

Marco Ellero
Ikerbasque Prof. Habil. Dr.

Curriculum Vitae

July 2023

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Bio-sketch

Birthdate 22/10/1974
Birthplace Trieste, Italy
Nationality Italian

Researcher identifiers

RG: www.researchgate.net/profile/Marco_Ellero
Orchid: orcid.org/0000-0001-8894-0395
Google: scholar.google.de/citations?user=7YaQy5sAAAAJ&hl=en
Scopus: www.scopus.com/authid/detail.uri?authorId=55967601300



Current positions

Ikerbasque Research Chair of Computational Fluid Dynamics (BCAM)
Honorary Professor (ZCCE, Swansea University)

Areas of expertise

Prof. Ellero's research interests deal with the theoretical modelling and numerical simulation of complex fluids, particulate systems and multiscale flow phenomena with particular focus on biofluid mechanics, microfluidics and rheology. The main goal of his work is the development of new models based on Lagrangian multiscale particle-methods and the design of efficient parallel algorithms for the analysis of complex flows problems.

Affiliations

- Basque Center for Applied Mathematics (BCAM), Alameda de Mazarredo 14, Bilbao 48009, Spain.
- IKERBASQUE, Basque Foundation for Science, Calle de María Díaz de Haro 3, 48013 Bilbao, Spain
- Zienkiewicz Centre for Computational Engineering (ZCCE), Swansea University, SA18EN, UK
- Institute of Non-Newtonian Fluid Mechanics (INNFM), Swansea University, SA18EN, UK

Education and Qualifications

- 2018 Professorial Qualification ("Acreditación") ANECA, Spain
Area: Engineering. Level: "Profesor Titular de Universidad"
- 2014 Professorial Qualification ("Habilitation"), Technical University Munich, Germany.
Area: Mechanical Engineering. Scientific area: "*Fluid Mechanics*".
Thesis subject: *Towards computational microfluidics: complex flow of complex fluids*
Advisor: Prof. N.A. Adams, Prof. R.I. Tanner, Prof. P. Español.
- 2014 Professorial Qualification ("Abitazione Scientifica Nazionale", ASN), MIUR, Italy
Area: Engineering (09/A1). Scientific area: "*Fluid Dynamics*" (ING-IND/06).
- 2014 Professorial Qualification ("Agencia Qualitat Sistema Universitari de Catalunya", AQU) Catalonia, Spain.
- 2004 Ph.D. in Theoretical Physics, Technical University Berlin
Thesis subject: *Smoothed Particle methods for the simulation of viscoelastic fluids*
Advisors: Prof. S. Hess, Prof. M. Kröger.
- 2000 M.Sc. in Physics ("Laurea"), University of Trieste
Thesis subject: *Particle simulation methods in fluid dynamics*
Advisor: Prof. M. Tassarotto.

Employment History

2018-present	Full Research Professor of CFD	Comp. Math. Division	BCAM Bilbao
2018-present	Honorary Professor	College of Engineering	University of Wales Swansea
2013-2018	Associate Professor (tenured)	College of Engineering	University of Wales Swansea
2013	Academic Visitor	Dept. Bioengineering	National University Singapore
2008-2013	Senior Lecturer (TV-L E 15)	Inst. Fluid Mechanics	Technical University Munich
2008-2013	Head Microfluidics Group	Inst. Fluid Mechanics	Technical University Munich
2007-2008	Juan de la Cierva Researcher	Dept. Theoret. Physics	UNED Madrid.
2006-2007	Research Assistant (BAT IIa)	Inst. Fluid Mechanics	Technical University Munich
2004-2006	ARC Research Associate	School Mech. Eng.	University of Sydney
2000-2004	Scientific Assistant (PhD)	Inst. Theoretical Physics	Technical University Berlin

Administrative service

2018-present	BCAM Area Coordinator: “Computational Mathematics”.
2018-present	Member of the BCAM Management Committee.
2018-present	BCAM Ikerbasque Fellowship - Evaluation Committee.

Teaching

2022-present	Affiliated with the Doctoral Programme in “Engineering Physics”	UPV/EHU
2019-present	“Computational Fluid Dynamics for Turbulent Flows”: [3 ECTS]	UPV/EHU
2018-2019	“Computational Fluid Dynamics: Formula Student Bizkaia”	UPV/EHU
2016-2018	“Microfluidics Lab”: “Human Physiology” [5 ECTS]	Swansea University
2015-2018	“Biomedical Flows in Physiology” [5 ECTS]	Swansea University
2014-2018	“Thermodynamics I” [5 ECTS]	Swansea University
2012-2013	Participation on “Bionics Lecture Series” [3 ECTS]	TU Munich
2006-2013	“Particle Methods in Fluid Dynamics” [3 ECTS]	TU Munich
2008-2013	“Biofluid Mechanics” [5 ECTS]	TU Munich

Awards and Fellowships

2018	“Certificado de Acreditación Nacional” issued by ANECA, Spain
2018	“Bizkaia Talent Grant” issued by Bizkaia Talent
2017	“Ikerbasque” Research Chair endowed by Basque Science Foundation, Basque Government.
2018	Awarded “Erasmus - Staff Training Mobility Scheme” at Illycaffè (Italy).
2014	“Acreditació de la Recerca de l’Àmbit de Ciències”, issued by Catalanian Ministry of Research.
2014	“Abilitazione Scientifica Nazionale” (ASN), issued by Italian Ministry of Research (MIUR).
2007	“Emmy Noether” Award of the German Science Foundation (DFG)
2007	“Juan de la Cierva” Award of the Spanish Ministry of Science (MEC)
1999	Fellowship of the Consortium of Magnetofluid Dynamics (CMFD, Trieste Univ.)
1997	“Erasmus” Fellowship, 1 year as undergraduate student at the University of Manchester, UK.

