Curriculum Vitae

Giuseppe Saccomandi

Dipartimento di Ingegneria Industriale
Università degli Studi di Perugia
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Education

1987	Laurea in Matematica cum laude, Perugia, Italy
1988	Perfezionamento (major Solid State Physics), Perugia, Italy

Research and Teaching Positions

2007→	`Full Professor of Fisica-Matematica MAT/07`, Engineering Science School, Università degli Studi di Perugia.
2001–2007	Full Professor of Fisica-Matematica MAT/07, Engineering Science School, Università degli Studi Lecce. Co-chair of the Engineering Science School, Università degli Studi Lecce.
1999–2001	Associate Professor of Fisica-Matematica MAT/07, Engineering Science School, Università degli Studi Lecce.
1997–1999	Tenured Researcher of Fisica-Matematica A03X, Engineering Science School, Università degli Studi di Perugia.
1992–1997	Tenured Researcher of Fisica-Matematica A03X, Engineering Science School, Università degli Studi di Roma LA SAPIENZA.
1990–1992	Computer Engineer, Engineering Science School, Università degli Studi di Perugia.

Editorial Activity

`Editorial Board`

`International Journal of Engineering Science` (www.elsevier.com);

`Mathematics and Mechanics of Solids` (www.sagepub.com);

`Guest Editor`

Special issue of *International Journal of Nonlinear Mechanics* for the Millard Beatty Anniversary (vol. 36, n.3, 2001);

Special issue *International Journal of Nonlinear Mechanics* for the Cornelius Horgan Anniversary (vol. 40, n.2-3, 2005);

Special issue *IMA Journal of Applied Mathematics* dedicated to Robin J. Knops (vol. 72, n.5, 2007);

Special issue *Biomechanics and Modeling in Mechanobiology*: Mathematical Methods and Models of Continuum Biomechanics (vol. 6, n.5, 2007)

Special issue *Note di Matematica* for the Alan Day Anniversary (vol. 27, n.2, 2007).

`Book Editor`

(with M. Hayes): CISM Lectures notes 424 TOPICS IN FINITE ELASTICITY, Springer-Wien-New York (2001);

(with R. Ogden): CISM Lectures notes 452 THERMOMECHANICS AND MECHANICS OF RUBBER-LIKE MATERIALS, Springer-Wien-New York (2004);

(with M. Destrade): CISM Lectures notes 495, NONLINEAR WAVES IN PRESTRESSED MATERIALS Springer-Wien-New York, 2007.

(with J. Merodio): Theme *Continuum Mechanics* in the UNESCO-EOLSS encyclopedia (WWW.EOLSS.NET/E6-161-toc.ASPCX).

Miscellaneous Professional Activities

`Visiting Fellowships`

2006 Senior Fellowship *Ville de Paris* for a long term visit to the Laboratoire de Modélisation en Mécanique, UMR 7607, Paris. Visiting Professor, Matemàtica Aplicada 2, Universitat Politècnica de Catalunya, Terrassa, Barcelona.

2005 Visiting Professor, Laboratoire de Modélisation en Mécanique, UMR 7607, Paris. The fellowship was a Séjours scientifiques de haut niveau (SSHN) grant awarded by the French government via Egide. Visiting Professor, Matemàtica Aplicada 2, Universitat Politècnica de Catalunya, Terrassa, Barcelona.

1999, 2002 Visiting Professor, Department of Civil Engineering, University of Virginia, Charlottesville.

`Organizer`

Mini-workshop *Mathematical Problems in Electro-Active Materials*, Mathematisches Forschunginstitut Oberwolfach (Germany) (2008).

Advanced School NONLINEAR WAVES IN PRESTRESSED MATERIALS hosted by CISM in Udine (2006).

Mini-workshop *Mathematical Methods and Models of Continuum Biomechanics*, Mathematisches Forschunginstitut Oberwolfach (Germany) (2005).

