

Marcello Edoardo Delitala

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Personal Details

Date of birth December 19, 1975

Place of birth Asti, Italy

Citizenship Italian

Position

November 2005–
current **Assistant Professor**, Mathematical Physics (*disciplinary sector MAT07*), Department of Mathematics - Politecnico di Torino - Italy.

Education

November 2008 **Habilitation à Diriger des Recherches**, *Spécialité: Mathématiques Appliquées*, University of Toulouse - France.

March 2005 **Ph.D. in Mathematics for Engineering Sciences**, Department of Mathematics - Politecnico of Turin - Italy.

October 2000 **Master Degree in Theoretical Physics**, University of Turin - Italy.

Achievements and Awards

- 2010 **Invited Mathematician**, Interdisciplinary Workshop on Pattern Formation in Morphogenesis, IHES - Paris, January 11-14, 2010.
- 2009 **Invited Presentation**, The Fifth China-Italy Joint Conference on Computational and Applied Mathematics. Mathematical Models in Life Science: Theory and Simulation, Rome, November 9–12, 2009.
- 2009 **Invited Presentation**, Assemblée Scientifica G.N.F.M. Montecatini Terme, October 1–3, 2009.
- 2009 **Invited Presentation**, Mathematical Modeling in the Medical Sciences Vanderbilt University, Nashville, May 18–21, 2009.
- 2009 **Invited Presentation**, Modern Topics in Nonlinear Kinetic Equations - DAMTP, Cambridge, April 20–22, 2009.
- 2008 **Invited Presentation**, *SIMAI2008*. Conference of the Italian Society of Applied and Industrial Mathematics, September 15-19, 2008.
- 2008 **Invited Presentation**, *ECMTB08*. European Conference on Mathematical and Theoretical Biology Edinburgh, 29th June - 4th July, 2008.
- 2008 **Invited Presentation**, *Cancersim 2008*. Euroconference on Modelling and Simulation of Cancer Growth and Therapy, Politecnico di Torino, Italy, May 19-21, 2008.

- 2007 **ERC Starting Grant 2007:** Proposal classified as "*potentially fundable meeting the threshold of excellence*".
(Less than 5% of the original 9167 proposals has been recommended for funding. List available at erc.europa.eu/pdf/Listfinal.pdf)
- 2007 Press release: "**La Stampa - Tuttoscienze - Guerra di numeri all'HIV**" (National newspaper), 16 October 2007.
- 2007 **INdAM-SIMAI Award** (National Institute of High Mathematics and Italian Society of Industrial Mathematics), *Best PhD dissertation* issued in the period 2004-2006.
- 2007 **Invited Lecturer**, BIOMAT - Mathematics and Life Sciences: Tumor growth and stem cells, University of Granada, Spain, June 11–16, 2007.
- 2007 **Invited Presentation**, XVIII UMI (Italian Mathematical Union) Congress, Bari, Italy, September 24–27, 2007.
- 2006 **Thomson ESI December 2006 and January 2007 - Essential Sciences Indicators: Special Topics:** Highly Cited Paper on Mathematics for the article: *Mathematical Methods and Tools of Kinetic Theory towards Modelling Complex Biological Systems*.
Interview available at www.esi-topics.com/fbp/december06-delitala-Bellouq.html
- 2006 "**in-cites**". **The top 3 Highly Cited Papers published in the last 2 years for Mathematics.** Article: *Mathematical Topics on the Modelling Complex Multicellular Systems and Tumor Immune Cells Competition*.
Citation available at www.in-cites.com/hotpapers/2006/november06-math.html

Founded Projects

- **FIRB** (Italian Ministry of Research and University) - Project. "Mathematical methods and tools for the modelling and simulation of the onset of cancer, immune competition, and therapies" related to the IDEAS-ERC starting grant, 2009-2013. [Principal Investigator]
- **Health** - Collaborative Large-scale project: FP7 Project. "Resolve chronic inflammation and achieve healthy ageing by understanding non-regenerative repair", 2008-2012. [Project Manager of the Work-Package 4]
- **Project for Young Researchers** - Politecnico of Torino: "Developments of generalized kinetic (Boltzmann) models in applied sciences", 2002 - 2003 [Coordinator].