Projects/Grants (Principal Investigator)

- 2022-2026 Severo Ochoa “Guarantor researcher” funded by the Spanish State Agency (CEX2021-001142-S/MICIN/AEI/10.13039/501100011033) Guarantor BCAM [€4.000.000]
- 2022-2023 Programa de Ayudas a la Investigación Colaborativa en áreas estratégicas: (ELKARTEK 2022) KAIROS: KK-2022/00052; PI-BCAM: [€133.537,97] funded by Departamento de Desarrollo Económico e Infraestructuras, Gobierno Vasco “Digitalización predictiva del comportamiento a largo plazo de materiales poliméricos composites.”
- 2022-2023 Programa de Ayudas a la Investigación Colaborativa en áreas estratégicas: (ELKARTEK 2022) SOSIAME: KK-2022/00110; PI-BCAM: [€113.600,00] funded by Departamento de Desarrollo Económico e Infraestructuras, Gobierno Vasco “Tecnologías Inteligentes Sostenibles para el Sector del Metal del Futuro ”
- 2022 Call for workshop organization “Modelling tools for complex suspensions” Bilbao, May 2022 CECAM Flagship call 2022 [€4.000]; Basque Government Call 2022 [€7.300]
- 2022-2023 Proyecto Transferencia Tecnológica (2021): funded by Bizkaia - Diputación Foral “Optimización del proceso de fusión de aluminio a través de tecnología matemática” Ref. 6/12/TT/2021/00009 PI [€42.060,07]
- 2021-2024 Proyectos de I+D+i “Retos investigación” (coordinado) (call 2020): funded by Ministerio de Ciencia, Innovación y Universidades “Microscopic foundations of softmatter experiments: computational nanohydrodynamics” (CompuNanoHydr) PID2020-117080RB-C55. PI-BCAM [€84.400]
- 2021-2023 H2020-MSCA-IF-2020; Action MSCA-IF-EF-ST “Desing of a Virtual Blood Rheometer for Thrombotic Process Characterization” EU proposal 101021893 - ViBRheo : PI-Host [€172.932,48]
- 2021-2024 Industrial PhD funded by BMW Group (Munich, Germany) “Machine learning for computational fluid dynamics”. [≈ €80.000]
- 2020-2021 Research Project: “Barcelona Supercomputing Center” (BSC) “Multiscale particle-based simulations of complex suspensions” [1.905M CPU hours]
- 2020-2022 Industrial project funded by the Illycaffè S.p.a. (Italy) “Mesoscopic modelling and simulation of coffee extraction”: [€45.000,00]
- 2020-2021 Internal BCAM project on Artificial Intelligence applications “Data-driven closure models for complex fluids using machine learning”: [€60.000,00]
- 2018-2022 Severo Ochoa “Guarantor researcher”: funded by the Spanish State Agency (SEV-2017-0718) Guarantor BCAM [€4.000.000]
- 2020-2021 Programa de Ayudas a la Investigación Colaborativa en áreas estratégicas: (ELKARTEK 2020) CIRCU-AL: KK-2020/000; PI-BCAM: [€95.400,00] funded by Departamento de Desarrollo Económico e Infraestructuras, Gobierno Vasco “Economía Circular de los Recursos en Metales (Aplicación a las Aleaciones de Aluminio)”
- 2019-2020 Programa de Ayudas a la Investigación Colaborativa en áreas estratégicas: (ELKARTEK 2019) KK-2019/00085; PI-BCAM: [€95.611,47] funded by Departamento de Desarrollo Económico e Infraestructuras, Gobierno Vasco “Matemática Inteligente para Eólica Offshore”(MATHEO)
- 2019-2020 Programa de Ayudas a la Investigación Colaborativa en áreas estratégicas: (ELKARTEK 2019) KK-2019/00015; PI-BCAM: [€66.195,15] funded by Departamento de Desarrollo Económico e Infraestructuras, Gobierno Vasco “Biomarcadores para el diagnóstico precoz y seguimiento de tratamiento en hipertensión pulmonar” (bmG19)
- 2019-2020 Proyectos de I+D+i “Retos investigación” (call 2018): RTI2018-094595-B-I00 [€41.140] funded by Ministerio de Ciencia, Innovación y Universidades “Virtual Rheological Analysis of Complex Shear Thickening Fluids” (VIRHACOST)
- 2018-2023 Bizkaia Talent - Financial Aid Programme 2017 [€78.488,46] “Multiscale Particle Simulation of Complex Suspensions”
- 2018-date Ikerbasque Professorship Grant awarded by the Ikerbasque Foundation [€40.000]

Projects/Grants (Principal Investigator): cont.

- 2016-2018 National Research Network in Advanced Engineering and Materials
"Computational modelling of magnetic self-assembled chains"
(with Glasgow U./Cardiff U./Microfluidic ChipShop GmbH) [£82,682]
- 2008-2013 Emmy-Noether Project funded by the German Science Foundation (DFG):EL 503/1-1:
"A unified Lagrangian particle approach for the simulation of complex multiscale flows"
[three 5-years full positions: ~ €941.000 (before taxes) + €50k funding allowance]
- 2013-2014 Emmy-Noether Project funded by the German Science Foundation (DFG):EL 503/1-2:
"A unified Lagrangian particle approach for the simulation of complex multiscale flows"
[two 1-year full positions: ~ €130.000 (before taxes) + €36k funding allowance]
- 2011-2013 Research Project funded by the German Science Foundation (DFG): EL503/2-1
"Numerical investigation of leukocyte binding in the human vasculature"
[one 2-years full position: ~ €114.000 (before taxes)+ €30k funding allowance]
- 2015-date Research Project of the "High Performance Computing Wales" (HPC Wales):
"Multiscale particle simulation for complex fluids and physiology"[10M CPU hours]
- 2008-2014 Research Projects of the "Höchstleistungsrechner in Bayern" (HLRB)
"Multiscale modeling of particle suspension" [22M CPU hours]
- 2012-2013 TUM Junior Fellow Fund [€22.500]

Invited Research Stays

- 02/2002 Institute of Theoretical Physics , UNED Madrid (Prof. P. Español)
- 06/2005 Institute of Theoretical Physics , UNED Madrid (Prof. P. Español)
- 02/2006 Institute of Theoretical Physics , UNED Madrid (Prof. P. Español)
- 02/2012 School of Mechanical Engineering , Sydney University (Prof. R. Tanner)
- 09/2013 Dept. Mechanical Engineering, National University Singapore (Prof. N. Phan-Thien).
- 12/2014 National Supercomputing Centre, Tianhe-II, Guangzhou (Prof. X.-F. Yuan).
- 04/2018 R&D Division, Illycaffè', Trieste (Erasmus - Staff Training Mobility Scheme).

