

# Curriculum Vitae et Studiorum

## Personal Data

Marina Pireddu

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Born on December 21<sup>st</sup> 1981 in Torino (TO)(Italy)  
Italian Nationality

## Current Position

06. 2015 – Tenured Assistant Professor of Mathematical Methods for Economics and Actuarial and Financial Science at the University of Milano-Bicocca.

## Education

09. 1995 – 07. 2000 High-School Liceo Scientifico G. Marinelli,  
Codroipo (UD)(Italy)

09. 2000 – 10. 2003 University of Udine,  
Bachelor degree in Mathematics (Laurea Triennale), graduated on October 9<sup>th</sup> 2003 with the highest marks and honours (110/110 e lode). Dissertation title: *Poincaré-Miranda Theorem*. Advisor: Prof. F. Zanolin.

10. 2003 – 06. 2005 University of Udine,  
Master degree in Mathematics (Laurea Specialistica), graduated on June 30<sup>th</sup> 2005 with the highest marks and honours (110/110 e lode). Dissertation title: *Topological degree, fixed-point theorems and chaotic-like systems*. Advisor: Prof. F. Zanolin.

01. 2006 – 12. 2008 University of Udine,  
PhD in Mathematics and Physics successfully completed on June 4<sup>th</sup> 2009. Dissertation title: *Fixed points and chaotic dynamics for expansive-contractive maps in Euclidean spaces, with some applications*. Advisor: Prof. F. Zanolin.

08. 2011 – 05. 2012 European University Institute (EUI),  
Doctoral Program in Economics, completed the first year, obtaining the Degree of Master of Research (MRes) in Economics.

## Grants and Prizes

10. 2000–09. 2003 Won a grant from INdAM (Istituto Nazionale di Alta Matematica) for students enrolled on a degree in Mathematics. Grant kept along the whole degree (3 years).
07. 2005 Won one of the 18 final prizes for the achievement of the two-years degree in Mathematics (Laurea Specialistica) for students holding a grant from INdAM.
01. 2006–12. 2008 Won a PhD fellowship for the program in Mathematics and Physics at the University of Udine. Fellowship kept along the whole PhD program (3 years).
07. 2009–06. 2011 Won a one-year postdoctoral fellowship at the Department of Mathematics for Decision Theory of the University of Florence, with title “Mathematical methods for Economics, Social Science and Finance”, renewed on July 2010 for a further year. Supervisor: Prof. M. Gori.
09. 2011–05. 2012 Won a four-year PhD fellowship for the Program in Economics at EUI. Fellowship kept along the period of staying at EUI (9 months).
12. 2017 Admitted to the one-year individual grant for the ground research activities.

## Participation in Research Projects

- 2005-2007 PRIN project “Ordinary Differential Equations and Applications” (national coordinator Prof. F. Zanolin).
- 2007-2009 PRIN project “Ordinary Differential Equations and Applications” (national coordinator Prof. F. Zanolin).

## Professional Activities

Referee for the following Journals: *Abstract and Applied Analysis*, *Economics Bulletin*, *International Journal of Bifurcation and Chaos*, *Macroeconomic Dynamics*, *Physics Letters A*.

Organizer (with Prof. F. Naimzada) of the Workshop “*Teorie Matematiche della Crisi*” (*Mathematical Theories of the Financial Crisis*), Univ. of Milano-Bicocca, February 6-7, 2014.

From 2014 to 2016 member of CISEPS (Center for Interdisciplinary Studies in Economics, Psychology and Social Sciences) Executive Board.

## Conference Attendance and Communications

08. 2003 Summer meeting with seminars organized by INdAM for grant holders in Perugia (Italy).
08. 2004–09. 2004 Summer School SMI in Perugia (Italy). Attended courses:

