Curriculum Vitæ

Marco De Paoli

September 23, 2025

General Information

Date and place of birth:	January 21, 1989; Udine (Italy);
Citizenship:	Italian;
Marital status:	married;
Affiliation:	Institute of Fluid Mechanics and Heat transfer, TU Wien;
E-mail:	marco.de.paoli@tuwien.ac.at
Homepage:	https://marcodepaoli.com/
Publons:	https://www.webofscience.com/wos/author/record/I-9819-2019
ResearchGate:	http://www.researchgate.net/profile/Marco_De_Paoli
Google Scholar:	https://scholar.google.com/citations?user=C0MUFNQAAAAJ&hl=en
ORCID:	0000-0002-4709-4185
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GitHub:	https://github.com/depaolimarco

Education

2014 - 2016	Ph.D. cum laude - Energy Engineering, University of Udine (Italy).
2011 - 2013	MS cum laude - Mechanical Engineering, University of Udine (Italy)
2008 - 2011	BS cum laude - Mechanical Engineering, University of Udine (Italy)

Academic Positions and Qualifications

2025 - today	P.I. of the ERC StG MORPHOS, TU Wien
2023 - 2025	Marie Skłodowska-Curie Fellow (awarded by the *European Commission*), University of Twente - Physics of Fluids Group (supervised by prof. Roberto Verzicco and prof. Detlef Lohse)
2022 - 2023	Erwin Schrödinger Fellow (awarded by the *Austria Science Fund*, FWF), University of Twente - Physics of Fluids Group (supervised by prof. Roberto Verzicco and prof. Detlef Lohse)
2017 - 2022	University Assistant (Post-Doctoral Fellow), Institute of Fluid Mechanics and Heat Transfer, Vienna University of Technology, Vienna (Austria)
2017 - 2017	Research Fellow, Polytechnic Department, University of Udine, Udine (Italy)
2016 - 2016	Visiting Researcher, Institute of Fluid Mechanics and Heat Transfer, Vienna University of Technology, Vienna (Austria)
2014 - 2015	Tutor, Mechanical Engineering studentsof the University of Udine, Udine (Italy)
2013 - 2013	Visiting Student, Institute de Mechanique des Fluides Toulouse (IMFT), Institute National Polytechnique de Toulouse (INPT), Toulouse (France)

Editorships

2023 - today	Associate Editor of The European Physical Journal - E
2025	Lead Guest Editor of the Topical issue “Microplastics Pollution in Environmental Flow” published by The European Physical Journal

Research interests

Multiphase with heat and mass transfer flows, drop- and partilce-laden turbulence, geophysical flows, environmental flows, flows in porous media.

Honors and awards

2025	Editor of Distinction Award - The Author Service Award, awarded from *Springer Nature*.
2025	Member (full) of Wolfgang Pauli Institute Vienna.
2024	ERC Starting Grant (5-years research grant), awarded from *European Research Council* (Horizon Europe).
2022	Marie Skłodowska-Curie Fellowship (2-years competitive postdoctoral fellowship), awarded from *European Commission* (Horizon Europe).
2021	Erwin Schrödinger Fellowship (3-years competitive postdoctoral fellowship), awarded from *Austria Science Fund* (FWF).
2018	*GAMM* Junior fellow for "young researchers who have accomplished an excellent Master or Doctoral thesis in the fields of Applied Mathematics or Mechanics", International Association of Applied Mathematics and Mechanics, Elected 2017, GAMM-Geschäftsstelle, Technische Universität Dresden.
2016	Awarded scholarship from Argonne National Laboratory (USA) for the International School "Argonne Training Program on Extreme Scale Computing 2016 (ATPESC 2016)", Chicago (USA).
2015	Best Poster Award (*ex aequo*) from Università degli Studi di Udine - PhD program in Environmental and Energy Engineering Science, Udine (Italy).
2015	Awarded scholarship from PRACE for the international school "High-performance Computing Summer School 2015", Toronto (Canada).
2008	Winner "Cecilia Danieli Fellowship" for a "Distinguished student" (ranked 2^{nd} out of 500 candidates), Marsh SPA, Udine (Italy).