Participation in International and National Research Projects

- **PRIN** (Italian Ministry of Research and University): "Modelli della teoria cinetica matematica per particelle attive nello studio di sistemi complessi" (Kinetic Theory models of active particles for modelling complex systems), 2005-2007. [Participant]
- **Research Training Network** (RTN) European Project: Modelling mathematical methods and computer simulations of tumor growth and therapy, 2004-2007. [Participant]
- **INdAM** (National Institute of High Mathematics) Project: "Traffic flow and optimization on complex networks" 2005-2006. [Participant]
- **CNR** (National Council for Research) Strategic Project: "Metodi e modelli matematici nello studio dei fenomeni biologici", 2003. [Participant]
- **Research Training Network** (RTN) European Project: Using Mathematical Modelling and Computer Simulation to Improve Cancer Therapy, 2000-2003. [Participant]
- **GNFM** (National Group of Mathematical Physics) - **INdAM** (National Institute of High Mathematics) Project: "Metodi e modelli matematici di traffico veicolare", 2002. [Participant]

- **Compagnia di SanPaolo** (Private Bank) Project: “Contributo della matematica applicata e dell’informatica alla ricerca contro i tumori”, 2001–2004. [Participant]

Training responsibilities

Teaching Teaching of several courses in Applied Mathematics, both at Bachelor’s degree level and at Master of Science level.

TEACHING

Rational Mechanics
(2009 - current)

Mathematical analysis II
Assistant. (2006 - 2009)

TEACHING

Mathematical methods for Engineers
(2009 - current)

Mathematical physics
Assistant. (2005 - 2007)

Mathematical physics laboratory
Assistant. (2005 - 2008)

Transportation models and Kinetic Theories:
analytical and computational methods
of kinetic theories
Assistant. (2005 - 2007)

Equations of Mathematical Physics
Assistant. (2005 - 2007)

TEACHING

Modelling complex living systems
by kinetic theory methods
(2007 - 2008)

Mathematical modelling
in applied sciences
(2008 - current)

BACHELOR DEGREE PROGRAM

Civil Engineering
Mathematics In Engineering

Computer and Communication
Networks Engineering
Computer Engineering
Electronic Engineering
Physical Engineering
Telecommunication Engineering

MASTER OF SCIENCE PROGRAM

Civil Engineering

Computer Engineering
Electronic Engineering
Physical Engineering
Telecommunication Engineering

Computer Engineering
Electronic Engineering
Telecommunication Engineering

Mathematical Modelling in Engineering

Mathematical Modelling in Engineering

PH.D. PROGRAM

(Ph.D Course)

(Ph.D Course)

Training Ph.D Students	Supervising of the activities of T. Lorenzi, related to the modelling of biological systems (2009-current) - <i>Ph.D Thesis In Mathematics For Engineering Sciences</i> .
	Supervising of the activities of I. Brazzoli, related to the modelling of biological systems (2005-2007) - <i>Ph.D Thesis In Mathematics For Engineering Sciences</i> .
	Supervising of the activities of A. Tosin, related to the modelling of vehicular traffic flow. (2006-2007) - <i>Ph.D Thesis In Mathematics For Engineering Sciences</i> .
Supervision of Master Dissertations	2009 - Genetic mutations (Mondino). 2008 - Bioinformatics in immunology (Peretti), Colonrectal cancer dynamics (Lorenzi). 2007 - Biological Systems (Bombaci), Social dynamics (Calajo). 2006 - Crowd dynamics (Canavesio), Traffic flow modelling (Pollio, Rassa).

Research Books

- [1] A. Bellouquid, M. Delitala, **Mathematical Modeling of Complex Biological Systems. A Kinetic Theory Approach**, (Birkhäuser - Springer, Boston), 2006.