Consulting and Research with External Companies

- 2023 Athletic Football Club (Bilbao, Spain) Analysis of pedestrian flow near a stadium
- 2021 BMW Group (Munich, Germany) Machine learning for fluid dynamics
- 2018 R&D Division, ILLYcaffè' S.p.A (Trieste, Italy) Models of transient coffee filtration.
- 2015 Microfluidic ChipShop GmbH (Jena, Germany) Models of magnetic self-assembled chains.

Journal Publications: summary

Journal	Impact Factor	Number of papers
Phys. Rev. Letters	7.943	2
J. Fluid Mech.	3.137	1
J. Food Engng.	3.625	1
Biomech. Model. Mechanobiol.	3.251	1
Micro and Nanofluidics	3.218	2
J. Chem. Physics	3.164	2
Comp. Phys. Comm	3.078	1
Phys. Rev. E	2.313	7
J. Comp. Physics	2.138	2
Int. J. Num. Meth. Engng.	2.056	1
Physics of Fluids	1.942	2
J. Non-Newt. Fluid Mech.	1.567	7
Computer and Fluids	1.467	1

Organizing/Scientific Committees, Editorial Boards

- 2007 Committee IUTAM Symposium "Advances on Micro and Nanofluidics", Dresden
- 2011 Invited Session on "Particle Methods for Micro/Nano Flows", PARTICLES 2011, Barcelona.
- 2013 Scientific Committee PARTICLES 2013, Stuttgart.
- 2013 Invited Session on "Particle Methods and Meshless Methods", GACM 2013, Hamburg.
- 2013 Invited Session on "Particle Models of Flow Physics", PARTICLES 2013, Stuttgart.
- 2014 Invited mini-symposium on "Particle methods for micro-flows", 11th World Congress on Computational Mechanics (WCCM XI), Barcelona.
- 2015 Scientific Committee PARTICLES 2015, Barcelona.
- 2015 Local Scientific Committee, 23rd UK Association of Comp. Mech. Conf., Swansea 2015
- 2016 Invited mini-symposium on "Particle-based methods for the simulation of complex fluids", 12th World Congress on Computational Mechanics (WCCM XII), Seoul - Korea.
- 2015 Scientific Committee Int. Conf. for Mesoscopic Methods in Engineering and Science (ICMMES).
- 2017 Scientific Committee PARTICLES 2017, Hannover.
- 2018 Scientific Committee PARTICLES 2019, Barcelona.
- 2019 Scientific Committee PARTICLES 2021, Hamburg.
- 2018 Editorial Board of the Journal Fluid Dynamics and Materials Processing.
- 2018 Editorial Board of the Journal of Non-Newtonian Fluid Mechanics.
- 2019 Editorial Board of Physics of Fluids.
- 2018 Scientific Committee Joint Research Lab in Offshore Renewable Energy (JRL-ORE)
- 2021 Scientific Committee SPHERIC 2021, New Jersey.
- 2022 Organization Board, CECAM Workshop on "Modelling of Complex Suspensions" 23-27 May, BCAM - Bilbao.
- 2022 Editorial Board of Advances in Computational Science and Engineering (AIMS).
- 2023 Organization Board, "International Workshop on Numerical Methods for Non-Newtonian Flows" (IWNMNNF-23) 28 May, Glasgow, UK.
- 2023 Guest Editor, Journal of Non-Newtonian Fluid Mechanics
Special Issue "International Workshop on Numerical Methods for Non-Newtonian Flows"
- 2023 Guest Editor, Physics of Fluids
Special Topics "Roger Tanner: 90 Years of Rheology"

Language skills

Italian (mother language), English, German, Spanish.

MSc/PhD/Postdocs supervision

2023-present	D. Kundu, "Sedimentation of complex-shape particles"	BCAM (Postdoc)
2023-present	L. Santelli, "Integral fractional viscoelasticity"	BCAM (Postdoc)
2022-present	D. Moreno, "Mesoscopic modelling of viruses in flow"	BCAM (PhD)
2021-present	D. Hernández-Delfin, "Pedestrian flow modelling"	BCAM (Postdoc)
2021-present	A. Bonfanti, "Physics-Informed Neural Network for CFD"	BMW Group (PhD)
2021-present	A. Garcia, "Modelling of pedestrian flow"	BCAM (PhD)
2021-present	P Angerman, "Frictional Flow Patterns in Complex Geometries"	Swansea (PhD)
2020-present	M. Echeverria, "Modelling and simulation of blood"	BCAM (PhD)
2021-present	E. Zhoravi, "Multiscale modelling of clotting using particle methods"	BCAM (Postdoc)
2020-2022	C. Mo, "Mesoscopic modelling and simulations of coffee extraction"	BCAM (Postdoc)
2019-2021	J.A. Ruiz Lopez, "Data-driven reduced-order models of suspensions"	BCAM (Postdoc)
2019-present	D. Nieto, "Multiscale modelling in fluids using machine-learning"	BCAM (Postdoc)
2019-present	N. Moreno, "Multiscale modelling of cellular transport/adhesion"	BCAM (Postdoc)
2018-present	E. Rossi, "Multiscale modelling of shear-thickening fluids"	BCAM (Postdoc)
2018-present	S.P. Kumar, "Multiscale modelling of complex suspensions"	BCAM (Postdoc)
2014-2017	A. Vazquez Quesada, "SPH modelling of complex fluids"	Swansea (Postdoc)
2015-2016	D. Khoo, "CFD in Integrated Microfluidics"	Swansea (MSc)
2010-2012	A. Vazquez Quesada, "Computational microrheology"	TUM (Postdoc)
2008-2013	X. Bian, "Numerical modelling of colloidal suspensions"	TUM (PhD)
2010-2013	Y. Shi, "Lagrangian turbulence modelled using particle methods"	TUM (PhD)
2011-2014	B. Gholami, "Numerical modelling of leukocyte dynamics"	TUM (PhD)
2011-2012	R. Quian, "Dynamic simulation of a spherical particle near a wall"	TUM (MSc)
2010-2011	Y. Shi, "Numerical analysis of implicit SPH viscosities"	TUM (MSc)
2009-2010	B. Cankurt, "SPH simulations of confined viscoelastic flows"	TUM (MSc)
2007-2008	E. Fonda, "Inverse kinetic Lattice-Boltzmann models"	Trieste (MSc)

