

# CURRICULUM VITAE

DI

LUIGI PREZIOSI

**Indirizzo:** Dip. Matematica

Politecnico di Torino

Corso Duca degli Abruzzi 24

I-10129 TORINO (ITALY)

**Tel.** 011 - 5647555 (ufficio)

0125 - 752218 (casa)

011 - 5647599 (fax)

**E-mail:** preziosi@polito.it

**Nato:** Napoli, 2 ottobre 1961.

## TITOLI

**laurea in Matematica**

cum laude ottenuta il 24 luglio 1984 presso l'Università di Napoli con una tesi su "Problemi di instabilità nell'interazione tra campo magnetico e convezione" (Prof. G. P. Galdi).

**Ph. D. in Mechanics**

con Minor in Matematica ottenuto il 31 dicembre 1986 presso l'Università del Minnesota (U.S.A.) con una thesis su "Selected topics in the mechanics of two fluids and viscoelastic media" (Prof. D. D. Joseph).

**Dottorato in Matematica** ottenuto il 31 Ottobre 1989 presso

l'Università di Napoli con una tesi su "Metodi di stabilità nonlineare in fluidodinamica non Newtoniana" (Prof. S. Rionero).

## POSIZIONI ACCADEMICHE

- Research/Teaching Assistant** in Meccanica ed in Fluidodinamica presso  
l'Università del Minnesota (U.S.A.) dal 1984 al 1986
- Ricercatore** di Fisica-Matematica  
presso il Politecnico di Torino dal 1989 al 1992
- Professore Associato** del raggruppamento A03X — Fisica Matematica  
presso l'Università di Calabria nel 1992–1993 e  
presso il Politecnico di Torino dal 1993 al 2000
- Professore Ordinario** del raggruppamento A03X — Fisica Matematica  
presso il Politecnico di Torino dal 2000 a tutt'oggi

## INVITI A CONFERENZE PLENARIE

Congresso dell'European Consortium of Mathematics for Industry, Latvia (2002) Congresso dell'Unione Matematica Italiana, Milano (2003) Congresso su "Linking mathematical and biological models in cancer research", Magdeburg (2003)

# INTERESSI DI RICERCA

La sua attività scientifica si è focalizzata sugli aspetti di **modellizzazione matematica**, dalla formulazione del modello, alla simulazione, attraverso il suo studio qualitativo.

Ha scritto oltre 80 articoli pubblicati su riviste scientifiche internazionali sui seguenti temi di ricerca

- a) **Moto e stabilità di fluidi immiscibili**
- b) **Moto e stabilità di fluidi non-Newtoniani**
- c) **Modelli iperbolici di conduzione del calore**
- d) **Problemi inversi**
- e) **Modelli cinetici in gas-dinamica**
- f) **Modelli cinetici e continui in bio-matematica**
- g) **Mezzi porosi deformabili con applicazione alla fabbricazione di materiali compositi ed alla dinamica dei terreni**

e tre volumi

- 1- R. Monaco e L. Preziosi, **Fluid Dynamic Applications of the Discrete Boltzmann Equation**, World Scientific, 1991.
- 2- N. Bellomo e L. Preziosi, **Modelling, Mathematical Methods, and Scientific Computation**, CRC Press, (1995).
- 3- N. Bellomo, L. Preziosi e A. Romano, **Mechanics and Dynamical Systems with Mathematica**, Birkhäuser, (2000).

Ha anche inventato e brevettato (U. S. Patent 4644782) il tensiometro rotante a sbarra, uno strumento per misurare la tensione superficiale tra liquidi immiscibili.

