



# Marta Menci

*Curriculum Vitae*

## PERSONAL DATA

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NAME: Marta Menci  
PLACE AND DATE OF BIRTH: Florence, Italy | 10 January 1990  
EMAIL: m.menci@unicampus.it  
LINKEDIN: <https://www.linkedin.com/in/marta-menci-22771517b>

## EMPLOYMENT

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since 01/02/2024	<b>Assistant Professor (RTD-A) at Università Campus Bio-Medico di Roma, member of the Automatics Research Unit</b>
SSD	MAT/08
	<b>Professor for the course “Mathematics”(SSD MAT/08) - 10 CFU</b> Università Campus Bio-Medico di Roma, Faculty of Biomedical Engineering and MedTech.
08/2022-01/2024	<b>Post-Doc at Università Campus Bio-Medico di Roma</b>
Title	Discrete and continuous mathematical models for collective dynamics.
Supervisor	Prof. Marco Papi.
04/2020-07/2022	<b>Post-Doc at Istituto per Le Applicazioni del Calcolo “Mauro Picone”, Consiglio Nazionale delle Ricerche (IAC-CNR)</b>
Title	Analisi qualitativa di moti collettivi attraverso modelli matematici discreti e continui
Supervisor	Emiliano Cristiani.

## SCIENTIFIC EDUCATION

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2016–2019	PHD STUDENT IN BIOENGINEERING AND BIOSCIENCE Università Campus Bio-Medico di Roma
Supervisor	Prof. Marco Papi
Defense	12/03/2020
Thesis Title	<i>Analytical foundations of a class of hybrid models with applications to collective dynamics.</i>
Committee Opinion	Ottimo
2014–2016	MASTER OF SCIENCE IN MATHEMATICS University of Florence
Supervisor	Prof. Roberto Natalini (IAC-CNR, Rome)
Co-supervisor	Prof. Fabio Rosso (University of Florence)
Thesis Title	<i>Collective motions: mathematical models and numerical simulations.</i>
Mark	110/110 cum Laude
2009–2013	BACHELOR OF SCIENCE IN MATHEMATICS University of Florence
Supervisor	Prof. Angiolo Farina (University of Florence)
Thesis Title	<i>Mathematical Model For Vasomotion.</i>
Mark	102/110
2009	MATURITÀ SCIENTIFICA P.N.I. Liceo Scientifico “Giovanni da Castiglione”, Castiglion Fiorentino (AR)
Mark	100/100 cum Laude

## SCIENTIFIC ASSOCIATION

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Member of the following Scientific Association:

- ◇ Gruppo Nazionale Calcolo Scientifico, Istituto Nazionale Di Alta Matematica *GNCS-INDAM* Affiliated to the INDAM Research Unit at Istituto per le Applicazioni del Calcolo “Mauro Picone”.
- ◇ Società Italiana di Matematica Applicata e Industriale *SIMAI*
- ◇ Unione Matematica Italiana *UMI*
- ◇ European Women in Mathematics *EWM*

## SCIENTIFIC COLLABORATIONS

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5/02/2024- 4/02/2025	<p>Scientific collaboration for the research project PRR.AP015.039 <i>D3-4-Health</i> “Digital Driven Diagnostics, prognostics and therapeutics for sustainable Health care”</p> <ul style="list-style-type: none"><li>◇ Gabriella Bretti, Roberto Natalini (IAC-CNR) and Matteo Semplice (Università degli Studi dell’Insubria)</li></ul> <p>Topic: 3D Simulations of formation and growth of tumor spheroids.</p>
2021-present	<p>Scientific collaboration with Sorbonne Université-CNRS (Paris) and Istituto per le Applicazioni del Calcolo-Consiglio Nazionale delle Ricerche</p> <ul style="list-style-type: none"><li>◇ Thierry Paul and Roberto Natalini</li></ul> <p>Topic: Mean Field approaches and Numerical methods for kinetic and hydrodynamic systems of equations.</p> <ul style="list-style-type: none"><li>◇ Nastassia Pouradier Duteil</li></ul> <p>Topic: 3D models and simulations of collective behavior for gregarious fish</p> <p>Joint collaboration with Laboratoire de Physique et Mécanique des Milieux Hétérogènes (PMMH),Paris.</p>
2020- 2023	<p>Member of a joint collaboration between <b>GaE Engineering</b> and Istituto per le Applicazioni del Calcolo-Consiglio Nazionale delle Ricerche</p> <ul style="list-style-type: none"><li>◇ Giuseppe Gaspare Amaro (GaE) and Emiliano Cristiani (IAC-CNR)</li></ul> <p>Topic: Crowd dynamics in large-scale events, models and simulation tools for high-densities scenarios.</p>
2019	<p>Member of the crowd management work group “Elaborazione RTV di prevenzione incendi, integrativa del decreto del Ministro dell’Interno 3 Agosto 2015”.</p> <ul style="list-style-type: none"><li>◇ Invited Speaker for Plenary talk on</li></ul> <p>Topic: Analysis of crowd disasters and crowd management</p> <p>Comando dei vigili del fuoco di Roma, Roma, December 2019.</p>
2017-present	<p>Scientific collaboration with Università Campus Bio-Medico di Roma</p> <ul style="list-style-type: none"><li>◇ Complex Systems and Security Lab <a href="http://www.coseritylab.it">http://www.coseritylab.it</a></li></ul> <p>Topic: Dynamics on graphs. Distributed algorithms.</p> <p>Multi-agents systems.</p>