Doctoral examination board

2023	Lorenzo Vasquez Giuliano , Politecnico di Torino (External Examiner) "Shear-responsive drug carriers for treating obstructed blood vessels: a coupled CFD-DEM approach".
2022	Raul Perez, Universidad Autonoma Madrid (External Examiner) "Complex fluids in the Gpu era. Algorithms and simulations".
2022	Francesca Tedeschi, Universita'di Padova (External Examiner) "Flow-type dependence and simulation techniques for non-Newtonian complex fluids."
2021	Dariel Hernández-Delfin, Universidad de Navarra (External examiner) "Discrete Elements Methods for granular materials"
2020	Massoud Rezavand, University Innsbruck (External examiner) "Integrated Numerical Modeling of Anaerobic Digestion Using Smoothed Particle Hydrodynamics"
2018	Dmitrii Azarnykh, Technical University Munich (External examiner) "Analysis of stochastic models in fluids by simulations"
2018	Babak Gholami, Technical University Munich (First supervisor/Examiner) "Multiscale particle modeling of atherosclerosis"
2015	Xin Bian, Technical University Munich (First Supervisor/Examiner) "Modeling and simulation of particle dispersions with smoothed dissipative particle dynamics"
2014	Farzaneh Hafezi, Swansea University (Internal Examiner) "Computational modelling of fluid-structure interaction at nano-scale boundaries"
2015	Esteban Lopez-Aguilar, Swansea University (Internal Examiner) "Rheological studies on viscoelastic surfactant systems"
2015	Anas Obeidat, Technical University Denmark (External Examiner) "Development of Smoothed Particle Hydrodynamics for Turbulent Flows"
2015	Jaime Arturo de la Torre, UNED Madrid (External Examiner) "Top-down and Bottom-up Approaches to Discrete Diffusion Models"

Referee activities

Journal of Fluid Mechanics, Journal of Computational Physics, Journal of Non-Newtonian Fluid Mechanics, Physical Review E, Journal of Rheology, Physics of Fluids, Nature Communications, Int. Journal of Numerical Methods in Engineering, Int. Journal of Numerical Methods in Biomedical Engineering, Computer Physics Communications, Computer and Fluids, Physica D, Macromolecules, Biotechnology and Applied Biochemistry, Computational and Applied Mathematics, Int. Journal of Heat and Fluid Flow, SIAM Journal on Multiscale Modelling and Simulations, Oxford University Press (UK), Referee for the Deutsche Forschungsgemeinschaft (DFG), Referee for the Swiss National Science Foundation (SNSF), Scientific Expert for the Partnership for Advanced Computing in Europe (PRACE).

Memberships

European Rheology Society, British Society of Rheology, Real Sociedad Española de Física, Grupo Español de Reología, Euromech, Institute of Non-Newtonian Fluid Mechanics (elected member).

Invited Talks

1. *Numerical modelling of transient viscoelastic flows using SPH*, July 2005, seminar lecture, invited by Prof. P. Español, Department of Theoretical Physics, UNED, Madrid, Spain.
2. *An incompressible formulation for SPH based on the SHAKE methodology*, August 2005, seminar lecture, invited by Prof. H.C. Öttinger, Polymer Physics Department, ETH Zurich, Switzerland.
3. *Numerical simulations of non-rotating particle suspensions in a viscoelastic fluid under shear*, February 2006, seminar lecture, invited by Prof. E. Lomba, Department of Theoretical Chemical Physics, CSIC, Madrid, Spain.
4. *Effect of non-rotating rigid inclusions on the rheological and micromechanical behaviour of a viscoelastic material*, March 2006, seminar lecture, invited by Prof. P. Español, Department of Theoretical Physics, UNED, Madrid, Spain.
5. *SPH computations of incompressible flows*, May 2006, seminar lecture, invited by Prof. A. Souto, Model Basin, ETSI Navales, UPM Madrid, Spain.
6. *Fluid particle models for microfluidics*, **Plenary lecture**, September 2007, IUTAM Symposium on Advances in Micro- and Nanofluidics, Dresden, Germany.
7. *Consistent scaling of thermal fluctuations in SPH/DPD*, **Keynote lecture**, July 2008, Symposium on Advanced Computational Description of Macromolecular Materials, 8th World Congress on Computational mechanics (WCCM8), Venice, Italy.
8. *A Lagrangian particle method for macroscopic/mesoscopic particulate flows*, August 2010, seminar lecture, invited by Prof. Briesen, Lehrstuhl für Systemverfahrenstechnik, TU München, Germany.
9. *SPH modelling of complex microflows*, Invited lecture, 25 October 2010, LMCC Workshop on Fundamentals and applications of SPH in science and engineering, Leuven, Belgium.
10. *Smoothed Particle Dynamics modelling of microfluids: theory and applications*, Invited lecture, March 2011, Minisymposium on Particle Methods at the 16th International Conference on Finite Elements in Flow Problems, Munich, Germany.
11. *Coarse graining of Smoothed Particle Hydrodynamics*, Invited Lecture, April 2011 Workshop on 'Dynamical Systems Methods in Classical and Quantum Fluids', International Center for Theoretical Physics, Trieste, Italy.
12. *Numerical Modelling of Micro/Nano-structured fluids*, May 20 2011, seminar lecture, invited by Prof. Delgado, Institute of Fluid Mechanics, Friedrich-Alexander University Erlangen-Nürnberg, Germany.
13. *Computational Microrheology using SPH*, Invited Lecture, October 2011 CECAM Workshop on Multiscale Particle-based methods, Zaragoza, Spain.
14. *Purely elastic instabilities studied via SPH*, Invited Lecture (Invited session), October 2011 2nd International PARTICLES Conference 2011, Barcelona, Spain.
15. *Elastic instability and transition to turbulence in periodic channel flows*, March 20 2012, seminar lecture, invited by Prof. R.I. Tanner, Rheology group, School of Aeronautical, Mechanical and Mechatronic Engineering, University of Sydney, Australia.
16. *Microrheology and Microfluidics simulations using particle methods* **Keynote Lecture**, October 2012, IUTAM Symposium on Particle Methods in Fluid Mechanics, Copenhagen, Denmark.
17. *Smoothed Particle Hydrodynamics*, Invited School Lecture, November 2012 CECAM School on "Fluid-Structure Interactions in Soft-Matter Systems: From the Mesoscale to the Macroscale", Prato, Italy.

