

## Professional Positions

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| From September 1, 2023              | Associate Professor,<br>Università degli Studi di Modena e Reggio Emilia (Italy)                     |
| September 1, 2020 - August 31, 2023 | Assistant Professor,<br>Università degli Studi di Modena e Reggio Emilia (Italy)                     |
| May 1, 2019 - August 31, 2020       | Post doctoral fellowship<br>Università degli Studi di Milano-Bicocca (Italy)                         |
| August, 27 - October 19, 2018       | Guest lecturer for the course “Theory of conservation laws”,<br>Universität Mannheim (Germany)       |
| September 1, 2017 - April 30, 2019  | Post doctoral fellowship<br>ACUMES Team<br>Inria Sophia Antipolis Méditerranée (France)              |
| August 1, 2016 - July 31, 2017      | Post doctoral fellowship<br>MATHTECH–CNR–INdAM project,<br>Università degli Studi di Brescia (Italy) |

## National Academic Qualification

Italian National Academic Qualification as Associate Professor. Sector: Mathematical Analysis, Statistics and Probability (01/A3) (November 9, 2020 - November 9, 2031)

## Education

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| January 2013 - March 2016       | <b>PhD in Pure and Applied Mathematics</b> ,<br>Università degli Studi di Milano–Bicocca (Italy),<br>and, jointly,<br><b>PhD in Mathematics</b> ,<br>Universität Stuttgart (Germany).<br>Grade: 1.0 - <i>magna cum laude</i> .<br>Title of the thesis <i>Balance laws: non local mixed systems and IBVPs</i><br>Supervisors prof. R.M. Colombo, prof. C. Rohde, dr. V. Schleper |
| September 2010 - September 2012 | <b>Master Degree in Mathematics</b> ,<br>Università Cattolica del Sacro Cuore, Brescia,<br>110/110 <i>cum laude</i>                                                                                                                                                                                                                                                             |
| September 2007 - July 2010      | <b>Degree in Mathematics</b> ,<br>Università Cattolica del Sacro Cuore, Brescia,<br>110/110 <i>cum laude</i>                                                                                                                                                                                                                                                                    |

## Visits & Summer Schools

- March–June 2014 and October–December 2014: periods of study and research at Universität Stuttgart (Germany).
- 18–22 July 2016: participation in the Summer School on Fluid Dynamics and Related Topics, Gran Sasso Science Institute (GSSI), L'Aquila (Italy).
- 5 November–16 December 2016: invitation to Institut Mittag-Leffler, Stockholm (Sweden), within the research program “Interactions between Partial Differential Equations & Functional Inequalities”. Also delivered a communication.

- 27 August–19 October 2018: period of research at Universität Mannheim (Germany), guest lecturer for the course “Theory of conservation laws”.
- 16–27 September 2019: visiting scholar at Politecnico di Torino, within the “Thematic Semester on Network Dynamics and Resilience”.

## Organizational Activity

- Co-organizer of the mini-symposium “Non local balance laws and their applications” within the congress ICIAM2019, Valencia (Spain), 15–19 July 2019.
- Co-organizer of the workshop “Conservation Laws & Surroundings”, held at Università degli Studi di Modena e Reggio Emilia, 8–10 May 2023.
- Co-organizer of the workshop “Nonlinear Meeting in Reggio Emilia”, held at Università degli Studi di Modena e Reggio Emilia, 12–13 September 2024.
- Co-organizer of the mini-simposio “Modelling through integro-differential PDEs” within the conference DSABNS, Napoli 20–24 January 2025.
- Co-organizer of the conference “Hyperbolic PDEs: Theorems and Applications. A Conference in Honour of Rinaldo M. Colombo’s 60th Birthday”, RISM, Varese, 21–23 May 2025.

## Communications to Congresses

- “Traffic Modeling and Management”,  
Sophia Antipolis (France), 20–22 March 2013.  
Title: *A justification of a LWR model based on a follow the leader description.*
- “Hyperbolic Techniques for Phase Dynamics”,  
Oberwolfach, 10–14 June 2013 (invited).  
Title: *A rigorous result on the discrete–continuum limit in traffic flow.*
- “Tenth Meeting on Hyperbolic Conservation Laws”,  
L’Aquila, 11–12 July 2013.  
Title: *On a kinetic limit in traffic models.*
- “15th Italian Meeting on Hyperbolic Equations”,  
Milan, 11–13 September 2013.  
Title: *A mixed system inspired by biology.*
- “XV International Conference on Hyperbolic Problems”,  
Rio de Janeiro, 27 July–1 August 2014.  
Title: *A mixed hyperbolic–parabolic system to describe predator-prey dynamics.*
- “Hirschegg Workshop on Conservation Laws”,  
Hirschegg (Austria), 13–19 September 2015.  
Title: *Analytic and numerical results for a mixed system inspired by biology.*
- “16th Italian Meeting on Hyperbolic Equations”,  
L’Aquila, 22–24 October 2015.  
Title: *Balance laws in bounded domains.*
- “Hyperbolic Techniques in Modelling, Analysis and Numerics”,  
Oberwolfach, 19–25 June 2016 (invited). Title: *Non local mixed systems and IBVPs for balance laws.*
- “SIMAI 2016”,  
Milan, 13–16 September 2016.  
Title: *IBVPs for hyperbolic balance laws with applications to traffic modelling.*
- “INdAM Workshop: Transport Modeling and Management”,  
Rome, 6–10 March 2017.  
Title: *IBVPs for hyperbolic balance laws in traffic modelling.*
- “XVII International Conference on Hyperbolic Problems”,  
University Park, Pennsylvania (USA), 25–29 June 2018. Title: *Recent results on conservation laws in bounded domains.*

