

Curriculum Vitae

Miguel A Mendez

Personal Details

Family name:	Mendez
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Date and place of birth:	31/10/1987, Maracay (Venezuela)
Nationality:	Italian
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Google Scholar:	Scholar profile
ResearchGate:	RG Profile



Current Position

- **Associate Professor**, von Karman Institute for Fluid Dynamics (VKI), Environmental & Applied Fluid Dynamics Department, Sint-Genesius-Rode, Belgium (May 2023–present).
- **Honorary Lecturer (interim appointment)**, Aero-Thermo-Mechanics Laboratory, École Polytechnique de Bruxelles, Université Libre de Bruxelles, Brussels, Belgium (February 2024–present)
- **Profesor Honorifico**, Experimental Aerodynamics and Propulsion Lab, Universidad Carlos III de Madrid, Leganés, Spain (February 2025–present).

Education

- **PhD in Engineering**, Université libre de Bruxelles (2013–2018). Thesis: *Dynamics of Gas Jet Impinging on Falling Liquid Films*. Supervisor: Jean Marie Buchlin (VKI).
- **Research Master in Experimental Fluid Mechanics**, von Karman Institute (2012–2013). Graduated with honours; von Karman Prize.
- **MSc in Energy and Nuclear Engineering**, University of Florence (2009–2012). GPA 110/110 *cum laude*.
- **Erasmus**, ETSI Sevilla (2010–2011). GPA 8.9/10.
- **BSc in Mechanical Engineering**, University of L'Aquila (2006–2009). GPA 107/110.

Previous Positions

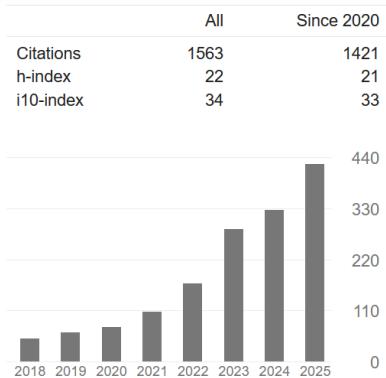
- **Assistant Professor**, VKI, Environmental & Applied Fluid Dynamics Department (2019–2023).
- **Postdoctoral Researcher**, VKI, Environmental & Applied Fluid Dynamics Department (2018–2019).

Awards & Distinctions

Emerging Leader 2022, by *Measurement Science and Technology*. **Outstanding Paper 2020**, by *Measurement Science and Technology*. **Solvay PhD Thesis Award** for Research Excellence (2019). **AFVL PhD Thesis Award** for laser diagnostics in fluid mechanics, by AFVL. **Best Oral Presentation at the Annual VKI PhD Symposium 2015-2016**. **Best Oral Presentation at the 10th Experimental Fluid Mechanics Conference 2015** **Theodore von Karman Prize** (best performance at the VKI Research Master program)

Research Output and Funding

- **Research Output & Impact** \approx 70 journal papers, 90+ conferences, 10 chapters in books; 2 edited books. The evolution of citations from Google Scholar is shown on the right. RG score: 2,773 Research Interest on Research Gate (top 3%); Google scholar h-index: 22; i10-index: 34.
- **Funding (last 5 years):** \sim 3.1 M€ as PI (including 1.5 M€ for an ERC Starting Grant) and \sim 3.4 M€ as collaborator on specific project work packages (see 6_PIN document).



Teaching (A.Y. 2025/2026)

(with starting year of each teaching activity)

- Fundamentals of Fluid Dynamics (22 h, 2.5 ECTS), VKI. *Started in 2017 as DEFM, adapted in 2019*
- Signal Processing, Module II (12 h, 1.5 ECTS), VKI. *Started in 2019*
- Introduction to Measurement Techniques (25% of the course), VKI. *Started in 2017*
- Tools for Scientific Computing (12 h, 1 ECTS), VKI *Started in 2022*
- Data-Driven Modal Analysis (12 h, 1 ECTS), VKI *Started in 2022*
- Machine Learning for Fluid Dynamics, Module I (12 h, 1 ECTS) at VKI. *Started as Data Driven Fluid Mechanics (DDFM) in 2021, adapted in 2025.*
- Machine Learning for Fluid Dynamics, Module II (24 h, 2 ECTS), VKI. *Started as DDFM since 2021, adapted in 2025.*
- Digital Twinning, Data Assimilation and Control (18 h, 2 ECTS), VKI. *Started in 2024.*
- Hands-on Machine Learning for Fluid Dynamics (32 h, 3 ECTS), VKI. *Started in 2021.*
- *Data-Driven Engineering (MECAH419)* (10 h), ULB. *Started in 2022*