Memberships of scientific societies

2025 –	Member (full) of the Wolfgang Pauli Institute Vienna
2024 –	Member of the Association of ERC Grantees in Europe (AERC)
2024 –	Member of the Association of ERC Grantees in Italy (AERG)
2018 – 2023	Junior Fellow of the International Association for Applied Mathematics and Mechanics (GAMM)
2014 – today	American Physical Society (APS), Society of Applied Mathematics and Mechanics (GAMM), European Mechanics Society (EUROMECH), European Research Community on Flow, Turbulence and Combustion (ERCOFTAC), International Society of Porous Media (InterPore), Marie-Curie Alumni Association (MCAA)

Grants

Research grants

2025 – 2030	ERC Starting Grant (5-years research grant), awarded from *European Research Council* (Horizon Europe), to investigate "Flow-induced morphology modifications in porous multiscale systems". Hosting institutions: TU Wien.
2023 – 2025	Marie Skłodowska-Curie Fellowship (2-years competitive postdoctoral fellowship), competitive fellowship awarded from *European Commission* (Horizon Europe). Hosting institutions: University of Twente - Physics of Fluids Group (supervised by prof. Detlef Lohse).
2022 – 2024	Erwin Schrödinger Fellowship (3-years competitive postdoctoral fellowship), competitive fellowship awarded from *Austria Science Fund* (FWF). Hosting institutions: University of Twente - Physics of Fluids Group (supervised by prof. Detlef Lohse) and Technische Universität Wien (supervised by prof. Soldati).
2022 – 2024	Co-applicant for a successful grant, awarded from *Austria Science Fund* (FWF) based at the Technische Universität Wien, Austria.
2020	Co-applicant for a successful grant for "the improvement of existing experimental facilities", based at the Technische Universität Wien, Austria.
2019	Co-applicant for a successful grant for "the realisation of research- and teaching-oriented experimental setups", based at the Technische Universität Wien, Austria.

High Performance Computing grants

2025	**De Paoli M.**, Stevens R., Verzicco R., Lohse D., EHPC-EXT-2024E02-122, 3D convection with dispersion at extreme Rayleigh-Darcy numbers, The European High Performance Computing- EuroHPC, European Union. 50.4 million hours allocated MareNostrum-5 (Tier 0, Extreme Access)
2024	**De Paoli M.**, Stevens R., EHPC-BEN-2024B08-060, A parallel solver for large-scale simulations of convection in porous media, The European High Performance Computing- EuroHPC, European Union. 0.3 million hours allocated MareNostrum-5 (Tier 0, Benchmark Access)
2023	Zonta F., **De Paoli M.**, Pirozzoli S., GEOCOSE - GEOlogical CO2 SEquestration: convection in three-dimensional porous media at high Rayleigh number, The European High Performance Computing- EuroHPC, European Union. 50 million hours allocated LUMI-C (Tier 0)
2019	Pirozzoli S., Zonta F., **De Paoli M.**, Soldati A. Three-dimensional simulation of convection in porous media, Italian Supercomputing Resource Allocation - CINECA Supercomputing Centre, Bologna (Italy). 9.6 millions core hours allocated Marconi KNL (Tier 0)
2016	Zonta F., **De Paoli M.**, Soldati A. Simulation of Geological Carbon Dioxide Sequestration, Vienna Scientific Cluster, Vienna (Austria). 8 million core hours allocated on VSC-3
2016	Zonta F., Roccon A., **De Paoli M.**, Soldati A. Influence of viscosity on the dynamics of deformable droplets in turbulence, Italian Supercomputing Resource Allocation - CINECA Supercomputing Centre, Bologna (Italy). 1.6 millions core hours allocated on Marconi (Tier 0)
2015	Zonta F., **De Paoli M.**, Soldati A. Simulation of geological carbon dioxide sequestration, Italian Supercomputing Resource Allocation - CINECA Supercomputing Centre, Bologna (Italy). 9.8 millions core hours allocated on Fermi (Tier 0)
2014	Zonta F., **De Paoli M.**, Soldati A. Numerical simulations of geological CO2 sequestration, Italian Supercomputing Resource Allocation, CINECA Supercomputing Centre, Bologna (Italy). 1.5 millions core hours allocated on Fermi (Tier 0)

Scientific Production

PhD Thesis

"Convection in Porous Media", University of Udine (Italy). Advisors: Prof. A. Soldati, Dr. F. Zonta.

