

CURRICULUM VITAE

LUIGI PREZIOSI

PERSONAL DETAILS

Date of birth: Naples, October 2nd, 1961.
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HIGHER EDUCATION

- Master degree in Mathematics cum laude at the University of Naples (July 24th, 1984)
- Ph.D. in Mechanics with minor in Mathematics at the University of Minnesota (Dec 31th, 1986)
- Ph. D. in Mathematics at the University of Naples (Oct 31th, 1989)

ACADEMIC HISTORY

- 2000 to now: Full professor at the Politecnico di Torino
- 1993 to 2000: Associate professor at the Politecnico di Torino
- 1992 to 1993: Associate professor at the Università della Calabria
- 1989 to 1992: Researcher at the Politecnico di Torino
- 1984 to 1986: Research/Teaching Assistant at the University of Minnesota

- 2007-2018: President of the School of Engineering Mathematics
- 2019-today: Vice-president of the School of Engineering Mathematics

RESEARCH ACTIVITY

Essentially devoted to the different aspects of mathematical modelling, from the formulation of models, to their analytic study, simulation and validation, in particular on the following topics

- Tumour growth
- Vascular networks
- Tissue mechanics
- Cell-environment interactions
- Cell migration
- Multiscale aspects in individual based models
- Soil, sand, and avalanche mechanics
- Flow and stability of immiscible liquids
- Flow and stability of non-Newtonian fluids
- Hyperbolic models in heat conduction
- Kinetic models in gas-dynamics
- Composite material manufacturing processes

MAJOR RESEARCH ACHIEVEMENTS

- Identified an efficient method to transport very viscous fluids in pipes with its workability window;
- First to model several composite material manufacturing processes;
- Introduced the use of the theory of mixture and then the theory of evolving natural configuration to describe tumour growth;
- Identified and modelled the mechanism of formation of vascular networks in embryogenesis;
- Identified criteria for cell segregation by the surrounding fibrous environment;
- Introduced a modification of cellular Potts models to include the presence of sub-cellular elements such as cell nucleus and membrane.

PUBLICATIONS

- 5 books and 5 edited books;
- 40 book chapters;
- More than 130 articles in peer-reviewed journals, with h-index=34 on Scopus, summing up to more than 5500 citations;
- The paper on “Heat waves” received more than 1300 citations and its addendum more than 500 citations. Other 9 papers have already received more than 100 citations.

PATENTS

- Spinning rod tensiometer, an instrument to measure the interfacial tension between immiscible liquids, (U. S. Patent 4644782 e 5150607).
- Deflecting module for an anti-sand barrier, a barrier thus obtained and a protection method from windblown sand (PCT/IT2015/000129)

AWARDS, CONSULTING, BOARDS

- Consultant on “Metal casting” at the Dept. Aerospace Engineering and Mechanics, University of Minnesota in 1987.
- IMA fellowship and consultant on “Lubricated pipelining problems” at the Institute for Mathematics and Application, University of Minnesota in 1989.
- MSI award at the Minnesota Supercomputer Institute in 1994.
- Consultant on “Crowd Dynamics and Security” for the Institute for the Innovation and the Territorial Systems (SITI) from 2005 to 2006.
- Consultant for RGI for the definition of the Research and Development plan in the field of bio-informatics from 2007 to 2009. The result of this activity was the foundation of the company Bio-Digital Valley.
- Consultant for Italferr on “Sand mitigation study within the preparation of preliminary and detailed engineering design of Saudi Landbridge railway project”;
- Consultant for the joint venture composed by Società Italiane Condotte d'Acqua, Itinera, SWS Engineering, Federici & Balco on “Sand mitigation design methodology for the Oman railway project”;
- Member of the VQR (Valutazione della Qualità della Ricerca) National Committee for the period 2013-2016
- Member of the board of the PNR (National Research Project, Section Health) in 2019
- Member of the Accademia dei Lincei since July 2016 (socio corrispondente).

Member of the following international scientific societies:

- European Society for Mathematical and Theoretical Biology (ESMTB)
- Society for Mathematical Biology (SMB)

- Society for Industrial and Applied Mathematics (SIAM)

Member of the Scientific Boards of the following societies:

- European Society for Mathematical and Theoretical Biology (ESMTB) from 2002 to 2008.
- Centro Interuniversitario di Matematica Applicata alla Biologia (CIMAB) since 2006 (President since 2010)
- Gruppo Nazionale di Fisica Matematica from 2008 to 2012
- Coordinator of the Activity Group of the Italian Society of Industrial and Applied Mathematics (SIMAI) on Life and Environmental Sciences since 2009

Member of the Advisory Editorial Board of the book series:

- Lecture Notes in Mathematical Modelling in the Life Sciences (Springer)

Associate editor of the international journals:

- Journal of Theoretical Biology
- Mathematical Medicine and Biology: A Journal of the IMA
- Networks and Heterogeneous Media
- Mathematics in Engineering
- PLOS One
- EPJ Nonlinear Biomedical Physics

Article reviewer (selected list)

Nature Reviews Cancer, Proceedings of the National Academy of Sciences, Physical Review Letters, Mathematical Models and Methods in Applied Sciences, Mathematical Methods in the Applied Sciences, Journal of Mathematical Biology, Bulletin of Mathematical Biology, Journal of Theoretical Biology, Mathematical Medicine and Biology: A Journal of the IMA, Networks and Heterogeneous Media, Applied Mathematical Modelling, Applied Mathematics Letters, Nonlinearity, Discrete and Continuous Dynamical Systems B, European Journal of Mechanics A and B, International Journal of Engineering Science, Physica D, The European Physical Journal E, New Journal of Physics, Physical Review E, PloS One, Mechanics of Materials, Mathematical and Computer Modelling, SIAM Journal of Applied Mathematics, Biomechanics and Modelling in Mechanobiology, Physics of Fluids, Mathematical Biosciences, Mathematical Biosciences and Engineering, Mathematical Modelling of Natural Phenomena, Mechanics Research Communications, Mathematical and Mechanics of Solids, European Journal of Applied Mathematics, European Physical Journal Plus, International Journal of Thermal Sciences, Journal of Mechanics in Medicine and Biology, Computer Methods in Applied Mechanics and Engineering

Book reviewer

Springer, Birkhauser, CRC Press, Oxford University Press, Cambridge University Press, World Scientific.

Grant and institute reviewer

European Research Council (ERC, EU), National Institute of Health (NIH, US), National Science Foundation (NSF, US), National Science Foundation (NSF, Israel), Agence Nationale de Recherche (ANR, France), Deutsche Forschungsgemeinschaft (DFG, Germany), Netherlands Organisation for Scientific Research (NWO, Netherland), Natural Sciences and Engineering Research Council of Canada, Canadian Institutes of Health Research, INRIA, Australian Research Council, Danish Council for Independent Research, Hungarian National Research, Development and Innovation Office, Research Council UK, Royal Society of Endinburgh Scotland Foundation.

MAIN RESEARCH FUNDS

- Contact Person of the Research Training Networks “Using Mathematical Modelling and Computer Simulation to Improve Cancer Therapy” (RTN-2000-00105) and “Modelling, Mathematical Methods and Computer Simulation of Tumour Growth and Therapy” (MRTN-2004-503661).
- Member of the Governing Board of the Starting Independent Research Grant 202680 “RareNoise”.
- Tutor of the Reintegration Grant 256605 DERMA on “DetEction of skin canceR: integrating Morphoelastic theories in biomechanical Analysis”.
- National coordinator of projects of Relevant National Interest (PRIN) for the years 2001-2002, 2010-2011, and 2019-2021 and local coordinator for the years 2008-2009.

CONGRESSES AND ADVANCED SCHOOLS

Plenary lectures

- ECMI 2002, “Congress of the European Consortium of Mathematics for Industry”, Jurmala (Latvia), Sept 10-14, 2002.
- UMI 2003, “Congresso dell’Unione Matematica Italiana”, Milano, Sept. 8-12, 2003.
- ESMTB 2008, “Congress of the European Society for Mathematical and Theoretical Biology”, Edinburgh, June 30-July 4, 2008.
- SIMAI/SEMA 2010, “Joint congress of the Italian Society of Industrial and Applied Mathematics and of the Spanish Society for Applied Mathematics”, Cagliari, June 21-25, 2010.

Main invited lectures at international symposia

- “Linking Mathematical and Biological Models in Cancer Research”, Magdeburg, Sept 24-27, 2003
- “Dynamics of Cancer: Modeling and Experiments”, Ann Harbor, May 9-13, 2005
- “Shape and Size in Medicine, Biotechnology and Materials Science”, Milan, April 28-29, 2008
- “Multiscale Approaches in Cell Mechanics”, Autrans, Jan 7-10, 2008
- “Mathematical Foundations of Mechanical Biology”, Banffs, Sept 26-Oct 1, 2010
- “Mathematics and Physics of Soft and Biological Matter”, ICTP Trieste, May 2-13, 2011
- “Pattern Formation and Multiscale Phenomena in Materials”, Oxford, Sept 26-28, 2011
- “Mechanics and Growth of Tissues: From Development to Cancer”, Dresden, March 21-25, 2011
- ICIAM 2011, Vancouver, July 18-22, 2011 (Thematic speaker)
- Meetings of the Edinburgh Mathematical Society, March 16, 2012
- “Coupling Geometric PDEs with Physics for Cell Morphology, Motility and Pattern Formation”, Cambridge, July 13 - Dec 18, 2015
- First Joint Meeting Brazil – Italy in Mathematics, Rio de Janeiro, Aug 29-Sept 2, 2016
- “Dynamical Systems Applied to Biology and Natural Sciences”, Feb 7-9, 2018
- “British Applied Mathematics Colloquium”, St. Andrews, March 26-29, 2018
- “Mathematical Models in Health Sciences”, Nantes, June 20-22, 2018
- SIMAI-UMI-PTM Joint meeting, Wroclaw, Sept 17-20, 2018

