

Francesca Marcellini – Curriculum Vitæ

Postdoc at the Department of Mathematics and Applications, University of Milano-Bicocca

[University of Milano-Bicocca](#)

Department of Mathematics and Applications

Via Cozzi 55, 20125

Milano, Italia

Phone: +39 02 6448 5728

Fax: +39 02 6448 5705

Email: francesca.marcellini@unimib.it

Web page: www.matapp.unimib.it/~marcellini/

National Academic Qualification

2017/03/28 - Italian National Academic Qualification as Associate Professor.

Sector: Mathematical Analysis, Statistics and Probability (01/A3).

Education

2006/02/15 - Degree at the University of Firenze.

Title of thesis: “Estimates for Ornstein-Uhlenbeck Differential Equations”.

Advisor: Professor Vincenzo Vespri (University of Firenze).

2009/12/21 - PhD in Mathematics and Application at the University of Milano-Bicocca.

Title of PhD thesis: “Conservation Laws in Gas Dynamics and Traffic Flow”.

Advisor: Professor Rinaldo M. Colombo (University of Brescia).

Prize

National award **INdAM-SIMAI 2012** for young researchers who have distinguished themselves for their contributions in Applied Mathematics.

Publications

1. G. Guerra, F. Marcellini, V. Schleper. Balance Laws with Integrable Unbounded Sources. *SIAM Journal of Mathematical Analysis*, 41: 1164–1189, 2009.
2. R.M. Colombo, F. Marcellini. Smooth and Discontinuous Junctions in the p -system. *Journal of Mathematical Analysis and Applications*, 361: 440-456, 2010.
3. R.M. Colombo, F. Marcellini. Coupling Conditions for the 3×3 Euler System. *Networks and Heterogeneous Media*, 5: 675–690, 2010.
4. R.M. Colombo, F. Marcellini, M. Rasclé. A 2-Phase Traffic Model Based on a Speed Bound. *SIAM Journal on Applied Mathematics*, 70: 2652–2666, 2010.
5. F. Marcellini. Leggi di Conservazione nella Dinamica dei Gas e nei Flussi di Traffico. *Matematica nella Società e nella Cultura, UMI*, 3: 47-50, 2010.

6. G. Guerra, M. Herty, F. Marcellini. Modeling and Analysis of Pooled Stepped Chutes. *Networks and Heterogeneous Media*, 6: 665–679, 2011.
7. R.M. Colombo, F. Marcellini. Smooth and Discontinuous Junctions in the p -system and in the 3×3 Euler System. *Riv. Mat. Univ. Parma*, 3: 55-69, 2012.
8. R.M. Colombo, G. Guerra, M. Herty, F. Marcellini. A Hyperbolic Model for the Laser Cutting Process. *Applied Mathematical Modelling*, 37: 7810-7821, 2013.
9. F. Marcellini. Mixed Systems in the Description of Traffic Flow. *Oberwolfach Report*, 29: 37-40, 2013.
10. F. Marcellini. Free-Congested and Micro-Macro Descriptions of Traffic Flow. *Discrete and Continuous Dynamical Systems-Series S-AIMS*, 7: 543-556, 2014.
11. R.M. Colombo, F. Marcellini. A Mixed ODE-PDE Model for Vehicular Traffic. *Mathematical Methods in the Applied Sciences*, 38: 1292-1302, 2015.
12. R.M. Colombo, F. Marcellini. NonLocal Systems of Balance Laws in Several Space Dimensions with Applications to Laser Technology, *Journal of Differential Equations*, 259: 6749-6773, 2015.
13. R.M. Colombo, F. Marcellini. A Traffic Model Aware of Real Time Data, 2015, *Mathematical Models and Methods in Applied Sciences*, 26: 445-467, 2016.
14. R.M. Colombo, F. Marcellini, E. Rossi. Biological and Industrial Models Motivating Nonlocal Conservation Laws: a Review of Analytic and Numerical Results, *Networks and Heterogeneous Media*, 11: 49-67, 2016.
15. F. Marcellini. ODE-PDE Models in Traffic Flow Dynamics, *Bulletin of the Brazilian Mathematical Society, New Series*, 47: 533-544, 2016.
16. F. Marcellini. A Traffic Model with Phase Transitions at a Junction, *Oberwolfach Report*, 13: 1720-1723, 2016.
17. M. Garavello, F. Marcellini. The Riemann Problem at a Junction for a Phase Transition Traffic Model, *Discrete and Continuous Dynamical Systems-Series A-AIMS*, 37: 5191-5209, 2017.
18. F. Marcellini. On the Stability of a Model for the Cutting of Metal Plates by Means of Laser Beams, *Applied Mathematics Letters*, 68: 143-149, 2017.
19. F. Marcellini. Existence of Solutions to a Boundary Value Problem for a Phase Transition Traffic Model, *Networks and Heterogeneous Media*, 12: 259-275, 2017.
20. M. Garavello, F. Marcellini. The Godunov Method for a 2-Phase Model, *Communications in Applied and Industrial Mathematics*, 9: 1-16, 2017.
21. M. Garavello, F. Marcellini. A Riemann Solver at a Junction compatible with a Homogenization Limit. *Journal of Mathematical Analysis and Applications*, 464: 1333-1351, 2018.