- “IFIP TC 7 Conference on System Modelling and Optimization”  
Essen (Germany), 23–27 July 2018. Title: *Crowd dynamics in domains with boundaries*.
- “Mathematical Modeling with Measures: where applications, probability and determinism meet”  
Lorentz Center, Leiden (The Netherlands), 3–7 December 2018 (invited).  
Title: *Well-posedness and stability estimates for conservation laws in bounded domains*.
- “Nonlinear Hyperbolic Problems: modeling, analysis, and numerics”  
Oberwolfach (Germany), 19–25 May 2019 (by invitation).  
Title: *Conservation and balance laws in domains with boundaries*.
- “ICIAM2019”  
Valencia (Spain), 15–19 July 2019.  
Title: *Modelling crowd dynamics through balance laws in bounded domains*.
- “Resilient Control of Infrastructure Networks”  
Turin, 24–27 September 2019.  
Title: *A model for multilane traffic flow on simple networks*.
- “WG2 Workshop on Nonlinear Problems in Traffic and Multispecies Diffusion Models”  
COST Action: CA18232 - Mathematical models for interacting dynamics on networks, 18 May 2021 (online).  
Title: *Multilane traffic flow models: road junctions and nonlocal approaches*.
- “SIMAI 2023”  
Matera, 28 August–1 September 2023.  
Title: *On a class of mixed non linear and nonlocal hyperbolic-parabolic systems*.
- “IEA CONPANHIE: Control problems for applied nonlinear hyperbolic equations, kick-off meeting”  
Besançon (France), 4–5 April 2024.  
Title: *Differential games for a mixed ODE-PDE system*.
- “EQUADIFF conference”  
Karlstad (Sweden), 10–14 June 2024.  
Title: *Mixed hyperbolic–parabolic systems: traffic-generated pollution and predator-prey-dynamics*.
- “AMS-UMI International Joint Meeting”  
Palermo, 23–26 July 2024.  
Title: *On a class of Initial-Boundary Value Problems for Renewal Equations*.  
Title: *A non linear and non local hyperbolic-parabolic system inspired by biology*.
- “Wave Phenomena and Stability”  
Trondheim (Norway), 3–5 September 2024.  
Title: *Mixed hyperbolic-parabolic system on  $\mathbb{R}^n$  and on bounded domains*.
- “Modeling, Control and Games through Partial Differential Equations”  
Ferrara, 2–4 September 2025.  
Title: *On a mixed ODE-PDE system: well posedness, stability and a differential game*.

## Seminars

- *The doubling of variables method and some applications*.  
Institut Mittag-Leffler, Stockholm (Sweden), 5 December 2016.
- *Balance laws in domains with boundaries: from definitions of solution to applications*.  
Tours (France), 5 June 2018.
- *Balance laws in domains with boundaries: definitions of solution, stability estimates and applications*.  
Mannheim (Germany), 27 September 2018.
- *Initial boundary value problems for balance laws*.  
Turin, 22 October 2019.
- *A multilane model for traffic flow at road junctions*.  
Mannheim (Germany), 10 December 2020 (online).

- *Traffic flow at road junctions: a macroscopic multilane approach.*  
Darmstadt (Germany), 16 December 2020 (online).
- *Non linear and non local hyperbolic–parabolic systems,*  
Inria d'Université Côte d'Azur (France), 13 April 2023.
- *On the dynamics of two competing populations through a mixed hyperbolic-parabolic system,*  
Modena, 1 July 2024.
- *Vaccination strategies: modelling and game,*  
UMI-MSE Online Seminar, 12 December 2024.