Service to the Profession and Society

- Reviewer for: *Data-Centric Engineering, Journal of Fluid Mechanics, Physics of Fluids, Experimental Thermal and Fluid Science, Review of Scientific Instruments, Chemical Engineering Science, International Journal of Multiphase Flows, Industrial & Engineering Chemistry Research, Journal of Coatings Technology and Research, European Journal of Operational Research.*
- Organizer/director and main lecturer: *Hands-on Machine Learning for Fluid Dynamics* (2022–2024, >130 participants each edition).
- Co-organizer/director: VKI Lecture Series on PIV/LPT (2021, 2024); *Introduction to Measurement Techniques* (2020); *Data Driven Fluid Mechanics LS* (2020, >230 participants; lecture notes published by Cambridge University Press), *Machine Learning for Fluid Dynamics LS* (2024, >300 participants; lecture notes published by von Karman Institute)
- Scientific Committee member: *European Coating Symposium, AI Fluids.*

Supervision and PhD Committee Service

- I currently supervise 11 PhD students (8 as PI and 3 in international co-supervision), with five defenses completed in 2023–2024. Details in Table 1.
 - Visiting PhDs (2023-2025): L. Kyriakidis, (DLR), T. Werner (TU Darmstadt), D. Gligor (UPM), I. Tirelli (UC3M), E. Saccaggi (Polito), J.Wang (Monash Univ), D. Grasev (UoD), M. Belda (Cz. Techn Univ)
 - I currently supervise 4 Research Master students at VKI (26 supervised in the last 5 years). 100+ MSc theses/internships supervised .
 - Member of 8 PhD Committees: Kamila Zdybal (ULB), Mushin Akkurt (VKI-UGhent), Sagar Adatreo (TU-DELFT), Antonio Colanera (UniNapoli), Hang Wang (ULB), Michele Quattromini (Univ Paris Saclay), Ivan Kharsansky (Ensta PariS), Enrico Amico (PoliTO)
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Outreach and Engagement

- **Public outreach:** Contributor to the VKI Open Days, presenting fluid-dynamics demonstrations and research activities to the general public.
 - **Science communication:** Featured in a popular podcast on ‘Engineering & PhD Life,’ discussing fluid-dynamics research, PhD training, and career perspectives ([link](#)), and in a recorded panel organized by NCP-FNRS to share feedback and strategic advice for prospective European-grant applicants (ERC, Horizon Europe) ([link](#)).
 - **Open-source software and training:** Developer of the open-source tools MODULO (MODAl mUltiscale pOd, see [github](#)) for modal decomposition and data-driven reduced-order modelling and SPICY (meshlesS Pressure from Image veloCimetrY, see [github](#)) for physics-constrained radial-basis-function regression for scattered data. Both tools are accompanied by public tutorials and instructional videos for the research community ([see MODULO on youtube](#), [see SPICY on youtube](#)).
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International and National Scientific Links

Besides my strong ties with UCM3 (**Universidad Carlos III de Madrid**) through my joint position and close interactions with S. Discetti and A. Ianiro, I maintain active collaborations with several international groups via student mobility, seminars, PhD committees, and joint proposals. These include close links with: A. Gosset and M. Lema (**Universidade da Coruña, UDC**); G. Cafiero, J. Serpieri, F. Avallone, G. Di Cicca and S. Pieraccini (**Politecnico di Torino**); A. Sciacchitano, F. Scarano, A. Koa, and C. Falsetti (**Delft University of Technology, TU Delft**); M. Manolesos and K. Giannakoglou (**National Technical University of Athens, NTUA**); F. Sanfedino and A. F. Urbano (**ISAE-SUPAERO**); P. Salgado, L. González, and S. Le Clainche (**Universidad Politécnica de Madrid, UPM**); Josip Basic (**University of Split**); O. Semeraro (**CNRS-LISN**); J. Hnidka (**University of Defence**); S. Brunton (**University of Washington**); B. Noack (**Shenzhen University**), T. Pagliaroli (**UNICUSANO**), R. Camussi (**UNIROMA3**), L. Magri (**Imperial College London**); L. Pastur (**ENSTA Paris**); P. Cinnella (**Sorbonne University**); M. Bähr, S. Götz, and P. Bekemeyer (**German Aerospace Center, DLR**); B. McKeon (**Stanford University**); P. Jordan (**Institut P', CNRS-Université de Poitiers**); O. San (**University of Tennessee**); and B. Dias (**NASA Ames Research Center**), among others. In Belgium, my closest links are with E. Garone, B. Scheid and A. Parente (**ULB**); Y. Bartosiewicz (**UCLouvain**); J. Degroote (**Ghent University**); J. Helsen (**VUB**); D. Seveno and R. Vetrano (**KU Leuven**); and J. Steelant (**KU Leuven / ESA**), complemented by broader interactions with other colleagues nationwide. I aim to further expand this network through my position at ULB.

