

Mauro Carfora

(October 2016)

Dipartimento di Fisica, Università degli Studi di Pavia

<http://fisica.unipv.it/personale/Persona.php?ID=238>

Education

Laurea in Fisica, (1977)

“La Sapienza” Roma

Ph.D. Physics, (1981)

University of Texas at Dallas

(Supervisor W. Rindler)

Positions

University of Pavia, Full Professor of Mathematical Physics, 2001 - Present

University of Pavia, Associate Professor of Theoretical Physics, 1997-2001

International School for Advanced Studies (ISAS-SISSA), Associate Professor of Math.Physics, 1992-1997

University of Pavia, Researcher (Theoretical Physics), 1985-1992

University of Rome "La Sapienza", Researcher (Theoretical Physics), 1981-1985

Visiting Positions

He has held visiting positions in many universities and research institutions abroad, among these: University of California, Berkeley (Physics Dept); BIRS at the Banff Centre, Canada; KITP at the University of California, Santa Barbara; University of Texas at Dallas, Ludwig-Maximilians-Universität München, N. Copernicus Astronomical Centre Warsaw, Banach Institute Warsaw; University of Oregon, Eugene; N. Bohr Institute, Copenhagen.

Honors and Awards

Tullio Levi-Civita International Prize for the Mathematical and Mechanical Sciences (with Tudor Ratiu) (2016).

Bruno Finzi Prize for Mathematical Physics of the Istituto Lombardo, Accademia di Scienze e Lettere (1997)

2nd Prize of The Gravity Research Foundation (with C. Rovelli and A. Bareira, 1996)

Profile of Success (together with Rebecca Bishop and Joseph P. Estrera) as testimonial of the Graduate School in Physics of the University of Texas at Dallas (2011).

Research Interests

Geometrical Analysis, and Combinatorial methods in theoretical and mathematical Physics. Applications in quantum gravity and moduli space theory. Ricci flow on Riemannian manifolds. Applications of geometric flows to theoretical and mathematical Physics. Renormalization group flow and geometrical flows. Relativistic cosmology.

Professional activities and service

-Counselor of the School of Graduate Studies in Science and Technology (Scuola di Alta Formazione Dottorale) (SAFD) of the University of Pavia 2014-present.

Member elected of the Scientific Committee of the National Group of Mathematical Physics (GNFM) of the National Institute of Advanced Mathematics (INDAM), (2001-2013)

Member of the Scientific Committee of the Centro Di Cultura Scientifica Alessandro Volta (2012-....)

-Dean of Graduate Studies in Physics of the University of Pavia, 2007-2014

-Vice-Director of the Department of Nuclear and Theoretical Physics of the University of Pavia, 2001-2012

-Coordinator of the theoretical group of the Pavia section of the INFN (Italian National Institute for Nuclear Physics) (1987-1993);

- Chief Editor of the Journal "GEOMETRIC FLOWS" published by DeGruyter (2013-...)
- Member of the Advisory Board of the journal "Mathematics and Mechanics of Complex Systems" (MEMOCS) (2012-...) published by the Research Center for the Mathematics and Mechanics of Complex Systems.

Projects:

- Local coordinator (Pavia) of the Italian national research projects:
 - "Geometry of Integrable systems I" (2000-2001 e 2002-2003).
 - "Geometry of Integrable systems II" (2004-2005)
 - "Moduli spaces, integrable structures, and PDE of evolutive type" (2006-2007)
 - "Geometrical methods in non linear wave equations and applications" (2008-2010).
 - "Geometrical and analytical theories of finite and infinite dimensional Hamiltonian systems" (PRIN 2010-11)
- Local coordinator (Pavia) of the INFN research projects
 - "Differential geometrical methods in field and string theory", (1985-2013)
- Local coordinator (Pavia) of the European HCM project Constrained Dynamical Systems (1993-96);
- Founding Member of the Scientific Committee of SIGRAV (Italian Society for Relativity and Gravitational Physics).
- Member of the Scientific Committee of the SIGRAV Graduate School in Contemporary Relativity and Gravitational Physics.