Referred Journal Publications

Please refer to my profiles on:
Google Scholar: https://scholar.google.it/citations?user=C0MUFNQAAAAJ&hl=en
ORCID: 0000-0002-4709-4185

In preparation/under review/in press

U1. **De Paoli M.**, Yerragolam G.S., Verzicco R., and Lohse D., Solute mixing in porous media with dispersion and buoyancy *(in press in Journal of Fluid Mechanics)*.
https://doi.org/10.48550/arXiv.2505.11005

Conference Proceedings

P4. Giurgiu V., Caridi G., **De Paoli M.** and Soldati A. (2024), Microfiber rotational dynamics in turbulence, *21st International Symposium on Application of Laser and Imaging Techniques to Fluid Mechanics.*
https://www.lisbonsymposia.org/proceedings

P3. Giurgiu V., Caridi G., Alipour M., **De Paoli M.** and Soldati A. (2023), Angular velocity measurement of Kolmogorov scale slender curved fibres, *Proceedings of the 30th conference on Experimental Fluid Mechanics organised by Deutschen Gesellschaft für Laser-Anemometrie (GALA).*
https://www.gala-ev.org/muenchen2023.html

P2. Alipour M., **De Paoli M.** and Soldati A. (2019), Simultaneous measurement of velocity and concentration fields in Hele-Shaw cell, *Proceedings of the 13th International Symposium on Particle Image Velocimetry.*
https://athene-forschung.unibw.de/128868

P1. Alipour, M. and **De Paoli M.** (2019), Convective dissolution in porous media: experimental investigation in Hele-Shaw cell, *Proceedings in Applied Mathematics and Mechanics*, 201900236. https://doi.org/10.1002/pamm.201900236

Invited papers

F2. M. De Paoli M., Convective mixing in porous media: A review of Darcy, pore-scale and Hele-Shaw studies, *The European Physical Journal E*, **46**, 129 (2023) (selected also for the EPJ-E Highlights).

F1. M. De Paoli, Influence of reservoir properties on the dynamics of a migrating current of carbon dioxide, *Physics of Fluids*, **33**, 016602 (2021) (Invited contribution from outstanding Early career researchers). Also selected as "noteworthy article" (Editor's Pick).

Invited presentations

I17. *An interdisciplinary journey in academia*, May 20, 2025, Career Development event at the Annual Meeting of the International Society of Porous Media, Coordinator: Student Affairs Committee, Interpore Foundation (Albuquerque, US).

I16. *AFiD-Darcy: A finite difference solver for numerical simulations of convective porous media flows*, April 8, 2025, Cassyni Seminar, Coordinator: Computer Physics Communications (online).

I15. *Mixing in multiscale porous media flows: insights from experiments, simulations and modelling*, February 14, 2025, Department of Mechanical and Aerospace Engineering, Sapienza University, Coordinator: Prof. Sergio Pirozzoli, Sapienza University (Rome, Italy).

I14. *Modelling heat and mass transport in convective porous media flows: a multiscale approach*, July 10, 2024, Department of Mechanical and Civil Engineering, Caltech, Coordinator: Prof. Xiaojing (Ruby) Fu, California Institute of Technology (Pasadena, US).

I13. *Multiscale modelling of convective mixing in confined porous media*, May 9, 2024, Dipartimento di Ingegneria dell'Energia, dei Sistemi, del Territorio e delle Costruzioni (DESTEC), Coordinator: Prof. Paolo Di Marco, University of Pisa (Pisa, Italy).

I12. *Heat and mass transport in porous media: Insights from experiments, simulations, and modelling*, March 14, 2024, Invited Seminar at the Laboratoire de Mécanique des Fluides de Lille (LMFL), Coordinator: Prof. Francesco Romanò, Ecole Nationale Supérieure d'Arts et Métiers, Dept. Fluid Mechanics & Energetics (Lille, France).

I11. *Solute dispersion in confined porous media: Insights from experiments, simulations, and modelling*, March 12, 2024, Laboratoire des Fluides Complexes et leurs Réservoirs, Coordinator: Prof. Fabrizio Croccolo, Université de Pau et des Pays de l'Adour (Anglet, France).