- *Functional Analysis*, G. Beer, University of Los Angeles, total amount of hours: 25+15.
  - *Complex Analysis*, T. Suwa, University of Hokkaido, total amount of hours: 25+15.
08. 2005–09. 2005    Advanced School and Workshop on Singularities in Geometry and Topology at ICTP in Trieste.
19. 09–21. 09. 2005    Workshop on Dynamics in Torino.
26. 06–30. 06. 2006    School on Centers and Chaos in Finite Dimensional Dynamical Systems in Trento.
13. 08–19. 08. 2006    Xth Prague Topological Symposium in Prague (held communication with title “Fixed points, periodic points and chaotic-like dynamics for contractive-expansive mappings”).
22. 08–30. 08. 2006    International Congress of Mathematicians in Madrid (held communication with title “Fixed points, periodic points and chaotic-like dynamics for contractive-expansive mappings”).
13. 06–16. 06. 2007    International Conference on Topological Methods, Differential Equations and Dynamical Systems in Firenze (held communication with title “Cutting surfaces and applications to fixed points and periodic points”).
25. 06–28. 06. 2007    8th Colloquium on the Qualitative Theory of Differential Equations in Szeged (held communication with title “Periodic points and chaotic-like dynamics: a topological approach”).
27. 09–28. 09. 2007    Topics in Dynamical Systems in Udine (held communication with title “A topological approach to chaotic-like dynamics with a connection to linked twist maps”).
30. 06–18. 07. 2008    School and Workshop on Dynamical Systems at ICTP in Trieste.
10. 09–12. 09. 2008    Nonlinear Differential Equations (NODE 2008) in Brussels.
15. 12–17. 12. 2008    Workshop on Analysis and Numerics of Population Dynamics and Epidemics Models at CISM in Udine.
11. 06–13. 06. 2010    XIXth European Workshop on General Equilibrium Theory in Cracow (held communication with title “Endogenous restricted participation in a financial market model with numeraire and real assets”).
26. 06–01. 07. 2011    XIth Society for the Advancement of Economic Theory Conference (SAET 2011) in Ancao (held communication with title “A simple model of restricted participation with real assets”).
15. 09–17. 09. 2011    XXXV AMASES Conference in Pisa (held communication with title “A simple model of restricted participation with real assets”).

- 20.09–22.09.2012 Dynamical Models in Economics and Finance (MDEF 2012) in Urbino (held communication with title “Chaotic dynamics for expansive-contractive maps: a topological method and applications to Economics”).
- 06.02–07.02.2014 Teorie Matematiche della Crisi (Workshop on Mathematical Theories of the Financial Crisis), Univ. of Milano-Bicocca (held communication with title “Real and Financial Interacting Oscillators: a Behavioral Macro-Model with Animal Spirits”).
- 18.09–20.09.2014 Dynamical Models in Economics and Finance (MDEF 2014) in Urbino (held communication with title “A financial market model with endogenous fundamental values through imitative behavior”).
- 25.06–27.06.2015 IX International Conference on Nonlinear Economic Dynamics (NED 2015) in Tokyo (held communication with title “An evolutive financial market model: imitation and endogenous fundamental values”).
- 07.09–09.09.2017 X International Conference on Nonlinear Economic Dynamics (NED 2017) – I CICSE Workshop in Pisa (held communication with title “Fashion cycle dynamics in a model with endogenous discrete evolution of heterogeneous preferences”).

## Seminars

- 13.12.2006 Held seminar with title “A topological approach to the study of periodic points and chaotic-like dynamics for functions defined on finite-dimensional spaces” at the Department of Mathematics and Computer Science of the University of Udine.
- 29.05.2009 Held seminar with title “Fixed points and chaotic-like dynamics for expansive-contractive maps in Euclidean spaces and some applications” at the Department of Mathematics and Computer Science of the University of Udine.
- 02.03.2010 Held seminar with title “Endogenous restricted participation in a financial market model with numeraire and real assets” at the Department of Mathematics for Decision Theory of the University of Florence.
- 20.04.2012 Held seminar with title “Restricted participation in General Equilibrium models” at the Department of Quantitative Methods for Economic and Business Sciences of the University of Milano-Bicocca.
- 13.09.2012 Held seminar with title “Chaotic dynamics for expansive-contractive maps: a topological method and some applications” at the Department of Mathematics and Applications of the University of Milano-Bicocca.
- 10.04.2014 Held seminar with title “Chaotic social interaction via endogenous reactivity: a simple topological proof” at the Department of Mathematics and Applications of the University of Milano-Bicocca.

