8(1), p. 1-9, ISSN: 0219-8878
18. M. Ferraris, M. Palese, E. Winterroth (2011). Local variational problems and conservation laws. DIFFERENTIAL GEOMETRY AND ITS APPLICATIONS, vol. 29, p. S80-S85, ISSN: 0926-2245
19. M. Palese, E. Winterroth, E. Garrone (2011). Second variational derivatives of local variational problems and conservation laws. ARCHIVUM MATHEMATICUM, vol. 47(5), p. 395-403, ISSN: 0044-8753
20. M. Ferraris, M. Francaviglia, M. Palese, E. Winterroth (2008). Canonical Connections in Gauge-Natural Field Theories. INTERNATIONAL JOURNAL OF GEOMETRIC METHODS IN MODERN PHYSICS, vol. 5 (6), p. 973-988, ISSN: 0219-8878, doi: 10.1142/S0219887808003144
21. Marcella Palese, Ekkehart Winterroth (2008). Lagrangian reductive structures on gauge-natural bundles. REPORTS ON MATHEMATICAL PHYSICS, vol. 62 (2), p. 229-239, ISSN: 0034-4877
22. M. Palese, E. Winterroth (2008). Noether identities in Einstein-Dirac theory and the Lie derivative of spinor fields. In: O. Kowalski, D. Krupka, O. Krupkova . DIFFERENTIAL GEOMETRY AND ITS APPLICATIONS, PROC. 10TH INT. CONF. DGA2007. p. 643-653, Singapore:WORLD SCIENTIFIC , ISBN: 9789812790606

23. M. Palese, E. Winterroth (2007). The relation between the Jacobi Morphism and the Hessian in gauge-natural field theories. THEORETICAL AND MATHEMATICAL PHYSICS, vol. 152(2), p. 377-389, ISSN: 0040-5779
24. M. Palese, E. Winterroth (2006). Some aspects of the homogeneous formalism in Field Theory and gauge invariance. ARCHIVUM MATHEMATICUM, vol. 42 (Suppl), p. 319-327, ISSN: 0044-8753
25. M. Palese, E. Winterroth (2005). Global Generalized Bianchi Identities for Invariant Variational Problems on Gauge-natural Bundles. ARCHIVUM MATHEMATICUM, vol. 41(3), p. 289-310, ISSN: 0044-8753
26. M. Francaviglia, M. Palese, R. Vitolo (2005). The Hessian and Jacobi Morphisms for Higher Order Calculus of Variations. DIFFERENTIAL GEOMETRY AND ITS APPLICATIONS, vol. 22 (1), p. 105-120, ISSN: 0926-2245
27. M. Francaviglia, M. Palese, E. Winterroth (2005). Generalized Bianchi identities in gauge-natural field theories and the curvature of variational principles. REPORTS ON MATHEMATICAL PHYSICS, vol. 56(1), p. 11-22, ISSN: 0034-4877
28. M. Palese (2005). Baecklund loop algebras for compact and non-compact nonlinear spin models in (2+1) dimensions. THEORETICAL AND MATHEMATICAL PHYSICS, vol. 144(1), p. 1014-1021, ISSN: 0040-5779
29. M. Francaviglia, M. Palese, E. Winterroth (2005). Second variational derivative of gauge-natural invariant Lagrangians and conservation laws. In: J. Bures et al.. Proc.IX Int. Conf. Diff. Geom. Appl.. vol. -, p. 591-604, PRAHA: MATFYZPRESS, Charles University in Prague, ISBN: 8086732630
30. M. Palese, E. Winterroth (2004). Covariant gauge-natural conservation laws. REPORTS ON MATHEMATICAL PHYSICS, vol. 54(3), p. 349-364, ISSN: 0034-4877
31. M. Francaviglia, M. Palese, R. Vitolo (2002). Symmetries and Conservation Laws in Variational Sequences. CZECHOSLOVAK MATHEMATICAL JOURNAL, vol. 52(127), p. 197-213, ISSN: 0011-4642
32. M. Palese, E. Winterroth (2002). Nonlinear (2+1)-dimensional field equations from incomplete Lie algebra structures.. PHYSICS LETTERS. SECTION B, vol. 532, p. 129-134, ISSN: 0370-2693
33. Mauro Francaviglia, Marcella Palese (2002) Generalized Jacobi morphisms in variational sequences, in: Jan Slovák and Martin Šadek (eds.): Proceedings of the 21st Winter School "Geometry and Physics". Circolo Matematico di Palermo, Palermo, 2002. Rendiconti del Circolo Matematico di Palermo, Serie II, Supplemento No. 69., 195-208.)