## PUBLICATIONS

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### ◇ Published

**M. Menci**, R. Natalini, T. Paul. “Microscopic, kinetic and hydrodynamic models of collective motions with chemotaxis: a numerical study”. *Mathematics and Mechanics of Complex Systems*, Vol. 12 , No. 1, 47–83, <https://doi.org/10.2140/memocs.2024.12.47> (2024).

E. Cristiani, **M. Menci**, A. Malagnino and G.G. Amaro. “An all-densities pedestrian simulator based on a dynamic evaluation of the interpersonal distances”. *Physica A: Statistical Mechanics and its Applications*, Vol. 616, 128625, <https://doi.org/10.1016/j.physa.2023.128625> (2023).

**M. Menci**, M. Papi, F. Smarrazzo. “Existence of solutions for coupled hybrid systems of differential equations for microscopic dynamics and local concentrations”. *Communications on Pure and Applied Analysis*, Vol.22, No.7, pp. 2146-2168 <https://doi.org/10.3934/cpaa.2023061> (2023).

**M. Menci**, M. Papi, M. Porzio and F. Smarrazzo. “On a coupled hybrid system of nonlinear differential equations with a nonlocal concentration”. *Journal of Differential Equations*, Vol. 361, pp. 288-338 <https://doi.org/10.1016/j.jde.2023.02.044> (2023).

E. Cristiani, A. De Santo and **M. Menci**. “A Generalized Mean-Field Game Model for the Dynamics of Pedestrians with Limited Predictive Abilities”. *Communications in Mathematical Sciences*. Vol. 21, Number 1, pp. 65-82 <https://dx.doi.org/10.4310/CMS.2023.v21.n1.a3> (2023).

G.G.Amaro, E. Cristiani and **M. Menci**. “Preventing congestion in crowd dynamics caused by reversing flow”. *Mathematical Modeling and Computing*, Vol. 9, Number 3, pp. 555–566, <https://doi.org/10.23939/mmc2022.03.555> (2022).

**M. Menci** and M. Papi. “Hybrid systems of differential equations under exogenous information with discontinuous source term”. *Nonlinear Analysis*, Vol. 221, <https://doi.org/10.1016/j.na.2022.112885> (2022).

F. Cacace, **M. Menci**, M. Papi and V. Piemonte. “In-Silico prediction of oral drug bioavailability: a multi-boluses approach”. *Medical Engineering & Physics*, 98, pp. 140-150. <https://doi.org/10.1016/j.medengphy.2021.11.004> (2021).

E. Cristiani, **M. Menci**, M. Papi and L. Brafman. “An all-leader agent-based model for turning and flocking birds”. *Journal of Mathematical Biology*, 83(4), pp.1-22. <https://dx.doi.org/10.1007/s00285-021-01675-2> (2021).

E. Di Costanzo, **M. Menci**, E. Messina, R. Natalini and A. Vecchio. “A hybrid model of collective motion of discrete particles under alignment and continuum chemotaxis”. *Discrete & Continuous Dynamical Systems-B*, 25(1), 443. <https://dx.doi.org/10.3934/dcdsb.2019189> (2020).

**M. Menci**, and M. Papi. “Global solutions for a path-dependent hybrid system of differential equations under parabolic signal.” *Nonlinear Analysis*, Vol. 184, pp.172-192. <https://doi.org/10.1016/j.na.2019.01.034> (2019).