Name	University	Co-supervisor	Funding	Year	2023	2024	2025	2026	2027	2028
Domenico Fiorini	KULeuven	D. Seveno	FWO/ESA	Defended						
Fabio Pino	ULB	B. Scheid	FRIA/AM	Defended						
Matilde Fiore	UCLouvain	Y. Bartosiewicz	FRIA/SCK	Defended						
David Barreiro	UCoruna	A. Gosset	UCoruna/AM	Defended						
Romain Poletti	UGhent	J. Degroote	FWO	Defended						
Pedro Marques	ULB	B. Scheid	FRIA/ESA	Defended						
Jan van Den Berghe	UCLouvain	Y. Bartosiewicz	FRIA	Defended						
Lorenzo Schena	VUB	J.Helsen	FWO	4rth						
Manuel Ratz	ULB	A. Parente	FRIA/ERC	3rd						
Damien Rigutto	ULB	B. Scheid	FRIA/AM	3rd						
Umberto Zucchelli	ISAE	F. Sanfedino	ESA	3rd						
Francisco Monteiro	UC3M	–	VLAIO/ERC	2nd						
Samuel Ahizi	UC3M	–	VLAIO/ERC	2nd						
Sebastiano Randino	ULB	E. Garone	FRIA/ERC	2nd						
David Grasev	UoD	J. Hnidka	ERC/UoD	2nd						
Tommaso De Maria	ULB	E. Garone	ERC	1st						
Yannick Lecompte	ULB	E. Garone	ERC	1st						

Table 1: Summary of PhD students and project timeline (gray = active years; light blue = current academic year).

Selected Invited Lectures, Seminars and Keynotes (2022–2025)

1. **Lectures at the EA2 “Advanced Post Processing Techniques Summer School”: AI in Fluid Dynamics — Meshless Modal Analysis of Scattered Data**, invited by Prof. Avallone, [event page](#), Torino, July 2025.
2. **Lectures at UC3M Doctoral School “An Introduction to Statistical and Variational Methods for Assimilation and Real Time Modeling”**, invited by Prof. S. Discetti, Madrid, Jun 2025, [link](#).
3. **Keynote Lecture on Reinforcement Twinning at the 1st AI and Fluid Mechanics Conference**, invited by Prof. Gavaises, [programme](#), Chania, May 2025.
4. **Seminar on Machine Learning for Fluid Dynamics at BrIAS**, invited by Prof. E. Garone, [video](#), Brussels, February 2025.
5. **Seminar on Reinforcement Twinning at the WP3 Cypher Meeting**, invited by Prof. A. Parente, [event page](#), Madrid, February 2025.
6. **Seminar on Meshless and Binless Super-resolution for PTV**, Exp in Fluids Seminar, invited by Prof. Tropea, [video](#), Online, November 2024.
7. **Seminar on Engineering AI at the workshop “Bridging Knowledge: Artificial Intelligence”**, organized by ASI, invited by Dr. A. Turchi, [agenda](#), Rome, May 2024.
8. **Seminar on “Trends and Challenges in Scientific Machine Learning for Engineering”**, invited by Dr. Esposito, ASI Online Seminar Series, [event page](#), March 2024.
9. **Keynote Lecture on Reinforcement Twinning at the 1st Cypher General Meeting**, invited by Prof. A. Parente, [meeting page](#), Ljubljana, April 2024.
10. **Keynote Lecture on Machine Learning for Fluid Dynamics at the 12th AIAC**, invited by Prof. Özgen, METU, Ankara, September 2023, [conference site](#).
11. **Lecture on Machine Learning for Fluids at the Short Course on CFD of ICCS**, invited by Dr. Shane, London, September 2023, [course programme](#).
12. **Three Lectures on Deep Learning for Turbulence Modeling at the FJOH Summer School**, invited by Prof. R. Stieglitz, Karlsruhe, August 2023, [school page](#), [video](#).
13. **Seminar at Extrality: “Trends and Challenges in Scientific Machine Learning for Fluid Dynamics”**, invited by Dr. Mazari, Online, September 2023, [event link](#).
14. **Seminar on Machine Learning for Engineering at IMT Nord Europe**, invited by Prof. Lacassagne, Douai, June 2023.
15. **Five Lectures on Data-Driven Modal Analysis at CAMS–AUB**, invited by Prof. Najem, Beirut, February 2023, [programme](#), [video](#).
16. **Lecture at JT51 on Data Processing**, invited by Prof. Zimmer, Paris, November 2022, [event page](#).
17. **Seminar at City, University of London: “Data-Driven Fluid Mechanics”**, invited by Prof. Marinos Manoles, London, October 2022, [event page](#).
18. **Seminar at KTH: “Comparative Analysis of Machine Learning Methods for Active Flow Control”**, invited by Prof. R. Vinuesa, Stockholm, September 2022, [event page](#).
19. **Seminar at Universidade da Coruña (UDC) on Machine Learning for Fluid Dynamics**, invited by Prof. Gosset, Ferrol, September 2022, [event page](#).
20. **Keynote Lecture on Data-Driven Methods for Image Velocimetry at the CFTL 2022 Meeting**, invited by Prof. Vetrano, Leuven, September 2022, [meeting page](#).
21. **Lecture on Model-Free Control Methods at the Workshop on Complex Fluids, Centro Enrico Fermi**, invited by Prof. Biferale, Rome, July 2022, [programme](#).