34. Fatibene L., M. Francaviglia, Palese M. (2001). Conservation Laws and Variational Sequences in Gauge-Natural Theories. MATHEMATICAL PROCEEDINGS OF THE CAMBRIDGE PHILOSOPHICAL SOCIETY, vol. 130 (2), p. 555-569, ISSN: 0305-0041
35. M. Francaviglia, M. Palese, R. Vitolo (1999). Superpotentials in variational sequences. In: I. Kolar et al.. Proceedings of the 7th International Conference on Differential Geometry and Applications-Satellite Conference of ICM in Berlin. p. 469-480, Masaryk University Brno, ISBN: 8021020970
36. M. Palese, Alfinito E., Leo M., Leo R. A., Soliani G (1996). Algebraic and geometrical properties of integrable nonlinear field equations. In: E. Alfinito et al.. Nonlinear physics. Theory and experiment. Nature, Structure and Properties of Nonlinear Phenomena. vol. -, p. 249-252, RIVER EDGE, NJ: World Scientific, ISBN: 9810225598
37. Alfinito E., Leo M., Leo R. A., M. Palese, Soliani G (1995). Integrable nonlinear field equations and loop algebra structures. PHYSICS LETTERS. SECTION B, vol. 352, p. 314-320, ISSN: 0370-2693
38. Alfinito E., Leo M., Leo R. A., M. Palese, Soliani G (1994). Algebraic properties of the 1+1 dimensional Heisenberg spin field model. LETTERS IN MATHEMATICAL PHYSICS, vol. 32, p. 241-248, ISSN: 0377-9017

Other scientific publications

39. M. Palese, M. Capone (2022): Perfect fluid geometries in Rastall's cosmology, The Fifteenth Marcel Grossmann Meeting, pp. 437-440 (2022) World Scientific.
40. M. Palese (2016) Variations by generalized symmetries of local Noether strong currents equivalent to global canonical Noether currents, Communications in Mathematics 24 (2016) 125–135.
41. M. Palese, E. Winterroth (2016) Classical Higgs fields on gauge gluon bundles, EPJ WOC Web of Conferences 129, 00016 (2016).
42. L. Fatibene, M. Ferraris, G. Magnano, M. Palese, M. Capone, S. Garruto, S. Mercadante, E. Winterroth, Higgs-like field from extended theory of gravitation, International Journal of Geometric Methods in Modern Physics, Volume: 11, Number: 02 (February 2014) DOI: 10.1142/S0219887814600019 1460001
43. M. Palese, E. Winterroth (2013) Higgs fields on spinor gauge-natural bundles. JPCS. 411. 012025- ISSN: 1742-6596.
44. M. Francaviglia, M. Palese, E. Winterroth (2013) Cohomological obstructions in locally variational field theories. JPCS. 474 . ISSN: 1742-6596.