**M. Menci**, G. Oliva, M. Papi, R. Setola and M. Zoppello. “Distributed Utility Estimation with Heterogeneous Relative Information”, IEEE Control System Letters, Vol. 2, Number 2, pp. 248-253. <https://doi.org/10.1109/LCSYS.2018.2819964> (2018).

**M. Menci**, G. Oliva, M. Papi, R. Setola and A. Scala. “A Suite of Distributed Methodologies to Solve the Sparse Analytic Hierarchy Process Problem”, Proceedings of the European Control Conference, pp. 1147-1453 (2018).

**M. Menci** and G. Oliva. “Robustness vs Control in Distributed Systems”, in Biological Robustness. Emerging Perspectives from within the Life Sciences, Bertolaso, Caianiello and Serrelli Eds., Springer, pp. 189-204 (2018). (ISBN 978-3-030-01198-7).

◇ **In press**

G. Bretti, E. Campanile, **M. Menci**, R. Natalini. “A scenario-based study on hybrid PDE-ODE model for Cancer-on-Chip experiment”. Problems in Mathematical Biophysics - a volume in memory of Alberto Gandolfi. SEMA SIMAI Springer Book Chapter.

◇ **Submitted**

E. Cristiani, N. Loy, **M. Menci**, A. Tosin. “Kinetic and Macroscopic Description of Self-Organizing Multi-Agent Systems with Continuous Leader-Follower Transition Dynamics”.

## PROJECTS

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◇ March 2024- March 2025: Coordinator of the GNCS-Indam Project

*Numerical modeling and high-performance computing approaches for multiscale models of Complex Systems.*

Team Members: Gabriella Bretti, Elio Campanile, Emiliano Cristiani, Francesca Ignoto, Matteo Semplice, Elia Onofri, Silvia Preda.

◇ 1/09/2022-31/12/2022: Participant of MISE *Cyber 4.0*. Topic: development of advanced technologies in the field of Industry 4.0 - cybersecurity, with a specific focus on e-health.

◇ 2020-2022: Participant of PRIN Project 2017, Cod. 2017KKJP4X003

*Innovative numerical methods for evolutionary partial differential equations and applications.*

◇ 2019: Participant of the GNAMPA (INdAM) project

*Partially dissipative hyperbolic systems and applications to biological models*, with Fabio Ancona, Roberta Bianchini, Francesca Guarguaglini, Roberto Natalini (group leader), Marco Papi, Flavia Smarrazzo.

## GRANTS

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◇ June 2023: Awarded by the European Woman in Mathematics for EWM Travel Grant.

◇ September 2024: Awarded for the “Research in Paris” Grant.

In September 2024, 1-15, I will spend a visiting period hosted by the Institut Henri Poincaré.

## REVIEW ACTIVITY

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Reviewer of articles for international journals and conferences including: Scientific Reports, Computers and Mathematics with Applications, Multiscale Modeling and Simulation, Mathematics and Computer in Simulation, Computational Methods in Applied Mathematics, Mathematics and Statistics, Applied Mathematics Letters, Applied Mathematical Modelling, Journal of the Royal Society Interface, Critis Conference 2018, Mascot Conference 2018, IEEE Conference on Decision and Control.

## EDITORIAL ACTIVITY

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◇ Since March 2024: Academic Editor for *PLOS ONE* Editorial Board.

## SUPERVISION OF GRADUATE STUDENTS

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◇ Francesco Forlani : *Sistema di supporto alle decisioni per la pianificazione strategica della flotta di un servizio di autonoleggio*

Corso di Laurea Magistrale in Ingegneria dei Sistemi Intelligenti, AA 2021/2022.

Mark: 110/110 cum Laude.

The thesis has been supervised in collaboration with the company *Proge-Software S.r.l.*