List of Publications

Under Review

- [1] D. Barreiro-Villaverde, A. Cantiani, and M. A. Mendez. "On the complex interplay of temperature, phase change and natural convection in self-pressurization-an investigation using segregated modeling". Submitted to International Journal of Heat and Mass Transfer. 2025. arXiv: [2512.13349](#).
- [2] D. Rigitto, M. Ratz, and M. A. Mendez. "A meshless data-tailored approach to compute statistics from scattered data with adaptive radial basis functions". Submitted to Experiments in Fluids. 2025. arXiv: [2511.20449](#).
- [3] F. Monteiro, T. De Maria, S. Ahizi, R. Abarca, G. C. A. Caridi, and M. A. Mendez. "Regime maps for sloshing in horizontal cylindrical tanks under vertical acceleration". Submitted to Physical Review Fluids. 2025. arXiv: [2512.02540](#).
- [4] P. A. Marques, A. Simonini, B. Scheid, and M. A. Mendez. "Sloshing-induced pressure drop in cryogenic propellant tanks: an experimental analysis with flow visualization". Submitted to International Journal of Heat and Mass Transfer. 2025.
- [5] M. Ratz, A. Parente, and M. A. Mendez. "Meshless data-driven decompositions with RBF-based inner products". Submitted to Computers and Fluids. 2025. arXiv: [2511.03264](#).
- [6] S. Ahizi, F. Monteiro, R. Abarca, and M. A. Mendez. "Heat-transfer enhancement by parametric sloshing in horizontal cylinders: experiments and EKF-based identification of Nusselt numbers". Submitted to International Journal of Heat and Mass Transfer. 2025. arXiv: [2510.19540](#).
- [7] J. Van den Berghe, M. A. Mendez, and Y. Bartosiewicz. "On the choking mechanism in supersonic ejectors: a one-dimensional analysis of Reynolds-averaged Navier–Stokes simulations". Submitted to Journal of Fluid Mechanics. 2025. arXiv: [2510.23385](#).
- [8] S. Randino, L. Schena, N. Coudou, E. Garone, and M. A. Mendez. "Nonlinear system identification for model-based control of waked wind turbines". Submitted to Data-Centric Engineering. 2025. arXiv: [2510.07336](#).
- [9] R. Poletti, E. Bombardi, L. Koloszar, M. A. Mendez, and J. Degroote. "Characterisation and extension of a rigid-body dynamics solver coupled with OpenFOAM for flight performance analysis of flapping-wing drones". Submitted to OpenFOAM Journal. 2025. arXiv: [2510.24518](#).
- [10] A. K. N. Doan, K. Bizon, P. Cinnella, M. A. Mendez, and A. Parente. "Hybrid physics-based machine learning methods for renewable sustainable fuels modelling". Roadmap article submitted to Journal of Physics: Energy (IOP). 2025.
- [11] F. Pino, E. Fracchia, B. Scheid, and M. A. Mendez. "Integral modelling and reinforcement-learning control of 3D liquid metal coating on a moving substrate". Submitted to Physical Review Fluids. 2025. arXiv: [2503.14270](#).
- [12] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. "Meshless super-resolution of scattered data via constrained RBFs and KNN-driven densification". Submitted to Physical Review Fluids. 2025. arXiv: [2503.04630](#).
- [13] R. Poletti, L. Schena, L. Koloszar, J. Degroote, and M. A. Mendez. "Reinforcement Twinning for hybrid control of flapping-wing drones". Submitted to Data-Centric Engineering. 2025. arXiv: [2505.18201](#).
- [14] L. Schena, W. Munters, J. Helsen, and M. A. Mendez. "POD-based sparse stochastic estimation of wind-turbine blade vibrations". Submitted to Journal of Sound and Vibration. 2025. arXiv: [2504.08505](#).