45. Francaviglia M., Palese M., Winterroth E. (2012). Locally variational invariant field equations and global currents: Chern-Simons theories. COMMUNICATIONS IN MATHEMATICS, 20 p.13-22, ISSN: 1804-1388
46. Palese M., Winterroth E. (2012). Symmetries of Helmholtz forms and globally variational dynamical forms. JPCS. 343 012129-(5pp.), ISSN: 1742-6596
47. Palese M., Winterroth E. (2012). Constructing towers with skeletons from open Lie algebras and integrability. JPCS.343, 012091-(7 pp.), ISSN: 1742-6596
48. M. Palese, E. Winterroth (2011). Variational Lie derivative and cohomology classes. AIP CONFERENCE PROCEEDINGS, vol. 1360, p. 106-112, ISSN: 0094-243X
49. M. Palese, E. Winterroth (2009). Invariant Variational Problems and Cartan Connections on Gauge-Natural Bundles. AIP CONFERENCE PROCEEDINGS, vol. 1191, p. 160-165, ISSN: 0094-243X
50. M. Palese, E. Winterroth (2007). Variational derivatives and Noether identities in gauge-natural theories. In: D. Iglesias Ponte et al. eds., XV International Workshop on Geometry and Physics, Puerto de la Cruz, September 11-16, 2006. Publicaciones de la Real Sociedad Matemática Española. vol. 11, p. 328-334 ISBN: 9788493519612
51. M. Palese, E. Winterroth (2006). Gauge-natural field theories and Noether Theorems: canonical covariant conserved currents. RENDICONTI DEL CIRCOLO MATEMATICO DI PALERMO. SUPPLEMENTO, vol. 79, p. 161-174, ISSN: 1592-9531
52. M. Francaviglia, M. Palese, E. Winterroth (2006). A general geometric setting for the energy of the gravitational field. Recent Developments in Gravitational Physics INSTITUTE OF PHYSICS CONFERENCE SERIES, vol. 176, p. 391-395, ISSN: 0951-3248
53. M. Francaviglia, M. Palese (2006). Generalized Jacobi morphisms and the variation of the Einstein tensor. Recent Developments in Gravitational Physics INSTITUTE OF PHYSICS CONFERENCE SERIES, vol. 176, p. 385-390, ISSN: 0951-3248, Monte Porzio Catone (Roma), 9-12/09/2002
54. Francaviglia M, Palese M, Winterroth E (2005). Bergmann-Bianchi identities in field theories. In: 16th SIGRAV Conference on General Relativity and Gravitational Physics. AIP CONFERENCE PROCEEDINGS, vol. 751, p. 188-190, ISSN: 0094-243X, Vietri (Italy), 13-16/09/04
55. A. Borowiec, M. Ferraris, M. Francaviglia, M. Palese (2003). Conservation laws for non-global Lagrangians. UNIVERSITATIS IAGELLONICAE ACTA MATHEMATICA, vol. 41, p. 319-331, ISSN: 0860-0120

56. M. Palese, Winterroth E (2003). On the Geometry of Bäcklund Transformations. In: M.J. Ablowitz et al.. *Nonlinear Physics: Theory and Experiments. II.* vol. -, p. 254-257, Singapore:World Scientific, ISBN: 9812382704
57. M. Palese, Vitolo R (2001). On a class of polynomial Lagrangians. *RENDICONTI DEL CIRCOLO MATEMATICO DI PALERMO. SUPPLEMENTO*, vol. 66, p. 147-159, ISSN: 1592-9531
58. Francaviglia M, M. Palese, Winterroth E (2001). A New Geometric Proposal for the Hamiltonian Description of Classical Field Theories. In: O.Kowalski et al.. *Mathematical Publications Differential Geometry and its Applications.* vol. 3, p. 415-424, OPAVA:Silesian University at Opava, Czech Republic, ISBN: 8072481665
59. M. Francaviglia, M. Palese (2001). Second order variations in variational sequences. In: L. Kozma et al.. *Steps in differential geometry.* vol. -, p. 119-130, DEBRECEN:Institute of Mathematics and Informatics, University Debrecen, H-4010 Debrecen, Pf. 12. Hungary
60. M. Palese, Leo R.A, Soliani G (2000). The Prolongation Problem for the Heavenly Equation. In: B. Casciaro,D. Fortunato, M. Francaviglia, M. Masiello . *Recent developments in general relativity.* p. 337-344, MILANO:Springer Italia, ISBN: 8847000688

Publications on foundations

61. M. Palese, E. Winterroth (2018) Noether theorems and reality of motion. Fourteenth Marcel Grossmann Meeting - MG14 University of Rome "La Sapienza" - Rome, July 12-18, 2015 World Scientific.
62. Francaviglia M., Palese M., Winterroth E. (2013) Field equations or conservation laws?, in Pisano R et al (eds) (2013); in *Physics, Astronomy and Engineering. Critical Problems in the History of Science and Society.* The Scientia Socialis Press, Siauliai. ISBN: 978-609-95513-0-2, 271-278.
63. L. Fatibene, M. Francaviglia, M. Palese (2010). Spazio, Tempo e Materia: Descartes, Newton, Einstein e le Teorie di Campo Moderne e Contemporanee. In: R. Cirino et al eds. *Filosofia e scienza.* vol. 1, p. 55-66, Roma: Aracne editrice, ISBN: 9788854837010
64. M. Francaviglia, M. Palese (2007). Il Ruolo della Geometria Non Euclidea nello Sviluppo delle Teorie Relativistiche della Gravitazione. In: AA. VV.. *Un Grande Matematico dell'Ottocento, Onoranze a Eugenio Beltrami 1835-1900, Milano 14-15 Ottobre 2004*", *Incontri di Studio 39*, Ed. Universitaria di Lettere, Economia e Diritto, Ist. Lombardo - Accademia di Scienze e Lettere (Milano, 2007). p. 195-210, Milano:Istituto Lombardo - Accademia di Scienze e Lettere
65. M. Francaviglia, M. Palese (2005). I fondamenti epistemologici della Relatività Generale e la sua "eredità matematica". *BOLLETTINO DELL'UNIONE MATEMATICA ITALIANA. A*, vol. 8-A.