## PUBBLICAZIONI

- 1- T. I. Hesla, F. R. Pranckh e L. Preziosi, “Squire’s theorem for two stratified fluids”, *Physics of Fluids*, **29**, 2808–2811, (1986).
- 2- L. Preziosi e D. D. Joseph, “Stokes’ first problem for viscoelastic fluids”, *Journal of Non-Newtonian Fluid Mechanics*, **25**, 239–259, (1987).
- 3- D. D. Joseph e L. Preziosi, “Stability of rigid motions and coating films in bicomponent flow of immiscible liquids”, *Journal of Fluid Mechanics*, **185**, 323–351, (1987).
- 4- L. Preziosi e D. D. Joseph, “Stable configurations of two fluids between coaxial cylinders”, in **Acta of the III Meeting on Waves and Stability in Continuous Media**, Maiellaro e Palese Eds., Editrice Laterza, Bari, 351–362, (1989).
- 5- L. Preziosi e D. D. Joseph, “The run-off condition for coating and rimming flows”, *Journal of Fluid Mechanics*, **187**, 99–113, (1988).
- 6- P. Than, L. Preziosi, D. D. Joseph e M. Arney, “Measurement of interfacial tension between immiscible liquids with the spinning rod tensiometer”, *Journal of Colloid and Interface Sciences*, **124**, 552–559, (1988).
- 7- L. Preziosi, K. P. Chen e D. D. Joseph, “Lubricated pipelining: Stability of core-annular flow”, *Journal of Fluid Mechanics*, **201**, 323–356, (1989).
- 8- D. D. Joseph e L. Preziosi, “Heat waves”, *Review of Modern Physics*, **61**, 47–71, (1989).
- 9- L. Preziosi e S. Rionero “Energy stability of steady shear flows of a viscoelastic fluid”, *International Journal of Engineering Science*, **27**, 1167–1181, (1989).
- 10- L. Preziosi, “On an invariance property of the solution to Stokes’ first problem for viscoelastic fluids”, *Journal of Non-Newtonian Fluid Mechanics*, **33**, 225–228, (1989).
- 11- L. Preziosi e F. Rosso, “Stability of a viscous liquid between sliding pipes”, *Physics of Fluids/A*, **2**, 1158–1162, (1990).
- 12- D. D. Joseph e L. Preziosi, “Addendum to Heat waves”, *Review of Modern Physics*, **62**, 375–392, (1990).
- 13- L. Preziosi e F. Rosso, “Interfacial stability in a two layer shearing flow of immiscible liquids between sliding pipes”, *European Journal of Mechanics/B: Fluid*, **10**, 253–267,

- (1991).
- 14- G. P. Galdi, D. D. Joseph, L. Preziosi e S. Rionero, “Mathematical problems for miscible, incompressible fluids with Korteweg stresses”, *European Journal of Mechanics/B: Fluid*, **10**, 269–294, (1991).
  - 15- L. Preziosi e E. Longo, “On the decomposition of domains in non linear discrete kinetic theory”, in **Discrete Models of Fluid Dynamics**, Series “Advances in Mathematics for Applied Sciences”, World Scientific, Alves Ed., 144–155, (1991).
  - 16- L. Preziosi e L. M. De Socio, “A non linear inverse phase transition problem for the heat equation”, : *Math. Model Methods Appl. Sci.*, **1**, 167–182, (1991).
  - 17- R. Monaco e L. Preziosi, **Fluid Dynamic Applications of the Discrete Boltzmann Equation**, World Scientific, 1991.
  - 18- L. Preziosi, G. Teppati e N. Bellomo, “Modelling and solution of stochastic inverse problems in mathematical physics”, *Mathematical and Computer Modelling*, **16**, 37–51, (1992).
  - 19- L. Preziosi, “Thermal creep problem by the discrete Boltzmann equation”, *Transport Theory and Statistical Physics*, **21**, 183–209, (1992).
  - 20- Z. Brzezniak, F. Flandoli e L. Preziosi, “On the discrete Boltzmann equation with multiple collisions”, *Stability and Nonlinear Analysis in Continuous Media*, **2**, 153–181, (1992).
  - 21- N. Bellomo, J. Polewczak e L. Preziosi, “Liapunov functionals and qualitative behaviour of the solution to the nonlinear Enskog equation”, in **Developments in Partial Differential Equations and Applications to Mathematical Physics**, G. Buttazzo, G.P. Galdi e L. Zanghirati Eds., Plenum Press, 1–13, (1992).
  - 22- E. Longo, L. Preziosi e N. Bellomo, “The semicontinuous Boltzmann equation: Towards a model for fluid dynamic applications”, : *Math. Model Methods Appl. Sci.*, **2**, 65–93, (1992).
  - 23- L. Preziosi, “An inverse source–sink problem for the nonlinear heat equation” *Mathl. Comp. Modelling*, **17**, 3–11, (1993).
  - 24- L. Preziosi, “Knudsen layer analysis by the semicontinuous Boltzmann equation”, in **Nonlinear Kinetic Theory and Mathematical Aspects of Hyperbolic Prob-**