Outreach

R.M. Colombo, F. Marcellini. Traffico Veicolare e Dinamica di Pedoni Attraverso le Leggi di Conservazione. *Quaderno 14, Dipartimento di Matematica e Fisica "Respighi"*, Piacenza, 2014.

Research Interests

My main research interest is related to hyperbolic PDEs, in particular Conservation Laws, their basic theory and their applications. I'm currently involved in the study of models concerning fluid dynamics, water flow, the cutting of metal plates by means of laser beams and traffic flow.

Coordination of Research Grants

GNAMPA 2018

(national)

Title: Conservation Laws: Hyperbolic Games, Vehicular Traffic and Fluid Dynamics

Responsible: F. Marcellini.

Participants: R.M. Colombo (Brescia), A. Corli (Ferrara), M. Garavello (Milano), G. Guerra (Milano).

Research Visits and International Collaborations

France Collaboration with Professor Michel Rascle (University of Nice)
University of Nice, Nice, France, February 2009

Germany Collaboration with Professor Michael Herty (RWTH)
RWTH, Aachen, Germany, July 2010

Germany Collaboration with Professor Michael Herty (RWTH)
RWTH, Aachen, Germany, August-September 2011

Germany Collaboration with Professor Michael Herty (RWTH) and Dr. Markus Nießen (Fraunhofer-ILT)
RWTH, Aachen, Germany, December 2014

USA Research Visit at UCLA, within the *Long Program "New Directions in Mathematical Approaches for Traffic Flow Management"*
UCLA, Los Angeles, Usa, October 2015

Communications at International Conferences

IMA-USA "Nonlinear Conservation Laws and Applications" (invited)
Summer Program, IMA, University of Minnesota, Minneapolis, USA, July 2009

Sophia Antipolis-France "Traffic Modeling and Management: Trends and Perspectives" (invited)
Scientific Talk: *Two-Phase and Micro-Macro Descriptions of Traffic Flow*
INRIA, Sophia Antipolis, France, March 2013

Oberwolfach-Germany "Hyperbolic Techniques for Phase Dynamics" (invited)
Scientific Talk: *Mixed Systems in the Description of Traffic Flow*
Oberwolfach, Germany, June 2013

Rio de Janeiro-Brazil "XV International Conference on Hyperbolic Problems" (selected)
Scientific Talk: *Mixed ODE-PDE Models in the Description of Traffic Flow*
Rio de Janeiro, Brazil, July 2014