66. R. Palese, M. Palese (2000). I "Metaphysische Anfangsgründe der Naturwissenschaft" di I. Kant; anticipazioni sulla possibilità di una Teoria di Relatività Generale. In: -. Atti del XIX congresso nazionale di storia della fisica e dell'astronomia. Centro Volta, Villa Olmo, Como, 28-29 maggio 1999, p. 267-273, Milano:Pasquale Tucci, Università di Milano
67. M. Francaviglia, M. Palese (1999). Il concetto di spazio da Euclide ad Einstein. In: Bruno D'Amore. Matematica e didattica: come privilegiare l'apprendimento. p. 138-140, BOLOGNA: Pitagora Editrice, ISBN: 9788837111137
68. M. Francaviglia, M. Palese (1999). Geometria e Fisica da Descartes ad Einstein. In: Lino Conti e Marco Mamone Capria. La scienza e i vortici del dubbio, p. 179-191, NAPOLI: Edizioni Scientifiche Italiane, ISBN: 9788881149964
69. M. Palese, R. Palese (1999). Il concetto di campo come elemento irriducibile della descrizione fisica in relatività generale. In: -. Atti del XVIII Congresso Nazionale di Storia della Fisica e dell'Astronomia. Centro Volta, Villa Olmo, Como, 15-16 maggio 1998, p. 239-246, Milano:Pasquale Tucci, Università degli studi di Milano.

Editorials

70. S. Capozziello, M. De Laurentis, L. Fatibene, M. Ferraris, M. Palese, E. Winterroth: Preface, Special Issue: Variational Principles and Conservation Laws in General Relativity, INTERNATIONAL JOURNAL OF GEOMETRIC METHODS IN MODERN PHYSICS 13 (8), 1602001.
71. Palese M. (2012). Editorial. In: Palese M. guest Editor. Communications in Mathematics Vol. 20/2012 No.1 (Issue on Geometric Methods in Calculus of Variations - STS of 6th ECM). vol. 20 (1), p. 1-2, OSTRAVA: University of Ostrava

Invited Lectures at Universities in Italy and abroad - not updated

1. Radici Cartesiane della Relatività Generale, invited by Prof. M. Galuzzi, presso il Dipartimento di Matematica dell'Università di Milano, 12 dicembre 1996;
2. Superpotenziali in Relatività Generale, invited by Prof. M. Modugno, presso il Dipartimento di Matematica Applicata dell'Università di Firenze, 8 ottobre 1997;
3. Superpotenziali: a Geometrical Setting in the framework of Variational Sequences, in Topologia, Problemi Ellittici al Contorno, Simmetrie ed Integrabilità, Lecce, 31/10/1998, invited by Prof. G. Soliani;

4. On Prolongation Structures of 2+1-Dimensional Nonlinear Field Equations, in *Topologia, Problemi Ellittici al Contorno, Simmetrie ed Integrabilita*, Lecce, 31/10/1998, invited by Prof. G. Soliani;
5. Symmetries in variational sequences, invited by Prof. D. Krupka, Opava, 04/05/2000;
6. Superpotential in variational sequences, invited by Prof. A. Borowiec, Wroclaw, 12/06/2000;
7. Second order variations in variational sequences, invited by Prof. D. Krupka, Opava, 19/10/2000;
8. Superpotentials in gauge-natural theories, invited by Prof. I. Kolar, Brno, 4/12/2000;
9. Symmetries in variational sequences, invited by Prof. K. Strambach, Erlangen-Nuernberg, 24/07/2001;
10. Second variational derivative of gauge-natural invariant Lagrangians and conservation laws, invited by Prof. I. Kolar, Praga, 2004;
11. Variational derivatives and conservation laws, invited by Prof. C. Bortone, Lecce 2004;
12. On the curvature of variational principles, invited by Prof. C. Bortone, Lecce 2005;
13. Noether identities in Einstein-Dirac theory and the Lie derivative of spinor fields, invited by Prof. I. Kolar, Olomouc, 2007.
14. Geometric aspects of gauge-natural field theories and conservation laws, invited by Prof. Herdeiro Oporto 2009.
15. Infinitesimal algebraic skeletons for a (2+1)-dimensional Toda type system, invited by Prof. Burdik Praga 2010.
16. Invariant gauge-natural Lagrangian field theories and Cartan connections, invited by Prof. J. Janyska Praga 2010.
17. Symmetries of Helmholtz forms and globally variational dynamical forms, invited by Prof. J. Musilova Brno 2012.
18. Variational derivative and the representation of the variational sequence by differential forms, invited by Prof. J. Janyska, Brno 2013