- lems**, V. Boffi Ed., World Scientific, (1993).
- 25- L. Preziosi, “The semi-continuous Boltzmann equation for gas mixtures”, : *Math. Model Methods Appl. Sci.*, **3**, 665–680, (1993).
- 26- N. Bellomo e L. Preziosi, “Mathematical methods in metrology: Modeling and solution methods”, in **Advances in Mathematical Tools in Metrology**, World Scientific, 23–36, (1994).
- 27- N. Bellomo e L. Preziosi, **Modelling, Mathematical Methods, and Scientific Computing**, CRC Press, (1995).
- 28- L. Preziosi, “From population dynamics to modelling the competition between tumors and immune system”, *Math. Comp. Modelling*, **23**, 135–152, (1996).
- 29- N. Bellomo, L. Preziosi e G. Forni, “On a kinetic (cellular) theory for competition between tumors and the host immune system”, *J. Biological Systems*, **4**, 479–502, (1996).
- 30- L. Preziosi, “The theory of deformable porous media and its application to composite materials manufacturing”, *Surveys in Mathematics for Industry*, **6**, 167–214, (1996).
- 31- L. Preziosi, D.D. Joseph e G. Beavers, “Infiltration of initially dry, deformable porous media”, *Int. J. Multiphase Flows*, **22**, 1205–1222, (1996).
- 32- N. Bellomo, L. Preziosi e G. Forni, “Dynamics of Tumor immune system interactions: The kinetic cellular theory”, in **Survey of Models for Tumor Immune System Dynamics**, 135–186, Birkhäuser, Boston (1996).
- 33- N. Bellomo, B. Firmani, L. Guerri e L. Preziosi, “On a kinetic theory of cytokine-mediated interaction between tumors and immune system”, *ARI Journal*, **1**, 21–32, (1997).
- 34- A. Farina e L. Preziosi, “Flow of waxy crude oils”, in *Progress in Industrial Mathematics*, M. Brøns, M.P. Bendsøe, e M.P. Sørensen Eds., Teubner, Stuttgart, (1997), 306–313.
- 35- D. Ambrosi e L. Preziosi, “Modelling industrial processes involving infiltration in deformable porous media”, in *Progress in Industrial Mathematics*, M. Brøns, M.P. Bendsøe, e M.P. Sørensen Eds., Teubner, Stuttgart, (1997), 110–117.
- 36- R. Lancellotta e L. Preziosi, “A general nonlinear mathematical model for soil consol-

- idation problems”, *Int. J. Engng. Sci.*, **35**, 1045–1063, (1997).
- 37- L. Preziosi e E. Longo, “On a conservative polar discretization of the Boltzmann equation”, *Japan J. Industr. Appl. Math.*, **14**, 399–435, (1997).
- 38- D. Ambrosi e L. Preziosi, “Modelling matrix injection through elastic porous preforms”, *Composites A*, **29**, 5–18, (1998).
- 39- S. Arnod, M. Battaglio, N. Bellomo, D. Costanzo, R. Foti, R. Lancellotta e L. Preziosi, “A consistent macroscopic mathematical model for soil consolidation problems”, in **Geotechnical Hazard**, M. Bozica, L. Zvonimir e S. Antun Eds., Balkema Publ. Rotterdam, 157–171, (1998).
- 40- B. Firmani, L. Guerri e L. Preziosi, “Tumor/immune system competition with medically induced activation/deactivation”, *Math. Models Methods Appl. Sci.*, **9**, 491–512 (1999).
- 41- L. Preziosi e L. Rondoni, “Conservative energy discretization of Boltzmann collision operator”, *Quarterly of Applied Mathematics*, **57**, 699–721, (1999).
- 42- S. Arnod, M. Battaglio, N. Bellomo, D. Costanzo, R. Lancellotta e L. Preziosi, “Finite deformation models and field performance”, *Transport in Porous Media*, **34**, 17–22, (1999).
- 43- A. Farina e L. Preziosi, “Infiltration processes in composite materials manufacturing: Modelling and qualitative results”, in **Complex Flows in Industrial Processes** A. Fasano, Ed., Birkhauser, 281–306, (2000).
- 44- K. Markov e L. Preziosi, Eds., **Heterogeneous Solids: Micromechanics, Modelling, Methods, and Simulations**, Birkhäuser, Boston, (2000).
- 45- A. Farina e L. Preziosi, “Deformable porous media and composites manufacturing”, in **Heterogeneous Solids: Micromechanics, Modelling, Methods, and Simulations**, K. Markov e L. Preziosi, Eds., Birkhäuser, Boston, 321–410, (2000).
- 46- A. Farina e L. Preziosi, “Infiltration of a polymerizing resin in a deformable preform for fiber reinforced composites”, in **Applied and Industrial Mathematics, Venice 2**, R. Spigler Ed., Kluwer Academic Publisher, Dordrecht, 259–271, (2000).
- 47- N. Bellomo, L. Preziosi, e N. Romano, **Mechanics and Dynamical Systems with Mathematica**, Birkhäuser, (2000).