## Teaching Activities

05. 2003–06. 2003    Calculus I practical exercises for undergraduate students in Computer Science, under the supervision of Prof. G. Gorni, at the University of Udine.
10. 2007–12. 2007    Calculus I practical exercises for undergraduate students in Engineering, under the supervision of Prof. E. Cabib, at the University of Udine.
03. 2009–06. 2009    Calculus II practical exercises for undergraduate students in Engineering, under the supervision of Prof. H. Weber, at the University of Udine.
10. 2012–12. 2012    Course of Mathematics for undergraduate students in Marketing, Business Communication and Global Markets (Li-Z), at the University of Milano-Bicocca.
10. 2012–01. 2013    Practical exercises of Mathematics for Economics for graduate students in Economic Science, under the supervision of Prof. R. Pini, at the University of Milano-Bicocca.
10. 2013–12. 2013    Course of Mathematics for undergraduate students in Marketing, Business Communication and Global Markets (Li-Z), at the University of Milano-Bicocca.
10. 2013–12. 2013    Practical exercises of Mathematics for Economics for graduate students in Economic Science, under the supervision of Prof. R. Pini, at the University of Milano-Bicocca.
10. 2014–12. 2014    Course of Mathematics for undergraduate students in Marketing, Business Communication and Global Markets (Li-Z), at the University of Milano-Bicocca.
10. 2014–01. 2015    Practical exercises of Mathematics for Economics for graduate students in Economic Science, under the supervision of Prof. A. Naimzada, at the University of Milano-Bicocca.
09. 2015–11. 2015    Course of Mathematics for undergraduate students in Organization Science (SCOR), at the University of Milano-Bicocca.
02. 2017–03. 2017    Course of Mathematics for undergraduate students in Organization Science (SCOR), at the University of Milano-Bicocca.
10. 2017–12. 2017    Course of Mathematics for undergraduate students in Organization Science (SCOR), at the University of Milano-Bicocca.
03. 2018                Minicourse with title “Financial models with interacting heterogeneous agents: modeling assumptions and mathematical tools from discrete dynamical system theory” for the PhD Program in Methods and Models for Economic Decisions at Insubria University.

## Scientific Papers and Contributions

### PUBLICATIONS:

- M. Pireddu, F. Zanolin, Fixed points for dissipative-repulsive systems and topological dynamics of mappings defined on N-dimensional cells, *Advanced Nonlinear Studies* 5 (2005), 411–440.
- M. Pireddu, F. Zanolin, Cutting surfaces and applications to periodic points and chaotic-like dynamics, *Topological Methods in Nonlinear Analysis* 30 (2007), 279–319.
- M. Pireddu, F. Zanolin, Some remarks on fixed points for maps which are expansive along one direction, *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* 39 (2007), 245–274.
- A. Pascoletti, M. Pireddu, F. Zanolin, Multiple periodic solutions and complex dynamics for second order ODEs via linked twist maps, *Electronic Journal of Qualitative Theory of Differential Equations, Proc. 8'th Coll. Qualitative Theory of Diff. Equ.* 14 (2008), 1–32.
- M. Pireddu, F. Zanolin, Chaotic dynamics in the Volterra predator-prey model via linked twist maps, *Opuscula Mathematica* 28/4 (2008), 567–592.
- A. Medio, M. Pireddu, F. Zanolin, Chaotic dynamics for maps in one and two dimensions: a geometrical method and applications to economics, *International Journal of Bifurcation and Chaos in Applied Sciences and Engineering* 19 (2009), 3283–3309.
- M. Pireddu, Period two implies chaos for a class of ODEs: a dynamical system approach, *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* 41 (2009), 43–54.
- M. Gori, M. Pireddu, A. Villanacci, Regularity and Pareto improving on financial equilibria with price-dependent borrowing restrictions, *Research in Economics* 67 (2013), 100–110.
- M. Pireddu, F. Zanolin, *Fixed points, periodic points and chaotic dynamics for continuous maps with applications to population dynamics*. In: Lotka-Volterra and Related Systems Recent Developments in Population Dynamics. De Gruyter Series in Mathematics and Life Sciences, vol. 2, pp. 123–234, De Gruyter, Berlin, 2013.
- M. Gori, M. Pireddu, A. Villanacci, Existence of financial equilibria with endogenous short selling restrictions and real assets, *Decisions in Economics and Finance* 37 (2014), 349–371.
- A. Naimzada, M. Pireddu, Dynamics in a nonlinear Keynesian good market model, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 24, 013142 (2014), DOI: 10.1063/1.4870015.