PARTICIPATION TO CONFERENCES, CONGRESS, WORKSHOPS AND SCHOOLS (AS A LECTURER)

1. Nonlinear Physics. Theory and Experiments (Gallipoli (LE), 29/06-07/07/1995);
2. Descartes and the Scientific Thought (Perugia, 3-7/08/1996);

3. Fondamenti della Fisica e Frontiere della Conoscenza (Trieste, 17-19/04/1997);
4. XVIII Congresso Nazionale di Storia della Fisica e dell'Astronomia (Como, 15-16/05/1998);
5. VII International Conference on Differential Geometry and its Applications (Brno, 10-14/08/1998);
6. XIII SIGRAV Conference on General Relativity and Gravitational Physics (Monopoli, Bari, 21-25/09/1998);
7. Topologia, Problemi Ellittici al Contorno, Simmetrie ed Integrabilita (Lecce, 29-31/10/1998);
8. XIX Winter School Geometry and Physics (Srni, 09-16/01/1999);
9. XIX Congresso Nazionale di Storia della Fisica e dell'Astronomia (Como, 28-29/05/1999);
10. XX Winter School Geometry and Physics (Srni, 15-22/01/2000);
11. Sophus Lie Seminar (Vienna, 29-31/05/2000);
12. Workshop on Geometrical Methods in Theoretical Physics, (Bialowieza, 2-10/07/2000);
13. Colloquium on Differential Geometry, (Debrecen, 25-30/07/2000);
14. XXI Winter School Geometry and Physics (Srni, 13-20/01/2001);
15. VIII Int. Conf. on Differential Geometry and its Applications (Opava, Czech Republic, 26-31/08/2001);
16. Int. Workshop Nonlinear Physics. Theory and experiments. II (Gallipoli (LE), 27/06-06/07/2002);
17. XV Congresso Nazionale di Relativita e Fisica della Gravitazione (Monte Porzio Catone (RM), 09-12/09/2002);
18. Int. Conf. Curvature in Geometry (Lecce, 13-18/06/2003);
19. Int. Conf. Current Geometry (Napoli, 24-28/06/2003);
20. XXXVI Int. Symposium on Mathematical Physics, Torun (Polonia) 09/06-12/06/04;
21. Int. Workshop Nonlinear Physics. Theory and experiments. III (Gallipoli (LE), 24/06-03/07/2004);
22. IX Int. Conf. Differential Geometry and its Applications, (Prague 29/08-03/09/2004);
23. XVI SIGRAV Conference on General Relativity and Gravitational Physics, Vietri (SA) 12-17/09/2004;
24. XXV Winter School Geometry and Physics (Srni, 15-22/01/2005);