18. *Simulations of Passive Microrheology using Particle Methods*, Invited Research Lecture, November 2012 CECAM School on “Fluid-Structure Interactions in Soft-Matter Systems: From the Mesoscale to the Macroscale”, Prato, Italy.
19. *Towards numerical prototyping of biomicrofluidics*, January 2012, seminar lecture, invited by Prof. T. Schratzenstaller, Biomedical Engineering, University of Applied Science, Regensburg, Germany.
20. *Particle modeling and simulation of colloidal and non-colloidal suspensions*, Invited Lecture, February 2013 Symposium on Particle-Based Methods in Fluid Mechanics and FSI Problems, FEF2013 San Diego, California.
21. *Rheology of a concentrated non-colloidal suspension studied with SPH: shear-thickening behaviour and its connection to cluster-formation*, February 2013, seminar lecture, invited by Prof. J. Brady, Chemical Engineering Department, California Institute of Technology, Los Angeles.
22. *Towards computational microfluidics: complex flow of complex fluids*, March 2013, seminar lecture, invited by Prof. T. McLeish and Prof. R. Crouch, School of Engineering and Computing Science, University of Durham, UK.
23. *Turbulence at zero Reynolds number: elastic instabilities and mixing*, May 2013, seminar lecture, invited by Prof. A. Potherat, Applied Mathematic Research Centre, Coventry University, UK.
24. *A general particle-modeling framework for computational microfluidics and microrheology*, May 2013, seminar lecture, invited by Prof. G. Dimitratis, Department of Aerospace and Mechanical Engineering, University of Liege, Belgium.
25. *Numerical simulations of elastic turbulence and mixing*, June 2013, seminar lecture, invited by Prof. C. Wagner, Department of Experimental Physics, Universitaet des Saarlandes, Germany.
26. *Particle modelling and simulation of colloidal and non-colloidal suspensions*, September 2013, seminar lecture, invited by Prof. N. Phan-Thien, Department of Bioengineering, National University of Singapore.
27. *Smoothed Particle Hydrodynamics simulations of elastic turbulence and mixing in a periodic channel flow*, September 2013, seminar lecture, invited by Prof. N. Phan-Thien, Department of Bioengineering, National University of Singapore.
28. *Smoothed particle hydrodynamics simulations of elastic turbulence*, Invited Lecture (Invited session), October 2013, 3rd International PARTICLES Conference 2013, Stuttgart, Germany.
29. *Numerical simulations of elastic instabilities and turbulence*, Invited Lecture (Invited session), October 2013, GACM Conference 2013, TUHH Hamburg, Germany.
30. *Multiscale particle methods for the simulations of complex fluids and microfluidics*, November 2013, seminar lecture, invited by Prof. M. Dreyer, Center of Applied Space Technology and Microgravity (ZARM), Bremen University, Germany.
31. *SPH and SDPD methods for Computational Rheology - Serial Lectures (6h)*. December 2014, seminar lecture, invited by Prof. Xue-Feng Yuan, Director of the National SuperComputing Center Guangzhou (NSCC-GZ), China.
32. *Three-dimensional SPH simulations of non-colloidal suspensions*, Invited Lecture, May 2015, CECAM Workshop on ‘Molecular hydrodynamics meets fluctuating hydrodynamics’, Madrid, Spain.
33. *Microstructure and rheology of non-colloidal suspensions under shear studied with SPH*, Invited Lecture, July 2015, Special Rheology Symposium in honor of Professor Roger I. Tanner 82nd birthday, Vathi, Samos, Greece.
34. *Smoothed Dissipative Particle Dynamics: theory and applications* Invited Lecture, September 21-23, 2015, Workshop on “Theory, Algorithms and Applications of Dissipative Particle Dynamics”, September 21-23, 2015, Shanghai University, China.
35. *Particle-based methods for the hierarchical modelling of polymeric fluids*, November 2015, seminar lecture, invited by Prof. Rob Poole, Centre for Engineering Dynamics, Liverpool University, UK.
36. *Smoothed Dissipative Particle Dynamics: towards a thermodynamically-consistent discretization of stochastic partial differential equations*, December 2015, seminar lecture, invited by Prof. Tim Phillips, Applied and Computational Mathematics Research Group, Cardiff University, UK.
37. *Smoothed Dissipative Particle Dynamics*, Invited School Lecture, CECAM School on “Hydrodynamic Fluctuations in Soft-Matter Simulations” February 9-12 2016, Prato, Italy.
38. *Smoothed Particle Hydrodynamics simulations of shear-thinning behavior in a non-colloidal suspension under flow*, Invited Research Lecture, CECAM School on “Hydrodynamic Fluctuations in Soft-Matter Simulations” February 9-12 2016, Prato, Italy.
39. *Particle methods for complex particulate systems*, March 2016, seminar lecture, invited by Prof. Roberto Verzicco, Dept. of Industrial Engineering Universit di Roma “Tor Vergata”, Italy