- A. Naimzada, M. Pireddu, Chaotic social interaction via endogenous reactivity, *Journal of Difference Equations and Applications* (2014), DOI: 10.1080/10236198.2014.903938.
- A. Naimzada, M. Pireddu, Adaptive decision dynamics: Bifurcations, multistability and chaos, *Applied Mathematics and Computation* 239 (2014), 375–390.
- A. Naimzada, M. Pireddu, Dynamic behavior of product and stock markets with a varying degree of interaction, *Economic Modelling* 41 (2014), 191–197.
- M. Hoelle, M. Pireddu, A. Villanacci, Incomplete financial markets with real assets and endogenous credit limits, *Journal of Economics* (2015), DOI: 10.1007/s00712-015-0438-4.
- M. Pireddu, Chaotic dynamics in three dimensions: A topological proof for a triopoly game model, *Nonlinear Analysis: Real World Applications* 25 (2015), 79–95.
- F. Cavalli, A. Naimzada, M. Pireddu, Effects of size, composition, and evolutionary pressure in heterogeneous Cournot oligopolies with best response decisional mechanisms, *Discrete Dynamics in Nature and Society* 2015 (2015), Article ID 273026, 17 pages.
- A. Naimzada, M. Pireddu, Real and financial interacting markets: A behavioral macro-model, *Chaos, Solitons and Fractals* 77 (2015), 111–131.
- F. Cavalli, A. Naimzada, M. Pireddu, Emergence of complex social behaviors from the canonical consumption model, *Mind & Society* (2015), DOI: 10.1007/s11299-015-0169-9.
- A. Naimzada, M. Pireddu, A financial market model with endogenous fundamental values through imitative behavior, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 25, 073110 (2015), DOI: 10.1063/1.4926326.
- A. Naimzada, M. Pireddu, Introducing a price variation limiter mechanism into a behavioral financial market model, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 25, 083112 (2015), DOI: 10.1063/1.4927831.
- F. Cavalli, A. Naimzada, M. Pireddu, Heterogeneity and the (de)stabilizing role of rationality, *Chaos, Solitons and Fractals* 79 (2015), 226–244.
- F. Cavalli, A. Naimzada, M. Pireddu, A family of models for Schelling binary choices, *Physica A: Statistical Mechanics and its Applications* 444 (2016), 276–296.
- A. Naimzada, M. Pireddu, Endogenous evolution of heterogeneous consumers preferences: multistability and coexistence between groups, *Economics Letters* 142 (2016), 22–26.

A. Naimzada, M. Pireddu, A positional game for an overlapping generation economy, *Journal of Difference Equations and Applications* (2016), DOI: 10.1080/10236198.2016.1179292.

M. Pireddu, A topological proof of chaos for two nonlinear heterogeneous triopoly game models, *Chaos: An Interdisciplinary Journal of Nonlinear Science* 26, 083106 (2016), DOI: 10.1063/1.4960387.

F. Cavalli, A. Naimzada, M. Pireddu, An evolutive financial market model with animal spirits: imitation and endogenous beliefs, *Journal of Evolutionary Economics* 27 (2017), 1007–1040.

A. Naimzada, M. Pireddu, Complex dynamics in an evolutionary general equilibrium model, *Discrete Dynamics in Nature and Society* 2018 (2018), Article ID 8471624, 13 pages.

A. Naimzada, M. Pireddu, An evolutive discrete exchange economy model with heterogeneous preferences, *Chaos, Solitons and Fractals* 111 (2018), 35–43.

A. Naimzada, M. Pireddu, Fashion cycle dynamics in a model with endogenous discrete evolution of heterogeneous preferences, to appear in *Chaos: An Interdisciplinary Journal of Nonlinear Science*.

#### UNPUBLISHED WORKS:

M. Pireddu (2009), *Fixed points and chaotic dynamics for expansive-contractive maps in Euclidean spaces, with some applications*. Ph.D. Thesis. Available at arXiv:0910.3832v1

M. Pireddu (2010), On expected and von Neumann-Morgenstern utility functions, mimeo, Università degli Studi di Firenze (2010). Available at arXiv:1010.4179v1

A. Naimzada, M. Pireddu (2012), Two coupled logistic maps, work in progress.

A. Naimzada, M. Pireddu (2013), Two coupled Ricker's maps, work in progress.

A. Naimzada, M. Pireddu (2016), Strong coexistence for a model with endogenous evolution of heterogeneous agents, submitted.

F. Cavalli, A. Naimzada, N. Pecora, M. Pireddu (2018), Agents' beliefs and economic regimes polarization in interacting markets, submitted.

F. Cavalli, A. Naimzada, N. Pecora, M. Pireddu (2018), Market sentiment and heterogeneous fundamentalists in an evolutive financial market model, submitted.