25. Differential Geometry and Physics, (Budapest 28/08-02/09/2005);
26. XXVI Winter School Geometry and Physics (Srni, 14-21/01/2006);
27. Int.Workshop Nonlinear Physics. Theory and experiments. IV (Gallipoli (LE), 22/06-01/07/2006);
28. XV Int. Workshop on Geometry and Physics (Puerto de la Cruz,Tenerife, Spagna, 11-16/09/2006);
29. Recent Advances in Diff. Geometry, Int. Conf. In Honour of O. Kowalski (Lecce 13-16/06/2007);
30. Algebra and Geometry of PDEs, Tromsøe 12-17/08/2007;
31. X Int. Conf. Differential Geometry and its Applications, (Olomouc, 27-31/08/2007) **(INVITED)**;
32. XXVIII Winter School Geometry and Physics (Srni, 12-19/01/2008);
33. Int. Workshop Nonlinear Physics. Theory and experiments. V (Gallipoli (LE), 12-22/06/2008);
34. 40th Int. Symposium on Math. Phys., Torun (Polonia) 25/06-28/06/08;
35. XXVIII Workshop on Geometric Methods in Physics, 28 June - 4 July 2009 Bialowieza (Poland).
36. XVI International Congress on Mathematical Physics - Young Researcher Symposium. Prague, Czech Republic. 3 - 8 August 2009.
37. XIX Fall Workshop on Geometry and Physics Oporto 2010
38. XVIII International Conference on Integrable Systems and Quantum symmetries (ISQS-18) Praga 2010 **(INVITED)**
39. XI Int. Conf. on Diff. Geom. Applications, Brno 2010 **(INVITED)**
40. VII Int. Conf Quantum theory and symmetries (QTS-7) August 7-13, Prague 2011
41. XX International Conference on Integrable Systems and Quantum symmetries (ISQS-20) Praga 2012
42. 6th European Congress of Mathematics, 2-7 luglio Cracovia 2012 Organizer of the Satellite Thematic Session "Geometric methods in calculus of variation", 6 luglio Cracovia 2012.
43. XXI International Conference on Integrable Systems and Quantum symmetries (ISQS-21) Praga 2013
44. XII Int. Conf. on Diff. Geom. Applications, Brno 2013 **(INVITED)**
45. Curiosando nella Matematica 2014 Torino
46. XXII International Conference on Integrable Systems and Quantum symmetries (ISQS-22) Praga 2014

47. XXXIV Convegno della Societa Italiana degli Storici della Fisica e della Astronomia 2014 10-13/09/ 2014 Museo Galileo, Firenze
48. 14th Marcel Grossmann Meeting-MG14, Rome 12 - 18 July, 2015
Session: HR1 - History of Relativity and Cosmology
49. - **INVITED Lecturer mini-course Cohomology and the Calculus of Variations** at XVIII Summer Diffiety School: School on Geometry of PDEs Lizzano in Belvedere (BO) Italy, July 20 - August 04, 2015.
50. - **INVITED PLENARY Lecturer on Invariant variational problems and cohomology** at International Summer School on Global Analysis and its Applications General Relativity: 100 years after Hilbert Stará Lesná, Slovakia, 17th - 21st August 2015
51. 8th International Workshop on Quantum Chromodynamics - QCD@work, Martina Franca, 27-30 June 2016
52. XIII Int. Conf. on Diff. Geom. Applications, 11-15 July, Brno 2016
(INVITED)
53. 7th European Congress of Mathematics, 18-22 July, Berlin 2016
54. - **INVITED** International Summer School on Global Analysis and its Applications Krakow 21-25 August 2017
55. Causality in General Relativity and related topics [100 years after Hilbert's 1917 "Die Grundlage der Physik (Zweite Mitteilung)"]
Dipartimento di Matematica Univesità di Torino May, 29th 2017
56. "A Century of Noether Theorems" [100 years after Noether's "Invariant Variationsprobleme"], Dipartimento di Matematica Univesità di Torino May, 9th 2018.
57. 15th Marcel Grossmann Meeting-MG15, University of Rome "La Sapienza" - Rome, July 1-7, 2018.
58. New trends and open problems in Geometry and Global Analysis, August 27 - 31, 2018 Castle Rauischholzhausen.
59. Analysis of differential operators on manifolds, 24-26 September 2018, Universität Freiburg
60. Advances in Group Theory and Applications 2019, June 25-28, 2019 - Lecce (Italy)
61. XIV Int. Conf. Differential Geometry and its Applications DGA2019, Hradec Králové, Czech Republic, September 1-6, 2019
62. Geometric Analysis, Submanifolds, and Geometry of PDE's (GASP), Politecnico di Torino - September 9-13, 2019
63. Conceptual and Phenomenological Reflections on Gauge Symmetries, the Brout-Englert-Higgs Mechanism, Particles, and Observables, 05.11.2020 - 06.11.2020 University of Graz, Institut für Philosophie (online)