- 48- E. De Angelis e L. Preziosi, “Advection-diffusion models for solid tumour evolution in vivo and related free boundary problem”, *Mathematical Models and Methods in Applied Sciences*, **10**, 379–408, (2000).
- 49- N. Bellomo e L. Preziosi, “Conceptual frameworks on the modelling of tumor heterogeneity and progression”, in **La Matematica nelle Scienze della Vita e Nelle Applicazioni**, G.L. Agnoli, M. Fabrizio, C. Vettori Ed., Pitagora Editrice, Bologna, 129–140, (2000).
- 50- D. Ambrosi e L. Preziosi, “Modelling injection moulding processes with deformable porous preforms”, *SIAM J. Appl. Math.*, **61**, 22–42, (2000).
- 51- A. Farina e L. Preziosi, “Non-isothermal injection moulding with resin cure and preform deformability”, *Composites A*, **31**, 1355–1372, (2000).
- 52- N. Bellomo e L. Preziosi, “Modelling and mathematical problems related to tumor evolution and its interaction with the immune system” *Math. Comput. Modelling*, **32**, 413–452, (2000).
- 53- R. Lancellotta, G. Musso e L. Preziosi, “A three-dimensional nonlinear model for soil consolidation”, **Theoretical and Numerical Methods in Continuum Mechanics of Porous Media**, W. Ehlers, Ed., Kluwer Academic Publisher, Dordrecht, 365–378, (2001).
- 54- L. Preziosi e A. Farina, “On Darcy’s law for growing porous media”, *Int. J. Nonlinear Mech.*, **37**, 485–491, (2001).
- 55- D. Ambrosi, R. Lancellotta e L. Preziosi, “Mathematical models for soil consolidation problems: A state-of-the-art report”, in **Modeling and Mechanics of Granular and Porous Materials**, G. Capriz, V.N. Ghionna, P. Giovine, Eds., Birkhauser, 159–180, (2002).
- 56- D. Ambrosi, A. Farina e L. Preziosi, “Recent developments and open problems in composites materials manufacturing” in **Progress in Industrial Mathematics**, A.M. Anile, V. Capasso, and A. Greco, Eds., Springer, 475–487, (2002).
- 57- L. Preziosi e L. Rondoni, “Conservative discretization of the Boltzmann equation and the semicontinuous model”, in **Lecture Notes on the Discretization of the Boltzmann Equation**, N. Bellomo e R. Gatignol, Eds., Chapman Hall/CRC Press,