Los Angeles-USA "Mathematical Foundations of Traffic" (invited)
Scientific Talk: *Coupling Different Traffic Models*
UCLA, Los Angeles, USA, September-October 2015

Sophia Antipolis-France "TRAM3 Terminus" (invited)
Scientific Talk: *Balance Laws: Applications to Traffic Flow and to Laser Technology*
INRIA, Sophia Antipolis, France, January 2016

Oberwolfach-Germany "Hyperbolic Techniques in Modelling, Analysis and Numerics" (invited)
Scientific Talk: *A Traffic Model with Phase Transitions at a Junction*
Oberwolfach, Germany, June 2016

Rome-Italy "INdAM: VIII Workshop on the Mathematical Foundations of Traffic" (selected)
Scientific Talk: *A Phase Transition Traffic Model at Junctions*
Rome, Italy, INdAM, 2017

Other Scientific Talks

Meeting SMI: “Partial Differential Equations”

Talk: *Entropy and Stability of Classical Solutions*

Cortona, Italy, 2007

Workshops ”Conservation Laws and Applications”

Talk: *Junctions in Gas Pipelines*

Brescia, Italy, 2008

Workshop: “6th Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives”

Talk: *Smooth and Discontinuous Junctions in the p -system*

L’Aquila, Italy, 2008

Workshop: ”Intensive Research Month on Hyperbolic Conservation Laws and Fluid Dynamics

Talk: *Smooth and Discontinuous Junctions in the p -system and in the 3×3 Euler System*

Parma, Italy, 2010

Workshop: ”Eighth Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives”

Talk: *A 2-Phase Traffic Model Based on a Speed Bound*

SISSA-ISAS, Trieste, Italy, 2010

Workshop: ”Consegna Premi INdAM-SIMAI 2012: Prospettive di sviluppo della matematica applicata”

Talk: *Two-Phase and Micro-Macro Descriptions of Traffic Flow*

Aula Marconi, CNR Roma, Italy, 2013

Workshop: “10th Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives”

Talk: *Two-Phase Models in the Description of Traffic Flow*

L’Aquila, Italy, 2013

In the context of ”Seminario di Equazioni Differenziali e Sistemi Dinamici”

Talk: *PDEs in the Modeling of Traffic Flows and Laser Cutting*

Milano-Bicocca 2017

International and Italian Workshops

“Nonlinear Hyperbolic problems”

Roma, Italy, 2007

“Evolution Equations in Pure and Applied Sciences”

Firenze, Italy, 2008

“Optimal Transportation, Geometry and Functional Inequalities”

Pisa, Italy, 2008

“7th Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives”

SISSA-ISAS, Trieste, Italy, 2009

“Contemporary Topics in Conservation Laws”

Besancon, France, 2015

IperGSSI2015 ”16th Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives”

L’Aquila, 2015

”Analysis and Control on Networks: trends and perspectives”

Padova, Italy, 2016

“Meeting on Hyperbolic Conservation Laws: Recent results and Research perspectives. On the occasion of the 60th birthday of Alberto Bressan”

SISSA-ISAS, Trieste, Italy, 2016

Schools and Advanced Courses

“Partial Differential Equations”, (SMI)
Cortona, Italy, 2007

Nonlinear Partial Differential Equations and Applications, (CIME COURSE)
Cetraro, Italy, 2008

“Modelling and Optimisation of Flows on Networks”, (CIME COURSE)
Cetraro, Italy, 2009

“First Winter School at IMEDEA on PDEs and Inequalities”
Madrid, Spain, 2009

Partecipation to Research Grants

PRIN 2007 (national)
Title: Equazioni della dinamica dei fluidi di tipo iperbolico e leggi di conservazione
Scientific Coordinator: S. Bianchini
Scientific Responsible: P. Secchi

GNAMPA 2009 (national)
Title: Flussi di Traffico di Pedoni
Responsible: M. Garavello