Journal Articles Published

- [15] P. A. Marques, S. Ahizi, F. Monteiro, B. Scheid, and M. A. Mendez. “On the scaling of heat and mass transfer in cryogenic propellant tanks: A model-based and experimental analysis under static conditions and lateral sloshing”. In: *Applied Thermal Engineering* 279 (2025). DOI: [10.1016/j.applthermaleng.2025.127751](https://doi.org/10.1016/j.applthermaleng.2025.127751).
- [16] L. Kyriakidis, M. Bähr, and M. A. Mendez. “Enhanced hybrid algorithm based on Bayesian optimization and Interior Point OPTimizer for constrained optimization”. In: *Optimization and Engineering* (2025). DOI: [10.1007/s11081-025-09975-y](https://doi.org/10.1007/s11081-025-09975-y).
- [17] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. “A meshless method to compute the proper orthogonal decomposition and its variants from scattered data”. In: *Proceedings of the Royal Society A* (2025). DOI: [10.1098/rspa.2024.0526](https://doi.org/10.1098/rspa.2024.0526). arXiv: [2407.03173](https://arxiv.org/abs/2407.03173).
- [18] M. Fiore, E. Saccaggi, L. Koloszar, Y. Bartosiewicz, and M. A. Mendez. “Data-driven turbulent heat flux modeling with inputs of multiple fidelity”. In: *Physical Review Fluids* 10.3 (2025), p. 034606. DOI: [10.1103/PhysRevFluids.10.034606](https://doi.org/10.1103/PhysRevFluids.10.034606). arXiv: [2409.03395](https://arxiv.org/abs/2409.03395).
- [19] F. Monteiro, P. Marques, A. Simonini, L. Carbonelle, and M. A. Mendez. “Experimental characterization of non-isothermal sloshing in microgravity”. In: *Experimental Thermal and Fluid Science* 166 (2025), p. 111476. DOI: [10.1016/j.expthermflusci.2025.111473](https://doi.org/10.1016/j.expthermflusci.2025.111473). arXiv: [2410.06590](https://arxiv.org/abs/2410.06590).
- [20] F. Pino, M. A. Mendez, and B. Scheid. “Pareto front of the magnetic wiping process in dip coating”. In: *Journal of Engineering Mathematics* (2025). Issue 1/2025. DOI: [10.1007/s10665-025-10426-x](https://doi.org/10.1007/s10665-025-10426-x). arXiv: [2406.14110](https://arxiv.org/abs/2406.14110).
- [21] J. Van den Berghe, M. A. Mendez, and Y. Bartosiewicz. “An extension of the compound flow theory with friction between the streams and at the wall”. In: *Journal of Fluid Mechanics* 1000 (2024), A85. DOI: [10.1017/jfm.2024.1041](https://doi.org/10.1017/jfm.2024.1041). arXiv: [2401.07236](https://arxiv.org/abs/2401.07236).
- [22] F. Pino, M. A. Mendez, and B. Scheid. “Linear stability analysis of a vertical liquid film over a moving substrate”. In: *Journal of Fluid Mechanics* 1000 (2024), A57. DOI: [10.1017/jfm.2024.940](https://doi.org/10.1017/jfm.2024.940).
- [23] D. Barreiro-Villaverde, A. Gosset, and M. A. Mendez. “On the coupling instability of a gas jet impinging on a liquid film”. In: *Journal of Fluid Mechanics* 992 (2024), A11. DOI: [10.1017/jfm.2024.553](https://doi.org/10.1017/jfm.2024.553). arXiv: [2309.15502](https://arxiv.org/abs/2309.15502).
- [24] F. Pino, M. A. Mendez, and B. Scheid. “Absolute and convective instabilities in a liquid film over a substrate moving against gravity”. In: *Physical Review Fluids* 9 (2024), p. 104002. DOI: [10.1103/PhysRevFluids.9.104002](https://doi.org/10.1103/PhysRevFluids.9.104002). arXiv: [2312.14613](https://arxiv.org/abs/2312.14613).
- [25] L. Kyriakidis, M. A. Mendez, and M. Bahr. “A hybrid algorithm based on Bayesian Optimization and Interior Point OPTimizer for optimal operation of energy conversion systems”. In: *Energy* 312 (2024), p. 133416. DOI: [10.1016/j.energy.2024.133416](https://doi.org/10.1016/j.energy.2024.133416).
- [26] D. Gligor, P. A. Marques, P. S. Sanchez, J. Porter, M. A. Mendez, and J. M. Ezquerro. “Experiments on sloshing mitigation using tuned oscillating baffles”. In: *Physics of Fluids* 36 (2024), p. 092122. DOI: [10.1063/5.0225917](https://doi.org/10.1063/5.0225917).
- [27] D. Fiorini, A. Simonini, J. Steelant, D. Seveno, and M. A. Mendez. “An experimental characterization of capillary driven flows in microgravity”. In: *Microgravity Science and Technology* 36 (2024), p. 61. DOI: [10.1007/s12217-024-10142-8](https://doi.org/10.1007/s12217-024-10142-8).
- [28] R. Poletti, L. Schena, D. Ninni, and M. A. Mendez. “MODULO: a python toolbox for data-driven modal decomposition”. In: *Journal of Open Source Software* 9.102 (2024), p. 6753. DOI: [10.21105/joss.06753](https://doi.org/10.21105/joss.06753).
- [29] R. Poletti, A. Calado, L. Koloszar, J. Degroote, and M. A. Mendez. “On the unsteady aerodynamics of flapping wings under dynamic hovering kinematics”. In: *Physics of Fluids* 36 (2024), p. 081901. DOI: [10.1063/5.0215531](https://doi.org/10.1063/5.0215531). arXiv: [2408.03222](https://arxiv.org/abs/2408.03222).