Meeting *Mathematical Problems in Elastodynamics and Related Continuum Theories*, (sponsor Istituto Nazionale di Alta Matematica) Cortona (2003).

Mini-workshop *Mathematical problems in the nonlinear elastodynamics of rubber-like materials* at the Mathematisches Forschunginstitut Oberwolfach (2002).

Advanced School THERMOMECHANICS OR RUBBER-LIKE MATERIALS hosted by CISM in Udine (2002).

Advanced school TOPICS IN FINITE ELASTICITY hosted by CISM in Udine (2000).

`Scientific Council`

The Interplay between Mechanics and Biology on Multiple-Length Scales, Castro Urdiales, CIEM University of Cantabria, Spain (2007).

New Trends in Biomechanical Modelling: from Molecular Statistics to Continuum Mechanics, Castro Urdiales, University of Cantabria, Spain (2006).

Session *Continuum mechanics* of the 21st International Congress of Theoretical and Applied Mechanics, 15-21 August 2004, Warsaw, Poland. International scientific committee of the

2nd Canadian Conference on Nonlinear Solid Mechanics, Vancouver (2002).

Reviewer and Advisor

Nucleo de Investigação Officina Mathematica Universidade do Minho (Portogallo). King Fahd University of Petroleum and Minerals (Saudi Arabia). INTAS (International association for the promotion of cooperation with scientists from the new independent states of the former Soviet Union). EUROCORES. Israel Science Foundation. MathSci.

`Talks in International Conferences (last three years, only invited)`

2007 *Finite amplitude mechanics*, general meeting Gruppo Nazionale Fisica Matematica (INDAM) 2007, Montecatini. *Dispersive waves in nonlinear solids*, Wascom 2007, Scicli (Ragusa). *General reductions in nonlinear elastodynamics*, Symmetry and Perturbation Theory 2007, Otranto.

2006 *Compactons in DNA*, New Trends in Biomechanical Modelling: from Molecular Statistics to Continuum Mechanics, Castro Urdiales, Spain. *Nonlinear Wave Propagation in Media with An Inherent Characteristic Length* International Symposium on Mechanical Waves in Solids,

MAY 15-18, 2006 HANGZHOU CHINA *Nouvelles tendances en modélisation de la biomécanique: la phénoménologie au niveau moléculaire* Fédération Francilienne de mécanique Paris. *The importance to be compatible with the linear theory*, Irish Mechanics Society Meeting 2006, Dublin (Eire).

2005 *Finite chain elasticity: a short review*, ECCMR 2005, Stockholm (Sweden). *Finite amplitude wave propagation in elastic solids*, WASCOM 2005, Acireale (Italy). *The mathematics and mechanics of biological materials*, Laboratoire de Modélisation en Mécanique, UMR 7607, CNRS, Paris (Francia). *Recent insights in the mathematics and mechanics of rubber-Like and biological materials*, Mathematical Methods and Models of Continuum Biomechanics, Mathematisches Forschunginstitut Oberwolfach (Germania).

Selected Publications

Giuseppe Saccomandi has published more than 100 papers and several book chapters. Here we are listing only the most relevant, most recent and/or most cited publication. The publications are listed by topic.

Differential equations and group analysis of differential equations

[1a] E. Pucci, G. Saccomandi: *On the weak symmetry groups of partial differential equations*, J. of Math. Analysis and Appl. **163**, 588–598 (1992).

[2a] Y. Cherruault, G. Saccomandi, B. Some: *New results for convergence of Adomian's method applied to integral equations*, Math. Comput. Modelling **16**, 85–93 (1992).

[3a] E. Pucci, G. Saccomandi: *Potential symmetries and solutions by reduction of partial differential equations*, J. of Phys. A: Math Gen. **26**, 681–690 (1993).

[4a] G. Saccomandi: *Potential symmetries and reduction methods of order two*, J. of Phys. A: Math. **30**, 221–227 (1997).