Scientific Papers on Peer Reviewed International Journals

- [1] M. Delitala, Critical analysis and perspectives on the kinetic (cellular) theory of immune competition, *Math. Comp. Model.* 35, 63–75, 2002.
- [2] N. Bellomo, M. Delitala, V. Coscia, On the mathematical theory of vehicular traffic flow I - Fluid dynamic and kinetic modeling, *Math. Mod. Meth. Appl. Sci.* 12, 1801–1843, 2002.
- [3] M. Delitala, Nonlinear models of vehicular traffic flow - New frameworks of the mathematical kinetic theory, *CR Mécanique* 331, 817–822, 2003.
- [4] E. De Angelis, M. Delitala, A. Marasco, A. Romano, Bifurcation analysis for a mean field modeling of tumor and immune system competition, *Math. Comp. Model.* 37, 1131–1142, 2003.
- [5] M.L. Bertotti, M. Delitala, From discrete kinetic and stochastic game theory to modelling complex systems in applied sciences, *Math. Mod. Meth. Appl. Sci.* 14, 1061–1084, 2004.
- [6] A. Bellouquid, M. Delitala, Kinetic (cellular) models of cell progression and competition with the immune system, *Z. angew. Math. Phys.* 55, 295–317, 2004.
- [7] N. Bellomo, A. Bellouquid, M. Delitala, Mathematical topics on the modelling complex multicellular systems and tumor immune cells competition, *Math. Mod. Meth. Appl. Sci.* 14, 1683–1733, 2004.
- [8] M. Delitala, Generalized kinetic theory approach to modeling spread and evolution of epidemics, *Math. Comp. Model.* 39, 1–12, 2004.
- [9] A. Bellouquid, M. Delitala, Mathematical Methods and Tools of Kinetic Theory towards Modelling Complex Biological Systems, *Math. Mod. Meth. Appl. Sci.* 15, 1639–1666, 2005.
- [10] E. De Angelis, M. Delitala, Modelling complex systems in applied sciences methods and tools of the mathematical kinetic theory for active particles, *Math. Comp. Model.* 43, 1310–1328, 2006.
- [11] M.L. Bertotti, M. Delitala, On the qualitative analysis of the solutions of a mathematical model of social dynamics, *Appl. Math. Letters* 19, 1107–1112, 2006.

- [12] V. Coscia, M. Delitala, P. Frasca, On the mathematical theory of vehicular traffic flow II. Discrete velocity kinetic models, *Int. J. Nonlinear Mech.*, 42, 411–421, 2007.
- [13] M. Delitala, A. Tosin, Mathematical modeling of vehicular traffic: a discrete kinetic approach, *Math. Mod. Meth. Appl. Sci.*, 17, 901–932, 2007.
- [14] M.L. Bertotti, M. Delitala, Conservation laws and asymptotic behavior of a model of social dynamics, *Nonlinear Anal. Real. World. Appl.*, 9, 183–196, 2008.
- [15] M.L. Bertotti, M. Delitala, On a discrete generalized kinetic approach for modelling persuaders influence in opinion formation processes, *Math. Comp. Model.*, 48, 1107–1121, 2008.
- [16] F. Berthelin, P. Degond, M. Delitala, M. Rascole, A model for the formation and evolution of traffic jams, *Archives of Rational Mechanics and Analysis*, 187, 2, 185–220, 2008.
- [17] N. Bellomo, M. Delitala, From the mathematical kinetic, and stochastic game theory for active particles to modelling mutations, onset, progression and immune competition of cancer cells, *Physics of Life Reviews*, 5, 183–206, 2008.
- [18] P. Degond, M. Delitala, Modelling and simulation of vehicular traffic jam formation, *Kinetic and Related Models*, 1, 279–293, 2008.
- [19] M.L. Bertotti, M. Delitala, On the existence of limit cycles in opinion formation processes under time-periodic influence of persuaders, *Math. Mod. Meth. Appl. Sci.*, 18, 913–934, 2008.
- [20] N. Bellomo, C. Bianca, M. Delitala, Complexity analysis and mathematical tools towards the modelling of living systems, *Physics of Life Reviews*, 6, 144–175, 2009.
- [21] S. De Lillo, M. Delitala, M.C. Salvatori, Modelling virus mutations and epidemics by mathematical kinetic theory for active particles, *Math. Mod. Meth. Appl. Sci.*, 19, 1405–1425, 2009.
- [22] N. Bellomo, M. Delitala, On the coupling of higher and lower scales using the mathematical kinetic theory of active particles, *Appl. Math. Lett.*, 22, 646–650, 2009.
- [23] M.L. Bertotti, M. Delitala, Clusters formation in opinion dynamics: A qualitative analysis., *Z. angew. Math. Phys.*, 2009, Doi: 10.1007/s00033-009-0040-0.

