



Matteo Bottacchiari

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PROFESSIONAL QUALIFICATION

01/07/2021 – CURRENT

Qualification to practise the profession of Industrial Engineer

Mechanics - "Albo A"

WORK EXPERIENCE

27/11/2023 – 30/11/2024

POST-DOC SAPIENZA UNIVERSITY OF ROME - DEPARTMENT OF BASIC AND APPLIED SCIENCES FOR ENGINEERING

EDUCATION AND TRAINING

01/11/2020 – 31/10/2023

PH.D. IN THEORETICAL AND APPLIED MECHANICS Sapienza University of Rome - Department of Mechanical and Aerospace Engineering

My research activity focused on phase-field models for biological membranes, with particular regard to their topological transitions in fusion and fission events. I was also Guest Student at the Center for Life Nano- & Neuro-Science at the Italian Institute of Technology in Rome.

Final grade Cum Laude

11/01/2018 – 13/01/2020

MASTER'S DEGREE IN MECHANICAL ENGINEERING Sapienza University of Rome

Specialization in Energy

Final grade 110 cum laude/110 |

Thesis Interaction between the two leaflets in the dynamics of lipid bilayers (Subject: Fluid dynamics)

20/09/2016 – 10/01/2018

BACHELOR DEGREE IN PHYSICS Sapienza University of Rome

20/09/2012 – 23/03/2016

BACHELOR DEGREE IN MECHANICAL ENGINEERING Sapienza University of Rome

TEACHING ACTIVITY

Adjunct Professor of "Mathematical Analysis I" (3 CFU, co-teaching)

Bachelor degree in Mechanical Engineering - Sapienza University of Rome
AY 2023/2024 - 2024/2025

Adjunct Professor of "Calculus I"

Temple University, Rome Campus
AY 2024/2025

Adjunct Professor of "Precalculus"

Temple University, Rome Campus
AY 2023/2024

Adjunct Professor of "Quantitative Methods for Business I" and of "Quantitative Methods for Business II"

Temple University, Rome Campus
AY 2023/2024 - 2024/2025

Teaching assistant (tutorship) for "Engineering Dynamics"

Temple University, Rome Campus
AY 2021/2022 - 2022/2023 - 2023/2024 - 2024/2025

Teaching assistant (tutorship) for "Physics I"

Bachelor degree in Energy Engineering - Sapienza University of Rome
AY 2020/2021 - 2021/2022

Teaching assistant (tutorship) for "Mathematical Analysis I"

Bachelor degree in Mechanical Engineering - Sapienza University of Rome
AY 2020/2021 - 2021/2022 - 2022/2023

Teaching assistant (tutorship) for "General Mathematics"

Bachelor degree in Business Administration - Tuscia University, Civitavecchia Campus
AY 2021/2022 - 2022/2023 - 2023/2024 - 2024/2025

RESEARCH GRANTS

Principal Investigator

FUNDING

- Progetti per Avvio alla Ricerca Sapienza di Tipo 1 - *Proteins and fusion of fluid lipid vesicles: exploration of a possible mechanism to lower the energy barrier* [2022] (1332€)
- Progetti per Avvio alla Ricerca Sapienza di Tipo 2 - *Multiscale simulation of the minimal energy pathway for endocytosis* [2024] (2000€)

HIGH PERFORMANCE COMPUTING RESOURCES

- Italian SuperComputing Resource Allocation (ISCRA) - Class C projects: *ToTraVes* [2022] (86400 core hours on GALILEO100), *GaVesFu* [2023] (100000 core hours on GALILEO100)

Collaborator

HIGH PERFORMANCE COMPUTING RESOURCES

- Italian SuperComputing Resource Allocation (ISCRA) - PRACE tier 0 call 23: *HPC simulations of natural and bio-inspired micro-cavitating systems* (45 M core hours on MARCONI 100 - 2021/2022)
- Italian SuperComputing Resource Allocation (ISCRA) - Class B projects: *FHDAS* (1.2 M core hours on MARCONI100 - 2021/2022)
- Italian SuperComputing Resource Allocation (ISCRA) - Class B projects: *CAMAGE3D* (0.7 M core hours on LEONARDO_DC - 2023/2024)
- Italian SuperComputing Resource Allocation (ISCRA) - Class B projects: *D-RESIN* (gpu hours on LEONARDO_B - 2023/2024)

01/06/2020 – 01/10/2020

Research scholarship

Numerical and experimental study of a microfluidic system for Hospital on a Needle applications
Sapienza University of Rome - Department of Mechanical and Aerospace Engineering

● **CONFERENCES AND SEMINARS**

Contributed talks

- **12th European Conference on Mathematical and Theoretical Biology**, *Topological transitions in fluid lipid membranes: activation energy and force fields*, Heidelberg, Germany [18/09/22 - 23/09/22]
- **5th Biophysics@Rome Conference**, *The local variation of the Gaussian modulus enables different pathways for fluid lipid vesicle fusion*, Rome, Italy [19/04/2023 - 20/03/2023]
- **APS Global Physics Summit 2025**, *The diffuse interface description of lipid membranes: hemifusion pathway and lateral stress profile*, Anaheim, California, USA [16/03/2025 - 21/03/2025]

Posters

- **Metastability and multiscale effects in interfacial phenomena**, *Topological transitions of fluid lipid vesicles*, CECAM-HQ-EPFL, Lausanne, Switzerland [13/03/2023 - 15/03/2023]

● **LANGUAGE SKILLS**

Mother tongue(s): **ITALIAN**
Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● **DIGITAL SKILLS**

Computational Fluid Dynamics

ANSYS Fluent | ANSYS CFX

Computer programming

C language | Wolfram Mathematica programming | PETSc library | Basics of Julia | FFTW

Others

Gnuplot | LaTeX

● **PUBLICATIONS**

2022
[Activation energy and force fields during topological transitions of fluid lipid vesicles](#)

Bottacchiari M., Gallo M., Bussoletti M., & Casciola C. M., Communications physics, 5(1), 283

2024
[The local variation of the Gaussian modulus enables different pathways for fluid lipid vesicle fusion](#)

Bottacchiari M., Gallo M., Bussoletti M., & Casciola C. M., Scientific reports, 14, 23

2024
[Mesoscopic elasticity controls dynamin-driven fission of lipid tubules](#)

Bussoletti M., Gallo M., Bottacchiari M., Abbondanza D. & Casciola C. M., Sci Rep 14, 14003

2024
[The diffuse interface description of fluid lipid membranes captures key features of the hemifusion pathway and lateral stress profile](#)

Bottacchiari M., Gallo M., Bussoletti M., & Casciola C. M., PNAS Nexus, pgae300

26/03/2025