Curriculum Vitæ et Studiorum

EUROPEAN CURRICULUM VITAE	
Personal information	
Name	Marco Bussoletti
Birth date	December 6th 1995
Email address	marco.bussoletti@uniroma1.it
PROFESSIONAL EXPERIENCE	
Period	February 1st 2023 – Now
Institution	DIMA – Mechanical and Aerospace Engineering Department. Sapienza University.
Occupation	Research fellow
Research interest	Mathematical models development for mesoscale systems, focusing on diffuse interface approaches and transport phenomena. Theoretical and numerical analysis of microstructured biological and nanotechnological fluid mechanics and use of rare events techniques for the study of topological transitions. Investigation of the non-linear interactions among nanostructured fluids and multiple rigid bodies through stochastic differential equations. Development and implementation of highly parallelized and performing numerical solvers.
Period	January 1st 2020 – Now
Institution	Temple University, Rome Campus.
Occupation	Adjunct Professor and Teaching Assistant
Subjects	Engineering.
EDUCATION	
Period	November 1st 2019 – January 31st 2023
Institution	DIMA – Mechanical and Aerospace Engineering Department. Sapienza University.
Title	PhD in Theoretical and Applied Mechanics with honours
Occupation	PhD program in Theoretical and Applied Mechanics, XXXV course – with scolarship.
Thesis title	Mesoscale remodeling of fluid lipid membranes. Tutor Prof. Carlo Massimo Casciola
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Institution	Sapienza University.
Title	Master of Science in Mechanical Engineering.
Grade	110/110 with honours.
Thesis title	Phase field models for biological membranes: equilibrium configurations and dynamics. Tutor Prof. Carlo Massimo Casciola
Period	October 2014 – October 2017
Institution	Sapienza University.
Title	Bachelor of Science in Mechanical Engineering
Grade	110/110 with honours.
Period	September 2009 – July 2014
Insitution	Istituto di Istruzione Superiore Gandhi Narni Scalo
Title	Scientific Diploma – Informatic National Plan
Grade	100/100.
MOTHER LANGUAGE	ITALIAN
OTHER LANGUAGES	
	English
Reading	Excellent
Writing	Excellent
Speaking	Excellent
	FRENCH
Reading	Elementary
Writing	Elementary
Speaking	Elementary
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SKILLS AND TECHNICAL	
EXPERTISE	
	Expertise in numerical simulation techniques for high order partial differential equations with strong non-linearities, with particular interest in: Navier-Stokes copuled with fluctuating, multiphase, microstructured systems presenting a diffuse interface and interacting with foreign rigid bodies. The hardware background consists in big computational clusters with high parallelization (Tier-0 and Tier-1), with or without GPU acceleration.

Expertise in using Unix, Windows, and MacOS Operative Systems, along with expertise in the relative Office softwares. Certified experience by European Computer Driving

Licence.

Knowledge of programming languages and libraries: C, C++, Python, Fortran, PETSc library, Deal.ii library, Mathematica, MatLab.

Expertise in using softwares and tools for graphical processing of data and editing: Gnuplot, Paraview, Tecplot, Latex, GIMP, Photoshop, Inkscape, Adobe Premier Pro.

SCIENTIFIC

PRODUCTION	
2025	Bottacchiari, M.; Gallo, M.; Bussoletti, M.; Casciola, C. M. Diffuse interface model for fluid lipid vesicles with area-difference elasticity. <i>Meccanica</i> 2025 , <u>https://doi.org/10.1007/s11012-025-01939-x</u>
2024	Bottacchiari, M.; Gallo, M.; Bussoletti, M.; Casciola, C. M. The Diffuse Interface Description of Fluid Lipid Membranes Captures Key Features of the Hemifusion Pathway and Lateral Stress Profile. <i>PNAS Nexus</i> 2024 , <i>3</i> (8), pgae300. https://doi.org/10.1093/pnasnexus/pgae300.
2024	Bussoletti, M.; Gallo, M.; Bottacchiari, M.; Abbondanza, D.; Casciola, C. M. Mesoscopic Elasticity Controls Dynamin-Driven Fission of Lipid Tubules. <i>Scientific</i> <i>Reports</i> 2024 , <i>14</i> (1), 14003. <u>https://doi.org/10.1038/s41598-024-64685-2</u> .
2024	Bottacchiari, M.; Gallo, M.; Bussoletti, M.; Casciola, C. M. The Local Variation of the Gaussian Modulus Enables Different Pathways for Fluid Lipid Vesicle Fusion. <i>Scientific Reports</i> 2024 , <i>14</i> (1), 23. <u>https://doi.org/10.1038/s41598-023-50922-7</u> .
2022	Bottacchiari, M.; Gallo, M.; Bussoletti, M.; Casciola, C. M. Activation Energy and Force Fields during Topological Transitions of Fluid Lipid Vesicles. <i>Communications Physics 2022 5:1</i> 2022, <i>5</i> (1), 1–12. <u>https://doi.org/10.1038/s42005-022-01055-2</u> .
ACKNOWLEDGMENTS	
2020	Excellent Graduate, Fondazione Roma Sapienza. Awarded among the best graduates in the Ateneo for the academic year 2018/2019.
2019	Excellence Program, Sapienza University.
Fundings and Grants	
2025	ERC Starting Grant: E-Nucl. (Collaborator, Euro 1500000)
2025	MDR-TP - Spoke 6. (Collaborator, 2.8 M core-hours on LEONARDO)
2024	PRIN 2022: The fluid dynamics of interfaces: mesoscale models for bubbles, droplets, and membranes and their coupling to large scale flows. (Collaborator, Euro 200000)
2024	Sapienza Large Project: Understanding Deep Brain Injury: The Role of Bubble 3 - Curriculum Vitæ of Bussoletti Marco