40. *Shear-thinning of non-colloidal suspensions*, May 2016, seminar lecture, invited by Prof. Pier Luca Maffettone, Dipartimento di Ingegneria Chimica, dei Materiali e della Produzione Industriale Universit degli Studi di Napoli Federico II, Italy.
41. *Towards a unified mesoscopic-continuum particle approach for complex fluids simulations*, Invited School Lecture, CECAM School on “Multiscale Simulations of Soft Matter with Hands-On Tutorials on ESPResSo++ and VOTCA”, October 10-13 2016, Max Planck Institute for Polymer Research, Mainz, Germany.
42. *Towards modeling and simulation of dense particle suspension with non-Newtonian matrices*, Invited Lecture, CECAM Workshop on “Mainz Materials Simulations Days” (MMSD), June 12-14, 2017, Max Planck Institute for Polymer Research, Mainz, Germany.
43. *Towards the simulation of dense particle systems interacting with complex media*, Invited Lecture, Workshop on “Dynamics of Interfaces in Complex Fluids and Complex Flows” (COST Action MP1305 “Flowing Matter”). February 28th-March 3rd 2017, Erlangen, Germany.
44. *Exploring the causes of shear-thinning in non-colloidal suspensions: experiments and simulation*, Invited Lecture, Meeting of the Institute of Non-Newtonian Fluid Mechanics (INNFM), 10-12 April 2017, Lake Vyrnwy, Wales, UK.
45. *Mesoscopic simulation of the transient behavior of semi-diluted polymer solution in a microchannel following extensional flow*, Invited Lecture, Physical Aspects of Polymer Science 2017, 13-15 September 2017 Swansea University Bay Campus, Swansea, UK.
46. *Mesoscopic particle simulation of complex suspensions: from modelling challenges to quantitative rheological predictions*, Invited Lecture, CECAM School on “Multiscale Simulations of Soft Matter” 26-29 September 2017, ITZ Fulda, Germany.
47. *Modelling and simulation of dense complex suspensions*, Invited Lecture, Mini-Symposium on Complex Particle Suspensions” organized by Dr. Christopher Leonardi, Prof. Yuntian Feng and Prof. Bruce D. Jones at the 5th International Conference on Particle-based Methods (Particles 2017) 26-28 September 2017, Hannover, Germany.
48. *Multiscale particle methods for complex fluid dynamics and microfluidics*, seminar lecture, invited by Prof. Luis Vega, Director of the Basque Centre for Applied Mathematics (BCAM), 9 October 2017, Bilbao, Spain.
49. *Numerical methods for complex fluids*, Invited School Lecture School on “Transport Phenomena in Complex Fluids”, International Centre for Mechanical Sciences (CISM) May 7, 2018 May 11, 2018 Udine, Italy.
50. *Rheology of viscoelastic suspensions: modelling, simulation and experiments*, Invited Lecture, Non-Newtonian Fluid Mechanics SIG Meeting, Schlumberger Cambridge Research, September 20-22 2018, Cambridge, UK.
51. *Modelling, simulation and rheology of suspensions with complex matrices*, seminar lecture, invited by Prof. Alejandro Müller, POLYMAT-UPV/EHU, 26 October 2018, San Sebastian, Spain.
52. *Smoothed Dissipative Particle Dynamics and GENERIC: a thermodynamically-consistent discretization of fluctuating hydrodynamics*, January 2019, seminar lecture, invited by Prof. Josef Málek, Department of Mathematical Modeling, Mathematical Institute, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic.
53. *GENERIC-derived viscoelastic models and their application to the flow of complex suspensions*, Invited Lecture, MS on “Mathematical models and methods in phenomenological thermodynamics of continuous media” organized by Josef Málek and Vit Prusa, July 15-19 2019, 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019), Valencia, Spain.
54. *Mesoscopic modelling of coffee espresso extraction*, Invited Lecture, MS on “New advances on SPH method: Algorithms and Applications” organized by Xiangyu Hu, October 28-20 2019, VI International PARTICLES Conference 2019, Barcelona, Spain.
55. *Modelling complex suspensions with particle methods*, November 2019, seminar lecture, invited by Prof. Gareth McKinley, Department of Mechanical Engineering, Massachusetts Institute of Technology, Boston, USA.
56. *Modelling complex suspensions with particle methods*, November 2019, seminar lecture, invited by Prof. George Karniadakis, Division of Applied Mathematics, Brown University, Providence RI 02912, USA.
57. *Modelling complex suspensions with particle methods*, November 2019, seminar lecture, invited by Prof. J.F. Morris, Levich Institute for Physico-Chemical Hydrodynamics, CUNY City College New York, NY 10031, USA.
58. *Introduction to Smoothed Particle Hydrodynamics*, Invited School Lecture, CECAM Workshop on “Challenges in Multiphase Flows” organized by B. Duenweg, R. Jagadeeshan and I. Pagonabarraga, 9-12 December 2019, Prato, Italy.

59. *The strange case of shear-thinning in non-Brownian suspensions*, Invited Lecture, Journal of Non-Newtonian Fluid Mechanics Webinar Serie, 1 July 2020.
60. *GENERIC-compliant simulations of Brownian multi-particle systems: modeling stochastic lubrication*, **Plenary Lecture**, XXVI CEDYA / XVI CMA, 15-19 June 2021, Gijón, Spain.
61. *Simulating the rheology of suspensions with non-Newtonian matrices*, Invited Lecture, Meeting of the Australian Society of Rheology, September 2021, Melbourne.
62. *Modelling and simulation of particle suspensions with polymeric matrices: rheology and microstructure*, **Keynote Lecture**, 5th US-Mexico Symposium on Advances in Polymer Science, MACROMEX 2021, XXXIV National Congress of the Mexican Polymer Society, November 1-4, 2021, Riviera Maya, MX.
63. *Fluid dynamics of coffee extraction*, **Keynote Lecture**, IUTAM Symposium - “From Stokesian suspension dynamics to particulate flows in turbulence” - August 29th September 2nd, 2022, Toulouse, France.

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Publications

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Key publications are marked with an asterisk.