## Responsible for Scientific Projects

- Project INdAM–GNAMPA 2022: *Equazioni di evoluzione: buona posizione, controllo e applicazioni*  
(*Evolution equations: well posedness, control and applications*)

## Participation in Scientific Projects

- Project INdAM–GNAMPA 2013: *Leggi di Conservazione: Teoria e Applicazioni*
- Project INdAM–GNAMPA 2014: *Leggi di conservazione nella modellizzazione di dinamiche di aggregazione*
- Project INdAM–GNAMPA 2015: *Balance Laws in the Modeling of Physical, Biological and Industrial Processes*
- Project INdAM–GNAMPA 2016: *Leggi di bilancio: teoria e applicazioni*
- Project INdAM–GNAMPA 2017: *Conservation Laws: from Theory to Technology*
- Project INdAM–GNAMPA 2020: *From Wellposedness to Game Theory in Conservation Laws*
- Project INdAM–GNAMPA 2023: *Analytical Techniques for Biology, Fluid Dynamics and Vehicular Traffic Models*
- Project INdAM–GNAMPA 2024: *Modelling and Analysis through Conservation Laws*
- Project INdAM–GNAMPA 2025: *Traffic, Biology and Gas Dynamics Models Based on Hyperbolic Equations*
- Project PRIN 2012: *Equazioni a derivate parziali nonlineari di tipo iperbolico, dispersivo ed equazioni di trasporto: aspetti teorici e applicativi*
- Project PRIN 2015: *Hyperbolic Systems of Conservation Laws and Fluid Dynamics: Analysis and Applications.*
- Project PRIN 2022: *Modeling, Control and Games through Partial Differential Equations*

## Teaching Activities

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|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| October 2013–January 2014   | Tutoring, Calculus II,<br>Degree in Engineering Management, Università degli Studi di Bergamo                                  |
| November 2015–February 2016 | Tutoring, Calculus II,<br>Degree in Physics, Università degli Studi di Milano-Bicocca                                          |
| September–October 2018      | “Theory of conservation laws”<br>course for Master and PhD students in Mathematics,<br>Universität Mannheim (Germany)          |
| Winter Semester 2019/2020   | Exercise lectures (48 hours), Calculus II,<br>Degree in Physics, Università degli Studi di Milano-Bicocca                      |
| Winter Semester 2019/2020   | Exercise lectures and tutoring (24 hours), Calculus II,<br>Degree in Engineering Management, Università degli Studi di Bergamo |

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| Winter Semester 2020/2021 | Calculus I (Analisi Matematica A) (54 hours), L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                                    |
| Spring Semester 2020/2021 | Calculus II (Analisi Matematica B) (54 hours), L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                                   |
| Spring Semester 2021/2022 | Calculus II (Analisi Matematica B) (54+54 hours), A-K and L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                        |
| Spring Semester 2022/2023 | Calculus II (Analisi Matematica B) (54+54 hours), A-K and L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                        |
| Winter Semester 2023/2024 | Exercise lectures (27 hours), Calculus I (Analisi Matematica A), L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia<br><br>Mathematical Models and Methods for Engineering (Modelli e Metodi Matematici per l'Ingegneria) (18 hours),<br>Degree in Engineering Management, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                         |
| Spring Semester 2023/2024 | Calculus II (Analisi Matematica B) (54+54 hours), A-K and L-Z<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                        |
| Winter Semester 2024/2025 | Mathematics for Technologies (Matematica per le Tecnologie) (45 hours),<br>Degree in Technologies For The Smart Industry ,<br>Università degli Studi di Modena e Reggio Emilia<br><br>Mathematical Models and Methods for Engineering (Modelli e Metodi Matematici per l'Ingegneria) (18 hours),<br>Degree in Engineering Management, Università degli Studi di Modena e Reggio Emilia<br><br>Exercise lectures and tutoring (24 hours), Calculus II,<br>Degree in Engineering Management, Università degli Studi di Bergamo |
| Spring Semester 2024/2025 | Calculus II (Analisi Matematica B) (81 hours),<br>Degree in Mechatronics Engineering, Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                                                                       |
| Winter Semester 2025/2026 | Mathematics for Technologies (Matematica per le Tecnologie) (42 hours),<br>Degree in Technologies For The Smart Industry ,<br>Università degli Studi di Modena e Reggio Emilia                                                                                                                                                                                                                                                                                                                                               |

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A.A. 2013/2014 Teaching seminar, on conservation laws and applications to vehicular traffic, for the course "Higher Analysis II", Università Cattolica del Sacro Cuore, Brescia.  
  
Teaching seminar, on conservation laws and applications to vehicular traffic, for the course "Real Analysis and Differential Equations", Università degli Studi di Milano-Bicocca.

- A.A. 2015/2016 Teaching seminar on applications of conservation laws to vehicular traffic for the course "Conservation Laws", Università Cattolica del Sacro Cuore, Brescia.
- 09 February 2024 Thematic seminar "Il paradosso di Braess", Liceo Wiligelmo, Modena
- 20 November 2024 Thematic seminar "La matematica del traffico: il paradosso di Braess", Liceo Spallanzani, Reggio Emilia
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- April–June 2016 High school teacher of Mathematics and Physics  
Liceo C. Golgi, Breno (BS), Italy.