Organisation of Congresses

- ESMTB2002, Milan, July 2-6, 2002
- ESMTB meeting at ICIAM2007, Zurich, July 16-20, 2007
- ECMI 2010, Wuppertal, July 26-30, 2010
- MathCell, Rome, Dec 14-15, 2010
- “The Mathematics of Cells and Tissues”, Cortona, Sept. 1-7, 2013
- “Mathematical Physiology of Cardiac, Skeletal and Smooth Muscles”, Pisa, Oct 5-9, 2015

- “MathTech”, Rome, June 26-28, 2017
- “Mathematical Physics of Living Systems” Cortona, Aug 27- Sept 2, 2017
- ”Multiscale Analysis and Modeling of Collective Migration in Biological Systems” Bielefeld, Oct 9-13, 2017
- “Imaging on Cancer Dynamics”, Torino, March 7-9, 2018
- ESMTB2018, Lisbon, July 22-26, 2018
- “Mathematics for Biomedicine”, Rome, Oct. 8-11, 2018
- “Active soft matters: from mechanobiology to smart devices” Cortona, Sept 21-25, 2020
- “BioTOMath - Mathematical Challenges in Biology and Medicine”, Torino, Sept 14-18, 2020

Organisation of advanced schools

- School director of 3 summer schools of the RTN “Using Mathematical Modelling and Computer Simulation to Improve Cancer Therapy” in the years 2001, 2002, and 2003
- Summer school of the Marie Curie RTN “Modelling, Mathematical Methods and Computer Simulation of Tumour Growth and Therapy”, Puerto de la Cruz, Tenerife, Sept 5-10, 2005, and teacher at the following two schools in Kolymbari, Crete, July 15-19, 2006 and Dundee, Aug 27-31, 2007
- Summer school on “From Nonlinear Physics to Biology and Medicine” Cargese, July 9-21, 2012
- EMS-ESMTB Summer School on “Multiscale Models in the Life Sciences”, Lyon, May 27-31, 2013.
- CIME-CIRM Summer School on “Mathematical Models and Methods for Living Systems”, Levico, Sept 1-6, 2014.

Teacher at advanced schools

- “Mathematics, Developmental Biology and Tumour Growth”, UIMP-RSME, Santander, Sept 11-15, 2006
- “Cell Growth and Pattern Formation”, Trento, March 19-23, 2007
- “BIOMAT: Tumor Growth and Stem Cells”, Granada, June 11-15, 2007
- “Models of Cancer and its Therapeutic Control: From Molecules to the Organism”, INRIA Rocquencourt, March 11-14, 2008
- “Mathematical Biology: Modeling and Differential Equations”, CRM, Barcelona, Feb 2-6, 2009
- “Recent Challenges of Mathematics in Biology and in Medicine of Cancer”, CIRM, Marseille, Feb 23-27, 2009
- “The Physics and Mechanics of Biological Systems”, Les Houches, July 6-31, 2009
- “Mathematical Modeling of Cancer Growth and Treatment”, Meiji University, Tokyo, Oct 27-30, 2009
- “Nonlinear PDEs Arising in Mathematical Biology: Cell Migration and Tissue Mechanics”, ICMS Edinburgh, Apr 14-21, 2010
- “Mathematical Modelling of Cancer Growth and Treatment”, Dundee, Aug 15-28, 2010
- CIME-CIRM Summer School on “Mathematical Models and Methods for Living Systems”, Levico, Sept 1-6, 2014
- CIMPA Summer school on “Mathematical modeling in Biology and Medicine”, Santiago de Cuba, June 8-17, 2016
- Scuola Estiva di Fisica Matematica, Ravello, Sept 5-17, 2016
- Mathematical Modelling of Self-Organizations in Medicine, Biology and Ecology: From Micro to Macro, Giardini Naxos, Sept 18-21, 2017
- CEMRACS 2018, “Numerical and Mathematical Modeling for Biological and Medical Applications: Deterministic, Probabilistic and Statistical Descriptions”, CIRM, Marseille, July 16-20, 2018
- LMS Research School: “PDE in Mathematical Biology”, Edinburgh, April 29-May 3, 2019.

Supervisory activity

Tutor of 45 master students in the last ten years.

Supervisor of 15 Ph.D. students. Among them

- Three are now associate professors at the Politecnico di Torino and the University of Florence.
- Five are researchers at the Politecnico di Torino,
- One is post-doc at the Politecnico di Torino
- Three are working in industry

(still supervising four students).

(still supervising four students).