- 56–95, (2002).
- 58- D. Ambrosi, N. Bellomo e L. Preziosi, “Modelling tumor progression, heterogeneity and immune competition”, *J. Theoret. Medicine*, **4**, 51–65, (2002).
- 59- D. Ambrosi e L. Preziosi, “On the closure of mass balance models for tumour growth”, *Mathematical Models and Methods in Applied Sciences*, **12**, 737–754, (2002).
- 60- H.M. Byrne, J.R. King, D.L.S. McElwain e L. Preziosi, “A two-phase model of solid tumor growth”, *Appl. Math. Letters*, **16**, 567–573, (2003).
- 61- A. Gamba, D. Ambrosi, A. Coniglio, A. de Candia, S. di Talia, E. Giraud, G. Serini, L. Preziosi e F. Bussolino, “Percolation, morphogenesis, and Burgers dynamics in blood vessel formation”, *Phys. Rev. Letters*, **90**, 118101, (2003).
- 62- G. Serini, D. Ambrosi, E. Giraud, A. Gamba, L. Preziosi e F. Bussolino, “Modelling the early stages of vascular network assembly”, *EMBO J.*, **22 (8)**, 1771–1779, (2003).
- 63- L. Graziano e L. Preziosi, “Multiphase models of tumour growth: General framework and particular cases”, in **Mathematical Modelling and Computing in Biology and Medicine**, V. Capasso Ed., Società Editrice Esculapio, Milano, 622-628, (2003).
- 64- A. Gamba, D. Ambrosi, E. Giraud, G. Serini, L. Preziosi e F. Bussolino, “Growth of endothelial cell networks and Burgers dynamics”, in **Mathematical Modelling and Computing in Biology and Medicine**, V. Capasso Ed., Società Editrice Esculapio, Milano, 518-525, (2003).
- 65- L. Preziosi, Ed., **Cancer Modelling and Simulation**, Chapman & Hall/CRC Press, (2003).
- 66- N. Bellomo, E. De Angelis e L. Preziosi, “Multiscale modelling and mathematical problems related to tumor evolution and medical therapy”, *J. Theor. Med.*, **5**, 111-136 (2004).
- 67- L. Preziosi, “Modeling tumor growth and progression”, in **Progress in Industrial Mathematics at ECMI 2002**, A. Buikis, R. Ciegis, and A.D. Fitt, Eds., Springer, 53–66, (2004).
- 68- R. Kowalczyk, A. Gamba e L. Preziosi, “On the stability of homogeneous solutions to some aggregation models”, *Discrete and Continuous Dynamical Systems B*, **4**, 203–220, (2004).

- 69- H.M. Byrne e L. Preziosi, “Modeling solid tumour growth using the theory of mixtures”, *Math. Med. Biol.*, **20**, 341–366, (2004).
- 70- L. Preziosi, “Modelli matematici a sostegno della ricerca contro il cancro”, *Boll. UMI Ser. VIII*, **8-B**, 55–76, (2005).
- 71- D. Ambrosi, F. Bussolino e L. Preziosi, “A review of vasculogenesis models”, *J. Theor. Med.*, **6**, 1–19, (2005).
- 72- C. Bertini e L. Preziosi, “La matematica nel sangue”, in **Matematica e Cultura 2005**, M. Emmer, Ed., Springer, 189–198, (2006).
- 73- M. Chaplain, L. Graziano e L. Preziosi, “Mathematical modelling of the loss of tissue compression responsiveness and its role in solid tumour development”, *Math. Med. Biol.*, **23**, 197–229, (2006).
- 74- L. Preziosi e S. Astanin, “Modelling the formation of capillaries”, in **Complex Systems in Biomedicine**, A. Quarteroni, L. Formaggia, A. Veneziani, Eds., Springer, 109–145 (2006).
- 75- A. Tosin, D. Ambrosi e L. Preziosi “Mechanics and chemotaxis in the morphogenesis of vascular networks” *Bull. Math. Biol.*, **68**, 1819-1836, (2006)
- 76- S. Astanin, L. Preziosi e A. Tosin, “Modelling tumour cord growth along the source of nutrient”, *Elektronnyi zhurnal Issledovano v Rossi* **48**, 478–487 (2006). In Russian. <http://zhurnal.ape.relarn.ru/articles/2006/048.pdf>,
- 76- V. Lanza, D. Ambrosi e L. Preziosi, “Exogenous Control of Vascular Network Formation in Vitro: A Mathematical Model” *Networks Heterogeneous Media*, **1**, 621–637 (2006).
- 77- L. Preziosi, “Hybrid and multiscale modelling”, *J. Math. Biol.*, **53**, 977-978, (2006).
- 78- F. Mollica, L. Preziosi e K.R. Rajagopal, Eds., **Modelling of Biological Materials**, Birkhäuser (2007).
- 79- L. Graziano e L. Preziosi, “Mechanics in Tumor Growth”, in **Modelling of Biological Materials**, F. Mollica, K.R. Rajagopal, and L. Preziosi, Eds., Birkhäuser, 267–328, (2007).
- 80- A. Chauviere, T. Hillen e L. Preziosi, “A continuum model for mesenchymal motion in a fibrous network”, *Networks Heterogeneous Media*, **2**, (2007).

- 81- A. Chauviere, T. Hillen e L. Preziosi, "Modelling the motion of a cell population in the extracellular matrix", *Discr. Cont. Dyn. Sys. B*, , (2007).
- 82- L. Preziosi, "Biomatematica" VII Appendice - XXI Secolo - Enciclopedia Treccani, vol. 1, (2007).