PRIN 2009 (national)
Title: Equazioni della dinamica dei fluidi di tipo iperbolico e leggi di conservazione
Scientific Coordinator: S. Bianchini
Scientific Responsible: P. Secchi

GNAMPA 2010 (national)
Title: Controllo per Leggi di Conservazione
Responsible: M. Garavello

Vigoni 2010 (international)
Title: NonLocal Transport Processes Modeling, Analysis, Numerics and Optimal Control
Responsibles: R.M Colombo, M. Herty

GNAMPA 2011 (national)
Title: Controllo per Leggi di Conservazione
Responsible: M. Garavello

GNAMPA 2012 (national)
Title: Problemi Misti e NonLocali per Leggi di Bilancio
Responsible: M. Garavello

PRIN 2012 (national)
Scientific Coordinator: S. Bianchini
Scientific responsible: G. Guerra

GNAMPA 2013 (national)
Title: Conservation Laws: Theory and Applications
Responsible: R.M. Colombo

GNAMPA 2014 (national)
Title: Leggi di Conservazione nella Modellizzazione di Dinamiche di Aggregazione
Responsible: M. Garavello

GNAMPA 2015 (national)
Title: Balance Laws in the Modeling of Physical, Biological and Industrial Processes
Responsible: R.M. Colombo

GNAMPA 2016 (national)
Title: Balance Laws: Theory and Applications
Responsible: M. Garavello

GNAMPA 2017 (national)
Title: Conservation Laws: from Theory to Technology
Responsible: R.M. Colombo

Organization of Conferences

- IperMiB2013: 15th Italian Meeting on Hyperbolic Equations
University of Milano-Bicocca, Milan, Italy, September 2013
- Minisymposium SIMAI-Analysis and numerics for the modeling through conservation laws
Politecnico di Milano, Milan, Italy, September 2016

Referee Activity

Served as referee for the journals:
- *Discrete and Continuous Dynamical Systems*
- *Journal of Differential Equations*
- *Mathematics and Computers in Simulation*
- *Mathematical Methods in the Applied Sciences*
- *Networks and Heterogeneous Media*

and for the conference
- *Equadiff 13*

Teaching

- Matematica I (a.a. 2012-2013) Materials Science University of Milano-Bicocca Referring Professor: Prof. Leonede De Michele.	Teaching hours: 36 Students: 100 Supervisor of all examinations
- Matematica I (a.a. 2013-2014) Materials Science University of Milano-Bicocca Referring Professor: Prof. Leonede De Michele.	Teaching hours: 36 Students: 200 Supervisor of all examinations
- Matematica I (a.a. 2014-2015) Materials Science University of Milano-Bicocca Referring Professor: Prof. Mauro Garavello.	Teaching hours: 36 Students: 200 Supervisor of all examinations
- Matematica I (a.a. 2015-2016) Materials Science University of Milano-Bicocca Referring Professor: Prof. Mauro Garavello.	Teaching hours: 24 Students: 150 Supervisor of all examinations
- Analisi Matematica I (a.a. 2016-2017) Mathematics and Physics	Teaching hours: 48 Tutoring hours: 20

University of Milano-Bicocca
Referring Professor: Prof. Sandro Levi
- Analisi Matematica I (a.a. 2017-2018)
Mathematics and Physics
University of Milano-Bicocca
Referring Professor: Prof.ssa Veronica Felli

Students: 200
Supervisor of all examinations
Teaching hours: 48
Tutoring hours: 20
Students: 200
Supervisor of all examinations

Further Information

Excellent knowledge of English.

Representative of PhD students and Postdocs at the University of Milano-Bicocca, 2006-2009 and 2012-2018.

Member SIMAI, GNAMPA.

Direct Links

Home Page:	Francesca Marcellini	Orcid	orcid.org/0000-0003-1619-6565
MathSciNet:	878325	Zentralblatt:	marcellini.francesca
Scopus:	27967940900	Resercher ID	L-4172-2013