- [30] M. Ratz and M. A. Mendez. “A meshless and binless approach to compute statistics in 3D ensemble PTV”. In: *Experiments in Fluids* 65 (2024), p. 142. DOI: [10.1007/s00348-024-03878-x](https://doi.org/10.1007/s00348-024-03878-x). arXiv: [2403.11828](https://arxiv.org/abs/2403.11828).
- [31] L. Schena, P. Marques, R. Poletti, S. Ahizi, J. Van den Berghe, and M. A. Mendez. “Reinforcement Twinning: from digital twins to model-based reinforcement learning”. In: *Journal of Computational Science* 82 (2024), p. 102421. DOI: [10.1016/j.jocs.2024.102421](https://doi.org/10.1016/j.jocs.2024.102421). arXiv: [2311.03628](https://arxiv.org/abs/2311.03628).
- [32] P. Marques, S. Ahizi, and M. A. Mendez. “Real-time data assimilation for the thermodynamic modelling of cryogenic storage tanks”. In: *Energy* 302 (2024), p. 131739. DOI: [10.1016/j.energy.2024.131739](https://doi.org/10.1016/j.energy.2024.131739). arXiv: [2310.11399](https://arxiv.org/abs/2310.11399).
- [33] D. Gligor, C. Peromingo, P. Salgado Sanchez, J. Porter, and M. A. Mendez. “Sloshing mitigation in microgravity with moving baffles”. In: *Acta Astronautica* 219 (2024), pp. 639–652. DOI: [10.1016/j.actaastro.2024.03.047](https://doi.org/10.1016/j.actaastro.2024.03.047).
- [34] P. Sperotto, M. Ratz, and M. A. Mendez. “SPICY: a Python toolbox for meshless assimilation from image velocimetry using radial basis functions”. In: *Journal of Open Source Software* 9.93 (2024), p. 5749. DOI: [10.21105/joss.05749](https://doi.org/10.21105/joss.05749).
- [35] D. Fiorini, A. Simonini, J. Steelant, D. Seveno, and M. A. Mendez. “Dynamic wetting experiments with nitrogen in a quasi-capillary tube”. In: *Physical Review Fluids* 8 (2023), p. 124004. DOI: [10.1103/PhysRevFluids.8.124004](https://doi.org/10.1103/PhysRevFluids.8.124004). arXiv: [2310.05490](https://arxiv.org/abs/2310.05490).
- [36] D. Barreiro-Villaverde, A. Gosset, and M. A. Mendez. “Damping of three-dimensional waves on coating films dragged by moving substrates”. In: *Physics of Fluids* 35 (2023), p. 072110. DOI: [10.1063/5.0154144](https://doi.org/10.1063/5.0154144). arXiv: [2305.16139](https://arxiv.org/abs/2305.16139).
- [37] T. Ivanova, F. Pino, B. Scheid, and M. A. Mendez. “Evolution of waves in liquid films on moving substrates”. In: *Physics of Fluids* 35 (2023), p. 013609. DOI: [10.1063/5.0132222](https://doi.org/10.1063/5.0132222). arXiv: [2203.08201](https://arxiv.org/abs/2203.08201).
- [38] D. Fiorini, L. Carbonelle, A. Simonini, J. Steelant, D. Seveno, and M. A. Mendez. “Characterization of a capillary-driven flow in microgravity by means of optical techniques”. In: *Multiphase Science and Technology* 35.3 (2023), pp. 55–66. DOI: [10.1615/MultScienTechn.2023047919](https://doi.org/10.1615/MultScienTechn.2023047919).
- [39] P. Marques, A. Simonini, L. Peveroni, and M. A. Mendez. “Experimental analysis of heat and mass transfer in non-isothermal sloshing using a model-based inverse method”. In: *Applied Thermal Engineering* (2023), p. 120871. DOI: [10.1016/j.applthermaleng.2023.120871](https://doi.org/10.1016/j.applthermaleng.2023.120871). arXiv: [2212.12246](https://arxiv.org/abs/2212.12246).
- [40] A. Calado, R. Poletti, L. K. Koloszar, and M. A. Mendez. “A robust data-driven model for flapping aerodynamics under different hovering kinematics”. In: *Physics of Fluids* 35 (2023), p. 047122. DOI: [10.1063/5.0139020](https://doi.org/10.1063/5.0139020). arXiv: [2212.09464](https://arxiv.org/abs/2212.09464).
- [41] F. Pino, L. Schena, J. Rabault, and M. A. Mendez. “Comparative analysis of machine learning methods for active flow control”. In: *Journal of Fluid Mechanics* 958 (2023), A39. DOI: [10.1017/jfm.2023.76](https://doi.org/10.1017/jfm.2023.76). arXiv: [2202.11664](https://arxiv.org/abs/2202.11664).
- [42] L. Gkimisis, B. R. Barros Dias, J. B. Scoggins, T. Magin, M. A. Mendez, and A. Turchi. “Data-driven modeling of stagnation-line flow with heat and mass transfer in hypersonic reentry”. In: *AIAA Journal* 61.8 (2023), pp. 3269–3286. DOI: [10.2514/1.J062332](https://doi.org/10.2514/1.J062332). arXiv: [2208.06240](https://arxiv.org/abs/2208.06240).
- [43] F. J. Mendez, M. A. Mendez, N. Sciarra, and A. Pascullo. “Multiobjective analysis of the Sand Hypoplasticity model calibration”. In: *Acta Geotechnica* (2024). DOI: [10.1007/s11440-023-02191-x](https://doi.org/10.1007/s11440-023-02191-x). arXiv: [2303.07234](https://arxiv.org/abs/2303.07234).
- [44] J. Van den Berghe, B. R. Barros Dias, Y. Bartosiewicz, and M. A. Mendez. “A 1D model for the unsteady gas dynamics of ejectors”. In: *Energy* (2022). DOI: [10.1016/j.energy.2022.126551](https://doi.org/10.1016/j.energy.2022.126551). arXiv: [2208.07687](https://arxiv.org/abs/2208.07687).
- [45] M. A. Mendez. “Linear and nonlinear dimensionality reduction from fluid mechanics to machine learning”. In: *Measurement Science and Technology* 34.4 (2023). DOI: [10.1088/1361-6501/acaffe](https://doi.org/10.1088/1361-6501/acaffe). arXiv: [2208.07746](https://arxiv.org/abs/2208.07746).