	Nucleation In Tissue Damage. (Collaborator, Euro 42000)
2024	Sapienza project – Avvio alla Ricerca: Drop coalescence inhibition by curvature elasticity in microemulsions. (PI, Euro 2000)
2024	Iscra B Cineca: CAMAGE3D. (Collaborator, 340 K core-hours on LEONARDO)
2023	Iscra B Cineca: D-RESIN. (Collaborator, 2 M core-hours on LEONARDO)
2023	Iscra C Cineca: Enlightening the Mesoscale dynAmics of Dynamin-driven fissiON of fluid lipid membranes. (PI, 16 k core-hurs on GALILEO100)
2022	Sapienza Large Project: Plants and plant-inspired microfluidics. (Collaborator, Euro 50000)
2022	Iscra C Cineca: A minimal model for dynamin mediated tubule fission. (PI, 30 k core- hurs on GALILEO100)
2021	Sapienza project – Avvio alla Ricerca: A continuous mesoscale analysis of curvature- mediated protein aggregation on lipid bilayers. (PI, Euro 1500)
2021	Prace 23rd call: HPC simulations of natural and bio-inspired micro-cavitating systems. (Collaborator, 45 M core-hours in MARCONI m100)
2021	Iscra C Cineca: MAPA - A continuous Mesoscale Analysis of curvature-mediated Protein Aggregation on lipid bilayers. (PI, 128 k core-hours on GALILEO100)
2021	Iscra B Cineca: FHDAS. (Collaborator, 0.6 M core-hours on MARCONI m100)
2021	Prace DECI: SOLID A full Scale simulatiOn on vapor fLow with Droplets: a physically consistent model to simulate droplet from nucleation to hydrodynamics. (Collaborator, 5.4 M core-hours on NAVIGATOR)
2020	Sapienza Large Project: Dynamics of Biological and Artificial Lipid Bilayer Membranes. (Collaborator, Euro 42000)
2020	Prace 20th call: BIMI Bubble dynamics from nanoscale Inception to Macroscale hydrodynamic Interaction. (Collaborator, 35 M core-hours on MARCONI m100)
2019	Iscra C Cineca: PFMLB Phase-Field Models for Lipid Bilayers. (PI, 4 k core-hours on MARCONI m100 and 140 k core-hours on GALILEO)
WORKSHOPS AND CONFERENCES	
2025	APS Global Physics summit 2025 with "Meososcoopic elasticity controls dynamin- driven fission of lipid tubules", Anaheim. (Speaker and Poster)
2023	CECAM workshop on "Metastability and multiscale effects in interfacial phenomena", Lausanne. (Poster)
2022	12th European Conference of Theoretical and Mathematical Biology, Heidelberg. (Speaker)
2021	Programming paradigms for GPU devices, CINECA.
2021	Recent Advances in Mechanics and Mathematics of Materials, offered by the Civil and Industrial Engineering Faculty, Sapienza University.
2021	Deep Learning and Applied Artificial Intelligence, course offered by the Master degree in Condensed Matter Physics, Sapienza University.
2020	Virtual School on Numerical Methods for Parallel CFD, CINECA.
TEACHING ACTIVITY	
2025 - 2025	Adjunct Professor of Classical and Statistical Thermodynamics, Temple University Rome Campus.

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2021 - 2025	Adjunct Professor of Engineering Dynamics, Temple University Rome Campus.
2020 - 2024	Teaching Assistant of Classical and Statistical Thermodynamics, Temple University Rome Campus.
2019 - 2022	Teaching Assistant of Calculus 1, Bachelor degree in Aerospace Engineering, Sapienza University.
2020 - 2022	Teaching Assistant of Calculus I, Bachelor degree in Civil Engineering, Sapienza University.
2020 - 2022	Teaching Assistant of Calculus I, Bachelor degree in Environmental Engineering, Sapienza University.
2019 - 2021	Teaching Assistant of Engineering Dynamics, Temple University Rome Campus.
2025	Co-advisor of a PhD Thesis in Theroetical and Applied Mechanics.
2022	Co-advisor of a Master of Science Thesis in Mechanical Engineering.
2021	Co-advisor of a Master of Science Thesis in Nanotechnology Engineering.

Rome, April 7th 2025