I10. *Convection-driven porous media flows: Implications for carbon dioxide sequestration*, November 17-18, 2023, Pre-APS-DFD Satellite Meeting on Environmental and Biological Fluid Dynamics, University of Pennsylvania, Coordinators: Prof. Paulo Arratia, Doug Jerolmack, Arnold Mathijssen, Hugo Ulloa, University of Pennsylvania, (Philadelphia, US).

I9. *Multiscale modelling of convective mixing in confined porous media*, November 8, 2023, PoreLab - Norwegian Center of Excellence (virtual presentation), Coordinator: Gaute Linga, NJORD Centre for Studies of the Physics of the Earth, University of Oslo (UiO), (Oslo, Norway).

I8. *Convection-driven porous media flows: Implications for carbon dioxide sequestration*, September 15, 2021, Physics of Fluids Group, University of Twente (virtual presentation), Coordinator: Prof. Detlef Lohse, Physics of Fluids Group, Twente (the Netherlands).

I7. *Convective dissolution in confined porous media: An application to CO2 sequestration*, January 13, 2021, EXPEC Advanced Research Center (virtual presentation), Coordinator: Dr. Sunil Kokal, Saudi Aramco, Dhahran (Kingdom of Saudi Arabia).

I6. *Convective dissolution in confined porous media: An application to CO2 sequestration*, December 15, 2020, Complex Fluids and Flows Unit (virtual presentation), Coordinator: Prof. M. E. Rosti, Okinawa Institute for Science and Technology, Okinawa (Japan).

I5. *Convective dissolution in confined porous media: The Darcy law and beyond*, November 21, 2019, Department of Mechanical Engineering, Coordinator: Prof. S. Ghaemi, University of Alberta, Edmonton (Canada).

I4. *Theory and applications of PTV*, September 5, 2018, 18th UIT Summer School on Advanced experimental techniques in heat and mass transfer, Unione Italiana Termofluidodinamica (UIT), Pontignano (Italy).

I3. *Fluid dynamics: an introduction to experiments and CFD*, June 18, 2018, Institute for the International Education of Students, Vienna (Austria).

I2. *Computational fluid dynamics, advances in fluid mechanics and European examples of hydropower plants*, June 19, 2017, Institute for the International Education of Students, Vienna (Austria).

I1. *Flows in porous media: an application to CO_2 sequestration*, February 25, 2015, International School for Advanced Studies (SISSA). Coordinator: Prof. G. Rozza, SISSA, Trieste, Italy.

Conference Contributions

More than 70 contributions in international scientific conferences (include the annual meetings of the American Physical Society, European Mechanics Society, Euromech colloquia, ERCOFTAC, GAMM, ICTAM, JMBC School for Fluid Dynamics, Gordon Research Conference).

Databases and datasets

D3. Data supporting "Simulation and modelling of convective mixing of carbon dioxide in geological formations", **De Paoli M.**, Zonta F., Enzenberger L., Coliban E. and Pirozzoli S. (2025) (link).

D2. Data supporting "Towards the understanding of convective dissolution in confined porous media: thin bead pack experiments, two-dimensional direct numerical simulations and physical models", C.J. Howland and **De Paoli M.** (2024) (link).

D1. Data supporting "Experimental assessment of mixing layer scaling laws in Rayleigh-Taylor instability", **De Paoli M.**, Perissutti D., Marchioli C. and Soldati A. (2022) (link)

Codes

C1. AFiD-Darcy: A Finite Difference Solver for Numerical Simulations of Convective Porous Media Flows, **De Paoli M.**, Yerragolam G. S., Lohse D. and Verzicco R. (2025) (link).

Press and media

The publications in which I have contributed been reported by national and international breaking news and scientific magazines, including Physics Today, MNS, SkyTG24, Science Magazine, Pays.org, ANSA, APA, Kudos Research Showcase. Public outreach activities include 2 television reports on the Austrian national public broadcaster (ORF), 1 journal interview, several press releases of Academic Institutions (University of Udine, TU Wien, University of Twente), organisation of workshops and public lectures in non-scientific events (Open Days at the University of Twente, KinderuniTechnik at TU Wien, Lectures in Summer Schools for High School Students from Italy and US). I have also served as speaker/mentor in career development events and meeting to connect academia to society, decision makers and industry members.