[5a] A. Day, G. Saccomandi: *On rates of propagation for Burgers' equation*, Rendiconti Lincei **s9.V9**, 145-1-48 (1998).

[6a] E. Pucci, G. Saccomandi: *Evolution equations, invariant surface conditions and functional separation of variables*, Physica **D139**, 28–47 (2000).

[7a] E. Pucci, G. Saccomandi: *On the reduction methods for ordinary differential equations*, J. of Phys. A: Math. Gen. **35**, 6145–6155 (2002).

Continuum mechanics

[1b] E. Pucci, G. Saccomandi: *Universal relations in continuum mechanics* Cont. Mech. and Thermodynamics **9**, 61–72 (1997).

[2b] E. Pucci, G. Saccomandi: *Plane universal solutions for constrained materials*, Mathematics and Mechanics of Solids **3**, 201–216 (1998).

[3b] G. Saccomandi: *On inhomogeneous deformations in finite thermoelasticity*, IMA J. of Applied Mathematics **63**, 131–148 (1999).

[4b] G. Saccomandi, M. F. Beatty: *Universal relations for fiber reinforced materials*, Mathematics and Mechanics of Solids **7**, 95–110 (2002).

[5b] K. R. Rajagopal, G. Saccomandi: *On the dynamics of non-linear viscoelastic solids with material moduli that depend upon pressur*, Int. J. of Engng. Sci. **45**, 41–54 (2007).

[6b] R. de Pascalis, M. Destrade, G. Saccomandi: *The stress field in a pulled cork and some subtle points in the semi-inverse method of nonlinear elasticity*, Proceedings of the Royal Society of London, Series A **463**, 2945–2959 (2007) [1].

Wave propagation

[1c] M. Hayes, G. Saccomandi: *Finite amplitude transverse waves in special incompressible viscoelastic solids* J. of Elasticity **59**, 213–225 (2000).

[1] Paper noticed by Science (www.sciencemag.org/cgi/content/full/317/5842/1151c), La Recherche, The Telegraph (Aug. 22, 2007), Math in the News (http://mathgateway.maa.org/do/ViewMathNews?id=179).

[2c] M. Destrade, G. Saccomandi: *On finite amplitude elastic waves propagating in compressible solids* Physical Review E **72**, #0016620 (2005).

[3c] M. Destrade, G. Saccomandi: *Solitary and compact-like shear waves in the bulk of solids* Physical Review E **73**, # 065604(R) (2006).

[4c] M. Destrade, G. Saccomandi: *Creep, recovery, and waves in a nonlinear fiber-reinforced viscoelastic solid,* SIAM Journal on Applied Mathematics, **68**, 80–97 (2007).

[5c] M. Destrade, G. Saccomandi: *Nonlinear transverse waves in deformed dispersive solids*, Wave Motion, Special Issue in Honour of J. Achenbach, **45** 325–336 (2008).

Elastomers

[1d] C. O. Horgan, G. Saccomandi: *Simple torsion of isotropic, hyperelastic, incompressible materials with limiting chain extensibility*, J. of Elasticity **56**, 159–170 (1999).

[2d] C. O. Horgan, G. Saccomandi: *Pure azimuthal shear of isotropic, hyperelastic, incompressible nonlinear elastic materials with limiting chain extensibility*, Int. J. of Nonlinear Mechanics **36**, 465–475 (2001).

[3d] C. O. Horgan, G. Saccomandi, I. Sgura: *A two-point boundary value problem for the axial shear of hardening isotropic incompressible nonlinearly elastic materials*, SIAM J. of Appl. Math. **62**, 1712-1-727 (2002).

[4d] E. Pucci, G. Saccomandi: *A note on the Gent Model for rubber-like materials*, Rubber Chemistry and Technology **75**, 839–851 (2002).