Organization of conferences and workshops

- Organizer (with: Giorgio Patrizio, Tommaso Ruggeri, Justin Corvino, Pengzi Miao) of the Summer School "Mathematical General Relativity in Cortona" (29 July-9 August, 2013) sponsored by INdAM (Istituto Nazionale di Alta Matematica), MSRI (Mathematical Science Research Institute), SMI (Scuola Matematica Interuniversitaria), CMI (Clay Mathematics Institute),
- Organizer (together with: Zidine Djadli (Institut Fourier, Universit'e Grenoble), Gerhard Huisken (Albert-Einstein-Institut), Lei Ni (University of California, San Diego), Eric Woolgar (University of Alberta)) of the International Workshop:
 - "Geometric flows in mathematics and physics" BIRS (Banff International Research Station- 5 days workshop 11w5010) Banff Centre (Canada), (17/04/2011 - 22/04/2011).
- Organizer (together with: Zidine Djadli, Andrea Malchiodi, Carlo Mantegazza) of the International Workshop:
 - "Geometric Flows in Mathematics and Theoretical Physics" Centro Ennio De Giorgi – Scuola Normale Superiore di Pisa, 22-25 June 2009
- Member of the Scientific Committee of "The jubilee 40th Symposium on Mathematical Physics: "Geometry and Quanta", June 25-28, 2008, Torun, Poland
- President (together with Bruno Bertotti) of the Scientific Committee of the International Conference "Spacetime in Action: one hundred years of Relativity" (Pavia March 29- April 2, 2005), framed within the UNESCO World Year of Physics 2005 Programme.
- Member of the Scientific Committee of the meeting "Problemi Attuali di Fisica Teorica" (Vietri, 2001, 2004, 2005, 2006, 2007, 2008,2010, 2012, 2014, 2015); Chair of the Quantum Gravity workshop.
- Acted as Committee Member for various Institutions (USA, Germany, France, Australia) for academic position evaluation.

5 publications

Carfora M, T Buchert, GFR Ellis, E W Kolb, MAH MacCallum, S Rasanen, BF Roukema, L Andersson, AA Coley and D Wiltshire (2015). Is there a proof that backreaction of inhomogeneities is irrelevant in cosmology?. CLASSICAL AND QUANTUM GRAVITY, vol. 32, p. 1-38, ISSN: 0264-9381, doi: 10.1088/0264-9381/32/21/215021

Carfora M, Marzuoli A (2012). Quantum Triangulations Moduli spaces, Strings, and Quantum computing. vol. 845, BERLIN HEIDELBERG:Springer Lecture Notes in Physics, ISBN: 9783642244391, doi: 10.1007/978-3-642-24440-7

Carfora M (2011). Ricci flow conjugated initial data sets for Einstein equations.. ADVANCES IN THEORETICAL AND MATHEMATICAL PHYSICS, vol. 15, p. 1411-1484, ISSN: 1095-0761

Carfora M (2007). Fokker-Planck Dynamics and Entropies for the normalized Ricci Flow. ADVANCES IN THEORETICAL AND MATHEMATICAL PHYSICS, vol. 11, p. 635-681, ISSN: 1095-0761

T. BUCHERT, M. CARFORA (2003). Cosmological Parameters are dressed. PHYSICAL REVIEW LETTERS, vol. 90, p. 031101-1,4, ISSN: 0031-9007

A selection of recent invited talks

"General Relativity and Einstein Equations" 12 lectures (with J. Corvino), XL SUMMER SCHOOL ON MATHEMATICAL PHYSICS (RAVELLO - SEPTEMBER 14 - 26, 2015).

"Topology, Entropy, and the Emergence of Geometrical Structures in Molecular Self-Assembly" Invited Talk at "Quantum Days in Bilbao: Mathematical Methods in Atomic and Molecular Physics", Bilbao, Basque Center for Applied Mathematics, (Bilbao, July 13-14 2015).

"Heat kernel embedding, dilatonic sigma models and Ricci flow extensions" Invited Talk at the BIRS Workshop "Geometric Flows: Recent Developments and Applications" (15w5148) (Banff, April 12-17, 2015)

"Einstein Constraints and Ricci Flow" a series of two lectures at the Indam-MSRI "Summer School on Mathematical Relativity in Cortona". (29 July- 9 August, 2013).

"Entropy: From geometrical enumeration to quantum field theory " Invited talk at 92e rencontre entre physiciens théoriciens et mathématiciens : Entropie en mathématiques et en physique. 26-28 Septembre 2013, (IRMA), Strasbourg, France."(Quantum) Glimpses of Spacetime Geometry " Invited talk at 87e rencontre entre physiciens théoriciens et mathématiciens : Géométrie de Lorentz en mathématiques et en physique 16-18 juin 2011, (IRMA), Strasbourg, France.

"Ricci Flow: A Theoretical Physics Perspective" and "Ricci flow conjugation and Initial data sets for Einstein Equations" Invited talks at the: Numerical Ricci Flow in Computer Science, Geometry, and Physics, Pacific Institute for Mathematical Sciences, Vancouver 14-16 July 2011.

"Ricci flow and Einstein equations" Invited talk at the: "Aspects géométriques et probabilistes de la théorie de la relativité", 10-12 juin 2010, (IRMA), Strasbourg, France