## SELECTED TALKS (LAST 4 YEARS)

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- 2024
- ◇ *Bridging Scales: Advancements in Numerical Simulations and Multiscale Modeling for Cell Dynamics*  
Contributed talk at 9th European Congress of Mathematics  
Seville, July 2024, 15-19.
  - ◇ *Numerical challenges of a novel class of hybrid models for collective cell dynamics with non-local interactions.*  
GIMC SIMAI YOUNG 24, Napoli, July 2023, 10-12.
  - ◇ *Emergent Behaviors in complex systems: modelling and simulations of collective cell dynamics*  
Invited seminar activity for PhD students at Università dell'Insubria,  
Dipartimento di Scienza e Alta Tecnologia, during a visiting period in May, 13-17.
- 2023
- ◇ *Modelling and simulations of cell dynamics across the scales.*
  - ◇ *Modeling Mathematically Movements: covid, birds, economy, computer-music, traffic.*  
Invited Talks (invited by Thierry Paul) during *Winter school: Sound and fury of modelling.*  
Arpino, Novembre 2023, 13-17.
  - ◇ *Human Digital Twin: multiscale modelling and simulations of cell dynamics*  
BUILD-IT Workshop: Building a Digital Twin: requirements, methods and applications.  
Roma, October 2023, 19-20.
  - ◇ *Modelling pedestrian dynamics: numerical advances and challenges*  
Third Conference of Young Applied Mathematicians YAMC23.  
Siena, September 2023, 18-22.
  - ◇ *Modelling cell migration: a Hybrid Approach for Cancer-on-chip Experiment*  
21st IMACS World Conference, Roma, September 2023, 11-15.
  - ◇ *Modeling cell dynamics: a numerical trip across the scales*  
Round Mean-field II: crowd-opinion-cell and more, Roma, June 2023, 13-14.
- 2022
- ◇ *Biomathematics and Bioengineering: life sciences perspectives*  
Invited talk at Luiss Guido Carli, Roma, June 2022, 22.
  - ◇ *Mean-Field limit for hybrid models with chemotaxis: theory and numerics*  
joint talk with Roberto Natalini (IAC-CNR).  
Round Mean-field: crowd-opinion-cells. Roma, September 2022, 27-29.

- 2021 | *Collective motion of discrete particles under alignment and continuum chemotaxis: a Hybrid Approach*  
SIMAI2020+2021, Parma, September 2021, 1-3.
- Collective motions of birds: an all-leader agent-based model for turning and flocking*  
Numerical aspects of hyperbolic balance laws and related problems.  
Verona, December 2021,15-17.

## ORGANIZATION OF MINISYMPOSIA AND CONFERENCES

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- ◇ Organizer of the 4th Young Applied Mathematicians Conference, 16-20 September 2024, Sapienza Università di Roma, Rome, Italy. <https://www.yamc.it/home>  
Co-Organizers: Gennaro Auricchio (University of Bath), Chiara Carrara (Università di Pavia), Giuseppe Alessio D’Inverno (SISSA, Trieste), Caterina Graziani (Università di Siena), Alen Kushova (Università di Pavia), Gabriele Loli (Università di Pavia), Sara Marziali (Università di Siena), Alessandro Marchetti (Università Campus Bio-Medico di Roma), Elia Onofri (IAC-CNR).
- ◇ Organizer of Minisymposium at GIMC SIMAI YOUNG 24, 10-12 July 2024, Naples, Italy. <https://sites.google.com/view/gsyw24/home-page?authuser=0>  
Title: *Particles in Numerical Simulations: trends and applications.*  
Co-Organizer: Elisa Iacomini (Università degli studi di Ferrara)  
Speakers: Sabrina Bonandin (RWTH Aachen), Jonathan Franceschi (Università di Pavia), Elisa Calzola (Università di Ferrara), Federica Ferrarese (Università di Ferrara), Sara Veneruso (RWTH Aachen), Diane Peurichard (Inria, Paris).
- ◇ Organizer of Minisymposium at ECCOMAS 7th Young Investigator Conference, 19-21 June 2023, Porto, Portugal. <https://paginas.fe.up.pt/yic2023/>  
Scientific area: Computational Applied Mathematics.  
Title: *Recent Advances on modelling and simulations of Collective dynamics.*  
Co-Organizer: Nadia Loy (Politecnico di Torino)  
Speakers: Elio Campanile (University of Trento), Martina Conte (Politecnico di Torino), Camilla Fioravanti (Università Campus Bio-Medico di Roma), Jonathan Franceschi (Università di Pavia), Chiara Segala (RWTH Aachen).
- ◇ Organizer of Minisymposium at 21 IMACS World Conference, 11-15 September 2023, Roma. <https://www.imacs2023.eu/index.php/IMACS2023/IMACS2023>  
Title: *Mathematical and computational methods for migration, aggregation and interaction of cell populations.*  
Co-Organizer: Gabriella Bretti (IAC-CNR).  
Speakers: Giorgia Ciavolella (Inria, Bordeaux), Nadia Loy (Politecnico di Torino), Donato Pera (Università degli studi dell’Aquila), Diane Peurichard (Inria, Paris).