- [46] A. Procaci, M. M. Kamal, M. A. Mendez, S. Hochgreb, A. Coussement, and A. Parente. “Multi-scale proper orthogonal decomposition analysis of instabilities in swirled and stratified flames”. In: *Physics of Fluids* 32 (2020), p. 123103. doi: [10.1063/5.0127956](https://doi.org/10.1063/5.0127956).
- [47] M. Fiore, L. Koloszar, M. A. Mendez, M. Duponcheel, and Y. Bartosiewicz. “Turbulent heat flux modeling in forced convection flows using artificial neural networks”. In: *Nuclear Engineering and Design* 399.1 (2022), p. 112005. doi: [10.1016/j.nucengdes.2022.112005](https://doi.org/10.1016/j.nucengdes.2022.112005).
- [48] D. Fiorini, M. A. Mendez, A. Simonini, J. Steelant, and D. Seveno. “Effect of inertia on the dynamic contact angle in oscillating menisci”. In: *Physics of Fluids* 32 (2022), p. 102116. doi: [10.1063/5.0119863](https://doi.org/10.1063/5.0119863). arXiv: [2208.05329](https://arxiv.org/abs/2208.05329).
- [49] M. Ratz, D. Fiorini, A. Simonini, C. Cierpka, and M. A. Mendez. “Analysis of an unsteady quasi-capillary channel flow with time-resolved PIV and RBF-based super-resolution”. In: *Journal of Coatings Technology and Research* (2022). doi: [10.1007/s11998-022-00664-4](https://doi.org/10.1007/s11998-022-00664-4). arXiv: [2202.13724](https://arxiv.org/abs/2202.13724).
- [50] P. Sperotto, S. Pieraccini, and M. A. Mendez. “A meshless method to measure pressure fields from image velocimetry”. In: *Measurement Science and Technology* 33 (2022), p. 094005. doi: [10.1088/1361-6501/ac70a9](https://doi.org/10.1088/1361-6501/ac70a9). arXiv: [2112.12752](https://arxiv.org/abs/2112.12752).
- [51] J. Dominique, J. Van den Berghe, C. Schram, and M. A. Mendez. “Artificial neural networks modeling of wall pressure spectra beneath turbulent boundary layers”. In: *Physics of Fluids* 34 (2022). doi: [10.1063/5.0083241](https://doi.org/10.1063/5.0083241). arXiv: [2201.03262](https://arxiv.org/abs/2201.03262).
- [52] M. Fiore, L. Koloszar, M. A. Mendez, M. Duponcheel, and Y. Bartosiewicz. “Physics-constrained machine learning for thermal turbulence modeling at low Prandtl numbers”. In: *International Journal of Heat and Mass Transfer* 194 (2022), p. 122998. doi: [10.1016/j.ijheatmasstransfer.2022.122998](https://doi.org/10.1016/j.ijheatmasstransfer.2022.122998). arXiv: [2201.06301](https://arxiv.org/abs/2201.06301).
- [53] D. Barreiro-Villaverde, A. Gosset, and M. A. Mendez. “On the dynamics of the jet wiping process: numerical simulations and modal analysis”. In: *Physics of Fluids* 33 (2021), p. 062114. doi: [10.1063/5.0051451](https://doi.org/10.1063/5.0051451). arXiv: [2103.16116](https://arxiv.org/abs/2103.16116).
- [54] M. Balabane, M. A. Mendez, and S. Nagem. “Koopman operator for Burgers’s equation”. In: *Physical Review Fluids* 6 (2021), p. 064401. doi: [10.1103/PhysRevFluids.6.064401](https://doi.org/10.1103/PhysRevFluids.6.064401). arXiv: [2007.01218](https://arxiv.org/abs/2007.01218).
- [55] F. J. Mendez, A. Pascullo, M. A. Mendez, and N. Sciarra. “Calibration of a hypoplastic model using genetic algorithms”. In: *Acta Geotechnica* 16 (2021), pp. 2031–2047. doi: [10.1007/s11440-020-01135-z](https://doi.org/10.1007/s11440-020-01135-z).
- [56] D. Ninni and M. A. Mendez. “MODULO: A software for multiscale proper orthogonal decomposition of data”. In: *SoftwareX* 12 (2020), p. 100622. doi: [10.1016/j.softx.2020.100622](https://doi.org/10.1016/j.softx.2020.100622). arXiv: [2001.01971](https://arxiv.org/abs/2001.01971).
- [57] M. A. Mendez, A. Gosset, B. Scheid, M. Balabane, and J. Buchlin. “Dynamics of the jet wiping process via integral models”. In: *Journal of Fluid Mechanics* 911 (2021), A47. doi: [10.1017/jfm.2020.107](https://doi.org/10.1017/jfm.2020.107). arXiv: [2004.13400](https://arxiv.org/abs/2004.13400).
- [58] C. Esposito, M. A. Mendez, J. Steelant, and M. R. Vetrano. “Spectral and modal analysis of a cavitating flow through an orifice”. In: *Experimental Thermal and Fluid Science* 121 (2021), p. 110251. doi: [10.1016/j.expthermflusci.2020.110251](https://doi.org/10.1016/j.expthermflusci.2020.110251).
- [59] M. A. Mendez, D. Hess, B. Watz, and J.-M. Buchlin. “Multiscale proper orthogonal decomposition (mPOD) of TR-PIV data: a case study on stationary and transient cylinder wake flows”. In: *Measurement Science and Technology* 31.9 (2020), p. 094014. doi: [10.1088/1361-6501/ab82be](https://doi.org/10.1088/1361-6501/ab82be). arXiv: [2001.01971](https://arxiv.org/abs/2001.01971).
- [60] D. Bian, R. Theunissen, M. A. Mendez, and Y. Wei. “Probabilistic evaluation of streamline topologies for the detection of preferential flow configurations in PIV applications”. In: *Experiments in Fluids* 61.13 (2020). doi: [10.1007/s00348-019-2852-9](https://doi.org/10.1007/s00348-019-2852-9).