64. Winter School Geometry and Physics 19-20 January 2021, Srni (online)
65. 2021 Winter School in Mathematical Physics, 20-22 January 2021 Les Diablerets (online)
66. 52 Symposium on Mathematical Physics, Toruń, June 14-17, 2021 (online)
67. Integrable Systems in Geometry and Mathematical Physics, Conference in Memory of Boris Dubrovin, SISSA, 28 June-2 July 2021 (online)
68. MATHEMATICS OF LIFE 2021, Hybrid Meeting September 13-18, 2021, Hisarya, Bulgaria & online (within activity of COST ACTION EUTOPIA)
69. Workshop "Geometric Methods in Physics", Dipartimento di Matematica Università di Torino June, 1st 2022.
70. 53 Symposium on Mathematical Physics, Toruń, June 15, 2022 (online)
71. - **INVITED** MPDEE - Models in Population Dynamics, Ecology and Evolution, Torino, Italy - June 13-17, 2022
72. - **INVITED** XV Int. Conf. Differential Geometry and its Applications DGA2019, Hradec Králové, Czech Republic, July 17–23, 2022
73. MATHMOD 2022 10th Vienna International Conference on Mathematical Modelling, July 27–29, 2022, Vienna, Austria
74. Avenues of Quantum Field Theory in Curved Spacetime, Sept. 14-16, 2022, Genova.
75. Workshop "Calculus of variations and field theories", Dipartimento di Matematica Università di Torino May, 31st 2023.
76. XII International Symposium on Quantum Theory and Symmetries, QTS12, July 24-28 2023, Prague.

TEACHING ACTIVITIES

Advisor of Master and Bachelor Thesis

- [2019] Master thesis in Mathematics

F. Zanello: Geometric Integration by Parts: Interior Euler Operator and Variational Morphisms (110/110, cum laude et mentione)

F. Zanello is a post-doc at the University of Potsdam.

- [2017] Master thesis in Mathematics

L. Accornero: Jet prolongations and calculus of variations: second and higher order variations in the framework of the variational sequence (110/110, cum laude et mentione)

This thesis has received a prize from the University of Torino as the best Thesis for the Master Course Mathematics in the years 2017-2018 ("medaglia d'argento") and the "Picco-Botta" prize.

L. Accornero is a post-doc at Max Planck Institute of Mathematics Bonn.

- [2015] Master thesis in Mathematics

F. Cattafi: Conservation Laws in Variational Sequences (110/110, cum laude et mentione)

F. Cattafi is a post-doc at the University of Wuerzburg.

- [2016] Bachelor thesis in Mathematics

I. Dalmaso: Modelli geometrico-funzionali della visione umana.

- [2015] Bachelor thesis in Mathematics

L. Accornero: Fibrati di getti e sequenza variazionale in meccanica (110/110 cum laude)

This thesis received the "S. Console" prize.

- [2014] Bachelor thesis in Mathematics

S. Gaido: Elementi di modellizzazione geometrica della percezione visiva

- [2011] Master thesis Laurea Magistrale in Studio dell'Evoluzione e Valorizzazione della Natura (SEVEN)

A. Mancuso: Matematica della complessità: modelli per la formazione dei "patterns" nei fenomeni naturali (110/110 cum laude;

This thesis has received a prize from the University of Torino as the best Thesis for the Master Course SEVEN in the years 2010-2011 ("medaglia d'argento").

Teaching activity and services for the University

- [2000/2001 and 2001/2002] Professore incaricato per affidamento

- [2007/08- today] Professore aggregato Facoltà di Scienze MM FF NN dell'Università di Torino

details:

2012-today

co-Titolare di Metodi Geometrici della Fisica Matematica (Elementi di Matematica Applicata-mutuato), Istituzioni di Fisica Matematica, Modelli fisico-matematici, Introduzione alla Fisica Matematica.

co-Titolare di Modelli Matematici (LM ECAU) 2016/2017.

Titolare di Modelli di sistemi complessi (LM in Biotecnologie industriali) 2012/13 2013/14 2014/15 2015/16.

Titolare di Modelli Matematici per le Applicazioni (e Introduzione alla Meccanica del Continuo-mutuato) 2011/12 .