## TEACHING ACTIVITY

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AA 2023-2024	<p><b>Professor</b> at Università Campus Bio-Medico di Roma (10 CFU-100h)</p> <p>◇ <i>Mathematics</i> (Taught in English)</p> <p>Faculty of Biomedical Engineering and MedTech</p>
AA 2022-2023	<p><b>Assistant Professor</b> at Università Campus Bio-Medico di Roma (5 CFU-50h)</p> <p>◇ <i>Mathematics</i> (Taught in English)</p> <p>Faculty of Biomedical Engineering and MedTech</p> <p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (13 CFU)</p> <p>◇ <i>Analisi Matematica e Algebra Lineare</i>,</p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Modelli e Metodi di Ottimizzazione e Statistica</i>,</p> <p>M.Sc. Program in Computer Science Engineering</p>
AA 2021-2022	<p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (13 CFU)</p> <p>◇ <i>Analisi Matematica e Algebra Lineare</i>,</p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Metodi Matematici</i></p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Modelli e Metodi di Ottimizzazione e Statistica</i></p> <p>M.Sc. Program in Computer Science Engineering</p>
AA 2020-2021	<p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (48 CFU)</p> <p>◇ <i>Analisi Matematica e Algebra Lineare</i>,</p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Metodi Matematici</i></p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Metodi di Ottimizzazione della Ricerca Operativa</i></p> <p>Faculty of Industrial Engineering</p> <p>◇ <i>Modellistica e Controllo di Reti e Sistemi a Eventi</i></p> <p>M.Sc. Program in Computer Science Engineering</p> <p>◇ <i>Modelli e Metodi di Ottimizzazione e Statistica</i></p> <p>M.Sc. Program in Computer Science Engineering</p>

AA 2019-2020	<p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (30 CFU)</p> <ul style="list-style-type: none"> <li>◇ <i>Matematica</i>, Faculty of Scienze e Tecnologie per l'Uomo e l'Ambiente</li> <li>◇ <i>Analisi Matematica e Algebra Lineare</i>, Faculty of Industrial Engineering</li> <li>◇ <i>Metodi di Ottimizzazione della Ricerca Operativa</i> Faculty of Industrial Engineering</li> <li>◇ <i>Automatic Control</i> (Taught in English) M.Sc. Program in Biomedical Engineering</li> </ul> <p><b>Teaching Assistant</b> at Luiss University</p> <ul style="list-style-type: none"> <li>◇ <i>Mathematical Methods for economics and finance</i> M.Sc. Program in Economy and Finance. (Prof. Fausto Gozzi).</li> </ul>
AA 2018-2019	<p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (21 CFU)</p> <ul style="list-style-type: none"> <li>◇ <i>Analisi Matematica e Algebra Lineare</i>, Faculty of Industrial Engineering</li> <li>◇ <i>Metodi di Ottimizzazione della Ricerca Operativa</i> Faculty of Industrial Engineering</li> <li>◇ <i>Automatic Control</i> (Taught in English) M.Sc. Program in Biomedical Engineering</li> </ul> <p><b>Teaching Assistant</b> at Luiss University</p> <ul style="list-style-type: none"> <li>◇ <i>Mathematics II</i> Faculty of Economics and Business (Prof. Marco Papi)</li> </ul>
AA 2017-2018	<p><b>Teaching Assistant</b> at Università Campus Bio-Medico di Roma (15 CFU)</p> <ul style="list-style-type: none"> <li>◇ <i>Analisi Matematica e Algebra Lineare</i>, Faculty of Industrial Engineering</li> <li>◇ <i>Automatic Control</i> (Taught in English) M.Sc. Program in Biomedical Engineering</li> </ul> <p><b>Teaching Assistant</b> at Luiss University</p> <ul style="list-style-type: none"> <li>◇ <i>Mathematics II</i> Faculty of Economics and Business (Prof. Marco Papi)</li> </ul>

## COMPUTING SKILLS

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Operative Systems | Ubuntu, Windows, MacOS

Word Processors | LaTeX, OpenOffice, MS Word

Programming Languages | Matlab, Scilab, C, C++, parallel computing environments for C

## LANGUAGES

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Italian | Mothertongue

English | Upper Intermediate (B2)  
Certification: Cambridge English Certification FIRST

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