Books

1. Ellero, M., X. Hu, J. Frohlich, and N. . Adams (2009). *IUTAM Symposium on Advances in Micro- and Nanofluidics: proceedings of the IUTAM Symposium on Advances in Micro- and Nanofluidics, Dresden, Germany, September 6-8, 2007*. IUTAM bookseries. Springer. ISBN: 9789048126255.

Book chapters

1. Ellero, M. . “Fluid Particle Models for the Simulation of Microfluids”. In: *IUTAM Symposium on Advances in Micro- and Nanofluidics*. Ed. by M. Ellero, X. Hu, J. Frhlich, and N. Adams. Vol. 15. IUTAM Bookseries. Springer Netherlands, pp.19–31. ISBN: 978-90-481-2626-2.
2. Litvinov, S., M. Ellero, X. Hu, N. Adams, and (2010). “Numerical Investigation of the Micromechanical Behavior of DNA Immersed in a Hydrodynamic Flow”. In: *High Performance Computing in Science and Engineering, Garching/Munich 2009*. Ed. by S. Wagner, M. Steinmetz, A. Bode, and M. M. Mller. Springer Berlin Heidelberg, pp.147–160. ISBN: 978-3-642-13872-0.
3. Ellero, M. and (2020). “Advanced Particle-Based Techniques for Complex Fluids and Multiscale Flow Processes”. In: *Transport Phenomena in Complex Fluids*. Ed. by T. Burghelea and V. Bertola. CISM International Centre for Mechanical Sciences book series, Springer Cham, pp.361–392. ISBN: 978-3-030-35557-9.
4. Ellero, M. (2015). Passive Microrheology Simulations Using Stochastic Particle Methods. *Procedia IUTAM* **18**. IUTAM Symposium on Particle Methods in Fluid Dynamics, 18–27.

Refereed journal papers

1. *Ellero, M., M. Kroger, and S. Hess (2002). Viscoelastic flows studied by smoothed particle dynamics. *Journal of Non-Newtonian Fluid Mechanics* **105**(1), 35 –51.
2. Ellero, M., P. Espanol, and E. G. Flekkøy (2003). Thermodynamically consistent fluid particle model for viscoelastic flows. *Phys. Rev. E* **68** (4), 041504.
3. Ellero, M. and M. Kroger (2004). The hybrid BDDFS method: memory saving approach for CONNFFESSIT-type simulations. *Journal of Non-Newtonian Fluid Mechanics* **122**(13), 147 –158.
4. Ellero, M. and M. Tassarotto (2005). An inverse kinetic theory for the incompressible NavierStokes equations. *Physica A: Statistical Mechanics and its Applications* **355**(24), 233 –250.
5. *Ellero, M. and R. Tanner (2005). SPH simulations of transient viscoelastic flows at low Reynolds number. *Journal of Non-Newtonian Fluid Mechanics* **132**(13), 61 –72.
6. Ellero, M., M. Kroger, and S. Hess (2006). Multiscale Modeling of Viscoelastic Materials Containing Rigid Nonrotating Inclusions. *Multiscale Modeling and Simulation* **5**(3), 759–785.
7. Tassarotto, M. and M. Ellero (2007). Unique representation of an inverse-kinetic theory for incompressible Newtonian fluids. *Physica A: Statistical Mechanics and its Applications* **373**(0), 142 –152.
8. *Ellero, M., M. Serrano, and P. Espanol (2007). Incompressible smoothed particle hydrodynamics. *Journal of Computational Physics* **226**(2), 1731 –1752.
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11. Vazquez-Quesada, A., M. Ellero, and P. Espanol (2009). Consistent scaling of thermal fluctuations in smoothed dissipative particle dynamics. *The Journal of Chemical Physics* **130**(3), 034901.
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16. Litvinov, S., M. Ellero, X. Hu, and N. A. Adams (2010). Particle-layering effect in wall-bounded dissipative particle dynamics. *Phys. Rev. E* **82** (6), 066704.
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22. Vázquez-Quesada, A., M. Ellero, and P. Espanol (2013). A generalized Faxen’s theorem to nonsteady motion of a sphere through a compressible linear viscoelastic fluid in arbitrary flow. *Phys. Rev. E* **87**, 032301(7).
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38. Vazquez-Quesada, A., N. J. Wagner, and M. Ellero (2017). Planar channel flow of a discontinuous shear-thickening model fluid: theory and simulation. *Physics of Fluids* **29**, 103104–10.
39. Ellero, M. and P. Espanol (2018). Everything You Always Wanted to Know About S-DPD* (*But Were Afraid to Ask). *Applied Mathematics and Mechanics* **39** (1), 103–124.