Titolare di Advanced Mathematics / Complementi di Matematica Corso in lingua Inglese per il Master Europeo MAMA-SELF 2010/11 e 2011/12 (Corsi di Studio in Scienza dei Materiali)

Titolare di Modelli Matematici dei Sistemi Evolutivi 2009/2010 (Corsi di Studio in Scienze Naturali)

Titolare di Metodi Geometrici della Fisica Matematica 2007/2008

co-Titolare di Metodi Geometrici della Fisica Matematica 2000/2001 e 2001/2002

2002-today

Lecturer PhD courses, School of Science of Nature, Univ. Torino:

Metodi Geometrici della Fisica Matematica I (varie edizioni antecedenti al 2009)

Metodi Geometrici della Fisica Matematica II (varie edizioni antecedenti al 2009)

Fondamenti algebro-geometrici del calcolo delle variazioni: sequenze variazionali e simmetrie (varie edizioni antecedenti al 2009)

Coomologia e calcolo delle variazioni I 2009/10

Coomologia e calcolo delle variazioni II 2010/11

Equivalenti lepagiani e sequenze variazionali II 2011/12

Equivalenti lepagiani e sequenze variazionali II 2012/13

Coomologia e Teoremi di Noether 2013/14

Contact structures in the calculus of variations and cohomology 2015/16

Detail of some relevant training studies

1996-2000

attended PhD Courses

- Sistemi dinamici differenziabili (E. Vesentini); - Metodi geometrici della Fisica Matematica I (M. Francaviglia); - Metodi geometrici della Fisica Matematica II (M. Francaviglia); - Teorie di campo relativistiche (M. Ferraris); - Sistemi hamiltoniani integrabili (G. Magnano); - L'analisi nel XVIII secolo (C.S. Roero); - Geometria delle equazioni differenziali e applicazioni (S. Benenti); - Meccanica dei continui (M. Ferraris).

1995-2009

attended Advanced Courses

XX Scuola estiva di Fisica Matematica (Ravello, Villa Rufolo, 18-30/09 1995): - Metodi di Lyapunov: stabilita per sistemi differenziali ordinari del secondo ordine in R_n , e per equazioni di evoluzione in spazi di Banach (P. Pucci, Perugia e J. Serrin, Minneapolis); - Argomenti su equazioni differenziali alle derivate parziali in teoria cinetica e dei fluidi (B. Perthame, Parigi);

XXI Scuola estiva di Fisica Matematica (Ravello, Villa Rufolo, 09-21/09 1996): - Metodi di geometria differenziale e topologia in fisica matematica (K. Marathe, New York) - Problemi matematici in gravita quantistica (C. Rovelli, Pittsburgh e M. Carfora, Trieste);

XXII Scuola estiva di Fisica Matematica (Ravello, Villa Rufolo, 08-20/09 1997) - Integrabilita e caos in sistemi hamiltoniani (S. Bolotin, Mosca) - Problemi di meccanica quantistica (G. Dell'Antonio, Roma);

Graduate school in Contemporary Relativity and Gravitational Physics: Physics of Black Holes , (Como, Villa Olmo 20-24/04 1998): - Black Hole Entropy in Supergravity and U-Duality (R. D'Auria, Politecnico di Torino); - Counting of Microscopic BPS States and Black Hole Entropy (R. Dijkgraaf, Amsterdam); - Thermodynamics of Black Holes and Hawking Radiation (C. Kiefer, Freiburg im Breisgau); - Numerical Treatment of Black Holes (R. Matzner, Austin, Texas);

Advanced Course of Open Education & Science (Levoca, Slovacchia 17-21/08/1998) - Differential Invariants (D. Krupka, Opava University, Repubblica Ceca); - Natural Variational Principles in Physics (J. Novotny, Opava University, Repubblica Ceca); - Homological Methods in Equations of Mathematical Physics (J.S. Krasil'shchik e A.M. Verbovetsky, Moscow Univerity, Russia).

Advanced Course of Open Education & Science (Levoca, Slovacchia 14-19/08/2000) - Introduction to Canonical Gravity

(J. Kijowski, Center for Theoretical Physics Polish Academy of Sciences, Warsaw, Poland); - Introduction to Lorentzian Geometry in the Large (P. T. Chrusciel Departement de Mathematiques, Faculte des Sciences, Tours, France)

14th International Summer School in Global Analysis and Mathematical Physics (Satellite of the XVI ICMP Prague, 2009, <http://www.icmp09.com/>) Olomouc, Czech Republic, August 10-14, 2009 <http://globalanal.upol.cz/summer2009> - Multimomentum Maps and Classical Field Theory (Mark J. Gotay, Pacific Institute for the Mathematical Sciences, University of British Columbia, Vancouver, Canada) -The Noether Theorems: From Noether to Severa, Yvette Kosmann-Schwarzbach (Centre de Mathematiques Laurent Schwartz, Ecole Polytechnique, Palaiseau, France)

Torino, March 6, 2024