[5d] C. O. Horgan, G. Saccomandi: *A molecular-statistical basis for the Gent model of rubber elasticity* J. of Elasticity, **68**, 167–176 (2002).

[6d] C. O. Horgan, G. Saccomandi: *Finite thermoelasticity with limiting chain extensibility*, Journal of Mechanics and Physics of Solids **75**, 839–851 (2003).

[7d] C. O. Horgan, R. W. Ogden, G. Saccomandi: *A theory of stress softening of elastomers based on finite chain extensibility.* Proceedings Royal Society of London A **460**, 1737Ű-1754 (2004).

[8d] R. W. Ogden, G. Saccomandi, I. Sgura: *Fitting hyperelastic models to experimental data* Computational Mechanics **34**, 484–502 (2004).

[9d] C. O. Horgan, G. Saccomandi: *A new constitutive theory for fiber-reinforced incompressible nonlinearly elastic solids* J. of Mech. and Phys. of Solids **53**, 1985–2025 (2005).

[10d] C. O. Horgan, G. Saccomandi: *Phenomenological hyperelastic strain-stiffening constitutive models for rubber* Rubber Chemistry and Technology **71**, 152–169 (2006).

[11d] D. De Tommasi, G. Puglisi, G. Saccomandi: *A micro-mechanical based model for the Mullins effect* J. of Rheology **50**, 495–512 (2006).

[12d] D. De Tommasi, G. Puglisi, G. Saccomandi: *Localized versus Diffuse Damage in Amorphous Materials* Physical Review Letters **100**, #085502 (2008) .

Biomechanics

[1e] C. O. Horgan, G. Saccomandi: *Constitutive modelling of rubber-like materials and biological materials with limiting chain extensibility*, Mathematics and Mechanics of Solids **7**, 353–371 (2002).

[2e] C. O. Horgan, G. Saccomandi: *A description of arterial wall mechanics using limiting chain extensibilty constitutive models* Biomechanics and Modeling in Mechanobiology **1**, 251–266 (2003).

[3e] G. Saccomandi, I. Sgura: *The relevance of nonlinear stacking interactions in simple models of double-stranded DNA* J. of the Royal Society Interfaces, **10**, 655–667 (2006).

[4e] R. W: Ogden, G. Saccomandi: *Introducing mesoscopic information into constitutive equations for arterial wall* Biomechanics and Modeling in Mechanobiology, **6**, 333–344 (2007).

Chapter in books

[i] G. Saccomandi: *Universal Results in Finite Elasticity*, capitolo 3 di Nonlinear Elasticity: Theory and Applications. Eds. Y. B. Fu & R. W. Ogden. Cambridge: Cambridge University Press Lecture Notes in Mathematics **283** (2001).

[ii] G. Saccomandi: *Universal Solutions and Relations in Finite Elasticity* in Topics in Finite Elasticity: CISM Lectures Notes **424** Eds. M. A. Hayes & G. Saccomandi, Springer Wien, 95-130 (2001).

[iii] G. Saccomandi: *Phenomenological theory of rubber-like elasticity* in Thermomechanics of Rubber-Like Elasticity: CISM Lectures Notes **452** Eds. G. Saccomandi and R.W.Ogden Springer Wien (2004).

[iv] G. Saccomandi: *Finite Amplitude Waves in Solids: a personal overview* in Nonlinear Waves in Pre-stressed materials: CISM Lectures Notes **495** Eds. M. Destrade and G. Saccomandi, Springer Wien (2007).

[v] J. Merodio and G. Saccomandi: *Nonlinear Elasticity* to be published as chapter 12 of the theme Continuum Mechanics in the UNESCO-EOLSS encyclopedia (WWW.EOLSS.NET/E6-161-toc.ASPCX)

Books

P. Biscari, T, Ruggeri, G. Saccomandi, M. Vianello: *Meccanica Razionale per l'Ingegneria*, Monduzzi, Bologna (2005). (Second edition, 2007).