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41. Vazquez-Quesada, A., P. Español, and M. Ellero (2018). Apparent slip mechanism between two spheres based on solvent rheology: Theory and implication for the shear thinning of non-Brownian suspensions. *Phys. Rev. Fluids* **3** (12), 123302.
42. Ellero, M. and L. Navarini (2019). Mesoscopic modelling and simulation of espresso coffee extraction. *Journal of Food Engineering* **263**, 181194.
43. *Vazquez-Quesada, A., P. Español, R. Tanner, and M. Ellero (2019). Shear-thickening of a non-colloidal suspension with a viscoelastic matrix. *Journal of Fluid Mechanics* **880**, 1070–1094.
44. Sagaya Prasanna Kumar, S., A. Vazquez-Quesada, and M. Ellero (2020). Numerical investigation of the rheological behavior of a dense particle suspension in a biviscous matrix using a lubrication dynamics method. *J. Non-Newt. Fluid Mech.* **281**, 104312.
45. Sagaya Prasanna Kumar, S., A. Vazquez-Quesada, and M. Ellero (2021). A conservative lubrication dynamics method for the simulations of dense non-colloidal suspensions with particle spin. *J. Comput. Phys.* **427**, 110001.
46. Rossi, E., J. A. Ruiz-Lopez, A. Vazquez-Quesada, and M. Ellero (2021). Dynamics and rheology of a superparamagnetic chain suspension under the combined effect of shear flow and rotating magnetic field. *Soft Matter* **17**, 6006–6019.
47. Moreno Chaparro, N. and M. Ellero (2021). A virtual rheometer for arbitrary flow configurations in mesoscopic Smoothed Dissipative Particle Dynamics simulations. *Phys. Fluids* **33** (1), 012006.
48. Mo, C., R. Johnston, L. Navarini, and M. Ellero (2021). Modeling the flow through erodible porous media with smoothed dissipative particle dynamics. *Physics of Fluids* **33** (9), 093101.
49. Vazquez-Quesada, A. and M. Ellero (2022). GENERIC-compliant simulations of Brownian multi-particle systems: modeling stochastic lubrication. *SEMA Journal* **79**, 165–185.
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51. Moreno, N., D. Moreno, F. Balboa Usabiaga, and M. Ellero (2022). Spikes morphology dictates a universal mechanism for SARS-CoV-2 and other enveloped viruses mobility. *Nature Scientific Report* **12**, 11080.
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53. Ellero, M. (2022). The strange case of shear-thinning in non-Brownian suspensions. *Science Talks* **3**, 100032.
54. Rossi, E., I. Garcia de Beristain, A. Vazquez-Quesada, J. E. Lopez-Aguilar, and M. Ellero (2022). SPH simulations of thixo-viscoplastic fluid flow past a cylinder. *J. Non-Newt. Fluid Mech.* **308**, 104891.
55. Lopez-Aguilar, J. E., O. Resendiz-Tolentino, H. R. Tamaddon-Jarohmi, M. Ellero, and O. Manero (2022). Flow past a sphere: Numerical predictions of thixo-viscoelastoplastic wormlike micellar solutions. *J. Non-Newt. Fluid Mech.* **309**, 104902.
56. Nieto, D., P. Español, and M. Ellero (2023). Non-affine motion and selection of slip coefficient in constitutive modelling of polymeric fluids using a mixed derivative. *J. Rheol.* **67** (1), 253–267.
57. Garcia, A., D. Hernandez-Delfin, D.-J. Lee, and M. Ellero (2023). Limited visual range in the social force model: effects on macroscopic and microscopic dynamics. *Physica A* **612**, 128461.
58. Ruiz-Lopez, J.-A., S. Prasanna Kumar, A. Vazquez-Quesada, J. de Vicente, and M. Ellero (2023). Tribological variable-friction coefficient models for the simulation of dense suspensions of rough polydisperse particles. *J. Rheol.* **67** (2), 541–558.
59. Sanchez, J. M., M. Arribas, H. Galarraga, M. Garcia de Cortazar, M. Ellero, and F. Girot (2023). Effect of Mn addition, cooling rate and holding temperature on the modification and purification of iron-rich compounds in AlSi10MnMg(Fe) alloys. *Heliyon* **9** (2), e13005.
60. Moreno, D., F. Balboa Usabiaga, N. Moreno Chaparro, and M. Ellero (2023). Computational modelling of passive microrheology of functionalized nano-particles. *J. Chem. Phys.* **158** (10), 104108.
61. Moreno Chaparro, N. and M. Ellero (2023). Generalized Lagrangian Heterogenous Multiscale Modeling of Complex Fluids. *J. Fluid Mechanics*, in press.
62. Vazquez-Quesada, A. and M. Ellero (2023). Smoothed Dissipative Particle Dynamics simulation dilute-to-dense Brownian suspensions: rheology and microstructure. *J. Non-Newt. Fluid Mech.* **317**, 105044.

Submitted papers

1. Beristain, I. Garcia de, M. Figueroa-Landeta, J. E. Lopez-Aguilar, M. Garcia de Cortazar, F. Girot, and M. Ellero (2023). Numerical simulations of thixotropic semi-solid aluminium alloys in a open rotor and rotor-stator mixers. *J. Non-Newt. Fluid Mech.* under review.
2. Balboa Usabiaga, F. and M. Ellero (2023). Simulating the dynamics and rheology of a suspension of star-shaped colloids. *Journal of Rheology*, under submission.
3. Mo, C., R. Johnston, L. Navarini, F. Suggi-Liverani, and M. Ellero (2023). Exploring the link between coffee matrix microstructure and flow properties using combined X-ray microtomography and smoothed particle hydrodynamics simulations. *Nature Scientific Report*, under review.
4. Hernandez-Delfin, D., A. Garcia, and M. Ellero (2023). Rheology of crowd: from faster-is-slower to shear thickening, under submission.
5. Harinadha, G., M. Ellero, and F. Balboa Usabiaga (2023). Swimming efficiently by wrapping. *Journal of Fluid Mechanics*, under review.
6. Harinadha, G., M. Ellero, and F. Balboa Usabiaga (2023). Mapping flagellated swimmers to surface-slip driven swimmers. *Journal of Computational Physics*, under review.
7. Zhoravi, E., N. Moreno, and M. Ellero (2023). Computational mesoscale framework for biological clustering and fractal aggregation. *Soft Matter*, under review.

In preparation

1. Angerman, p., S. Sagaya Prasanna Kumar, B. Sandnes, R. Seto, and M. Ellero (2022). Microstructural SPH model and simulations of DST fluids, in preparation.
2. López-Aguilar, J. E., S. Sagaya Prasanna Kumar, A. Vazquez-Quesada, and M. Ellero (2022). A confinement-induced lubrication-enhanced mechanism for discontinuous shear thickening in dense suspensions, in preparation.
3. S, D., S. Prasanna Kumar, A. Vazquez-Quesada, and M. Ellero (2021). Rheology of a dense particle system with a discontinuous shear-thickening matrix, in preparation.

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Abstracts in conference proceedings

1. Vazquez-Quesada, A., P. Espanol, R. Tanner, and M. Ellero (2019). Shear-thickening of a non-colloidal suspension with a viscoelastic matrix. *Proc. of the Annual European Rheology Conference (AERC2019)*, Portoroz, Slovenia, April, 2019.
2. Vazquez-Quesada, A., P. Espanol, R. Tanner, and M. Ellero (2019). Shear-thickening of a non-colloidal suspension with a viscoelastic matrix. *IWNMNNF International Workshop on Numerical methods for Non-Newtonian Flows, Peso de Regua - 18 June 2019*.
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