Professional activities

Coordinator of

- *Summer School on Convection and deformation in porous media: Geophysical and biological flows*, CISM-IUTAM Summer School, 15-22 July 2022, CISM, Udine, Italy. Coordinated in collaboration with Prof. C. MacMinn, University of Oxford, Oxford (UK).

Co-chairman of

- *10th GACM Colloquium on Computational Mechanics 2023 for Young Scientists from Academia and Industry*, German Association for Computational Mechanics, September 2023, Vienna, Austria. Co-chaired in collaboration with F. Key (TU Wien, Vienna, Austria), A. Wagner (TU Wien, Vienna, Austria), K. Mang (Leibniz University, Hannover, Germany) and M. Stender (Hamburg University of Technology, Hamburg, Germany).

Organizer or co-organizer of

- Minisymposium on *Pore-Scale Physics and Modeling*, at the 18th Annual Meeting of the International Society of Porous Media (InterPore), May 2026, Nantes, France. Co-organized in collaboration with Peter Kang (U. Minnesota, USA), Xiaojing (Ruby) Fu (CalTech, USA), Yashar Mehmani (PennState, USA), Bo Guo (U. Arizona, USA) and Cyprien Soulaine (CNRS, France).
- Minisymposium on *Pore-scale modelling*, at the 17th Annual Meeting of the International Society of Porous Media (InterPore), May 2025, Albuquerque (NM), USA. Co-organized in collaboration with Ke Xu (Peking University, China), Yu Qiu (Stanford University, USA) and Benzhong (Robin) Zhao (McMaster University, Canada).
- Minisymposium on *Numerical simulations in porous media flows*, at the 10th GACM Colloquium on Computational Mechanics 2023 for Young Scientists from Academia and Industry, German Association for Computational Mechanics, September 2023, Vienna, Austria.

Lead guest editor of

- the Topical issue on *Microplastics Pollution in Environmental Flow*, published by The European Physical Journal, 2025. Co-edited in collaboration with Dr. Giuseppe Suaria (Consiglio Nazionale delle Ricerche, Lerici, Italy) and Prof. Fabrizio Croccolo (Université de Pau et des Pays de l'Adour, Anglet, France).

Member of

- Committee of the doctoral program of Happiness Imuetinyan, *CO2ES/Geomechanics and Porous Media, Laboratory of Complex Fluids and its Reservoirs, Universitie de Pau et des Pays de l'Adour*, 2022–2025, Pau (France) (online).
- Committee of the doctoral program of Rima Benhammadi, *IDAEA-CSIC and UPC Barcellona*, 2025, Barcellona (Spain).
- Committee for the Master thesis defense at the University of Twente (1 student, 2025).
- Scientific Panel for the ISCRA and LISA initiatives. *CINECA*, October 2023–2024, Bologna (Italy) (online). ISCRA is the Italian SuperComputing Resource Allocation promoted by CINECA, the Italian most powerful HPC center, which will directly award in excess of 400 millions core processor hours, to ensure an adequate supply to scientists and engineers for HPC-related research.
- Association of ERC Grantees (AERG, *European Union*). 2024 –, Bruxelles (Belgium).
- Association of ERC awardees in Italy (AERC). 2024 –, Fondazione Politecnico di Milano, Milano (Italy).
- Marie-Curie Alumni Association (MCAA, funded by the *European Union*). 2024 –, Bruxelles (Belgium).

International collaborations

- *Flow morphology characterisation in porous media*, in collaboration with prof. Lou Kondic, New Jersey Institute of Technology, Newark (NJ, US).
- *Heat transport scaling laws in porous media*, in collaboration with prof. Xiaojue Zhu, Max Planck Institute for Solar System Research, Goettingen (Germany).
- *Pore-scale experimental and numerical investigation of heat transfer in a homogenous porous medium*, in collaboration with prof. Roberto Verzicco and prof. Detlef Lohse, University of Twente, Twente (the Netherlands).
- *Numerical investigation on three-dimensional Rayleigh-Darcy convection at high Rayleigh number*, in collaboration with prof. Sergio Pirozzoli, University of Rome "La Sapienza" (Italy).
- *Experimental investigation on the dynamics of anisotropic particles in turbulent channel flow*, in collaboration with prof. Sina Ghaemi, University of Alberta at Edmonton (Canada).
- *Numerical and experimental investigation on airborne virus transmission*, in collaboration with prof. Francesco Picano, University of Padua, Padua (Italy).