Other Publications: Lecture Notes, Proceedings

- [a] N. Bellomo, A. Bellouquid, M. Delitala, Methods and tools of the mathematical kinetic theory toward modeling complex biological systems (pp. 175–194) in *Transport Phenomena and Kinetic Theory* Eds. C. Cercignani and E. Gabetta, Birkhäuser-Springer (Boston), 2007. **[Chapter of Book]**.
- [b] M.L. Bertotti, M. Delitala, N. Bellomo, From the kinetic theory of active particles to the modelling of social behaviors and politics, *Quality and Quantity*, 41, 545–555, 2007. **[Paper on peer reviewed journal]**.
Collection of Lectures of the Conference: "Matematica e società per i quaranta anni della rivista", organized by P. Contucci and S. Graffi, Bologna, 8-9 December 2006.
- [c] A. Bellouquid, M. Delitala, From the Kinetic Theory for active particles to modelling the immune competition, (pp. 31–47) in *Selected Topics on Cancer Modelling Genesis - Evolution - Immune Competition - Therapy*, Eds. N. Bellomo, M. Chaplain and E. De Angelis, Birkhäuser-Springer (Boston), 2008. **[Chapter of book]**.

- [d] N. Bellomo, A. Bellouquid, M. Delitala, From the mathematical kinetic theory of active particles to multiscale modelling of complex biological systems, *Math. Comp. Model.*, 47, 687–698, 2008. **[Paper on peer reviewed journal]**.
Collection of Lectures of the Conference: "Metodos matematicos e modelagem em fenomenos biofisicos", organized by B. Perthame, P. Markowich and J. Zubelli, Angra dos Reis (Rio de Janeiro), Brazil, 5-11 March, 2006.
- [e] N. Bellomo, E. De Angelis, M. Delitala, **Lecture Notes on Mathematical Modelling in Applied Sciences**, SIMAI e-Lecture Notes, ISSN 1970-4429, 1–148, 2008. **[University Lecture Notes]**.
Available on line at: <http://cab.unime.it/journals/index.php/lecture/issue/view/5>
- [f] M. Delitala, **Mathematical modelling of complex living systems** 1–108, 2008. **[Dissertation]**.
Dissertation of the *Habilitation à Diriger des Recherches* obtained at the University of Toulouse, November 2008.
- [g] M. Delitala, On the Mathematical Modelling of Complex Biological Systems. A Kinetic Theory Approach, in *Bollettino UMI* (Italian Mathematical Union), Serie IX, I(3), 603–618, 2008. **[Paper on peer reviewed (national) journal]**.
Proceedings of the XVIII Conference UMI, September 21-27, 2007, Bari, Italy.
- [h] M. Delitala, T. Lorenzi, Progression and heterogeneity in colorectal cancer dynamics - A model based on the Kinetic Theory for active particles, **[Preprint]**.
Preprint submitted on peer reviewed journal
- [i] C. Bianca, M. Delitala, Genetic mutations and immune system competition: a model by the kinetic theory of active particles, **[Preprint]**.
Preprint submitted on peer reviewed journal