Reviewer (Updated Publons profile)

- **Scientific Journals:** *Proceedings of the National Academy of Sciences (PNAS), Geophysical Research Letters, Journal of Fluid Mechanics, Journal of Fluid Mechanics - Rapids, Physical Review Fluids, Physical Review Fluids - Letters, International Journal of Multiphase Flow, Proceedings of the Royal Society A, European Journal of Mechanics B - Fluids, Physics of Fluids, Water Resources Research, Advances in Water Resources, International Communications in Heat and Mass Transfer, Transport in Porous Media, Langmuir, Interpore Journal, Experimental Thermal and Fluid Science, Acta Mechanica, Acta Mechanica Sinica, Meccanica, Journal of Turbulence, Journal of Fluids Engineering, International Journal of Ambient Energy, Environmental Science & Technology, ZAMP, Journal of the Society of Petroleum Engineers, Advanced Materials Interfaces, Applied Sciences, Heat Transfer, Numerical Heat Transfer- Part B: Fundamentals, Industrial and Engineering Chemistry Research, Chaos, Energies, Optics, Processes, Symmetry, Sustainability, Water, Engineering Reports.*
- **Conferences:** *International Conference on Multiphase Flows (ICMF 2016), Conference on Modelling Fluid Flow (CMFF 2018), 10th Colloquium of the German Association of Computational Mechanics (GACM 2023), Annual Meeting of the International Society of Porous Media (Interpore 2025).*
- **Funding agencies:** *National Science Center - Poland, ETH Zurich, Italian SuperComputing Resource Allocation at CINECA.*

Industrial investigations

TR6. **De Paoli M.** (leader, project #1939516), Alipour M. and Soldati A., TR 01-21 (2021), Analysis of mask performance, prepared for *klarama UG*, Pforzheim, Germany.

TR5. **De Paoli M.**, Alipour M. and Soldati A., TR 03-20 (2020), Analysis of mask performance, prepared for *Sperrer Industrieverpackungen GmbH*, Freilassing, Germany.

TR4. **De Paoli M.**, Alipour M. and Soldati A., TR 02-20 (2020), Analysis of mask performance: Model Technomask Classic, prepared for *Blue Italy Group*, Pescara, Italy.

TR3. **De Paoli M.**, Alipour M. and Soldati A., TR 01-20 (2020), Analysis of mask performance: Model Technomask Crystal, prepared for *Blue Italy Group*, Pescara, Italy.

TR2. **De Paoli M.**, Zonta F. and Soldati A., TR 02-18 (2018), Analysis of electrophoretic deposition, prepared for *Silgan*, Ljubljana, Slovenia.

TR1. **De Paoli M.**, Zonta F. and Soldati A., TR 01-18 (2018), Analysis of heat transfer in the oven, prepared for *Silgan*, Ljubljana, Slovenia.

Teaching and supervision

Teaching activities (approximate number of students in brackets)

2017–2022	Assistant for "Fluid Mechanics 2" undergraduate course, TU Wien ($\approx$ 80).
2018–today	Lecturer for "Applied Fluid Mechanics", undergraduate course, TU Wien ($\approx$ 30).
2018–2022	Lecturer for "Applied Fluid Mechanics Laboratory", undergraduate course, TU Wien ($\approx$ 30).
2018–today	Lecturer for "CFD Applied Fluid Mechanics", undergraduate course, TU Wien ($\approx$ 30).
2019–2022	Assistant for "Fundamentals of Fluid Mechanics" undergraduate course, TU Wien ($\approx$ 600).
2016–today	Co-supervisor of PhD students (2), supervisor (or co-supervisor) of MSc students (12), supervisor (or co-supervisor) of BSc students (16).