- [61] M. A. Mendez, A. Gosset, and J. Buchlin. “An experimental analysis of the stability of the jet wiping process: Part II—Multiscale modal analysis of the gas jet–liquid film interaction”. In: *Experimental Thermal and Fluid Science* 106 (2019), pp. 48–67. doi: [10.1016/j.expthermflusci.2019.03.004](https://doi.org/10.1016/j.expthermflusci.2019.03.004).
- [62] A. Gosset, M. A. Mendez, and J. Buchlin. “An experimental analysis of the stability of the jet wiping process: Part I—Characterization of the coating uniformity”. In: *Experimental Thermal and Fluid Science* 103 (2019), pp. 51–65. doi: [10.1016/j.expthermflusci.2018.12.029](https://doi.org/10.1016/j.expthermflusci.2018.12.029).
- [63] M. A. Mendez, M. Balabane, and J.-M. Buchlin. “Multi-scale proper orthogonal decomposition of complex fluid flows”. In: *Journal of Fluid Mechanics* 870 (2019), pp. 988–1036. doi: [10.1017/jfm.2019.212](https://doi.org/10.1017/jfm.2019.212). arXiv: [1804.09646](https://arxiv.org/abs/1804.09646).
- [64] M. A. Mendez, A. Enache, A. Gosset, and J.-M. Buchlin. “Experimental characterization of the jet wiping process”. In: *EPJ Web of Conferences* 180 (2018), p. 02064.
- [65] M. A. Mendez, M. T. Scelzo, A. Enache, and J.-M. Buchlin. “Fluidic vectoring of a planar incompressible jet flow”. In: *EPJ Web of Conferences* 180 (2018), p. 02065. doi: [10.1051/epjconf/201818002065](https://doi.org/10.1051/epjconf/201818002065).
- [66] M. A. Mendez, M. T. Scelzo, and J.-M. Buchlin. “Multiscale modal analysis of an oscillating impinging gas jet”. In: *Experimental Thermal and Fluid Science* 91 (2018), pp. 256–276. doi: [10.1016/j.expthermflusci.2017.10.032](https://doi.org/10.1016/j.expthermflusci.2017.10.032).
- [67] M. A. Mendez, B. Scheid, and J.-M. Buchlin. “Low Kapitza falling liquid films”. In: *Chemical Engineering Science* 170 (2017), pp. 122–138. doi: [10.1016/j.ces.2016.12.050](https://doi.org/10.1016/j.ces.2016.12.050).
- [68] M. Mendez, M. Raiola, A. Masullo, S. Discetti, A. Ianiro, R. Theunissen, and J.-M. Buchlin. “POD-based background removal for particle image velocimetry”. In: *Experimental Thermal and Fluid Science* 91 (2017), pp. 181–192. doi: [10.1016/j.expthermflusci.2016.08.021](https://doi.org/10.1016/j.expthermflusci.2016.08.021).
- [69] M. Mendez, L. Nemeth, and J.-M. Buchlin. “Measurement of liquid-film thickness via light absorption and laser tomography”. In: *EPJ Web of Conferences* 144 (2016), p. 02072. doi: [10.1051/epjconf/201611402072](https://doi.org/10.1051/epjconf/201611402072).

Edited Books

- [1] M. A. Mendez, A. Ianiro, B. R. Noack, and S. L. Brunton, eds. *Data-Driven Fluid Mechanics: Combining First Principles and Machine Learning*. Cambridge University Press, Jan. 2023. ISBN: 9781108842143. doi: [10.1017/9781108896214](https://doi.org/10.1017/9781108896214).
- [2] M. A. Mendez and A. Parente, eds. *Machine Learning for Fluid Dynamics*. von Karman Institute for Fluid Dynamics, Nov. 2025. ISBN: 978-2875162090.

Book Chapters

- [1] M. A. Mendez, R. Poletti, L. Schena, S. Randino, F. Monteiro, T. De Maria, and Y. Lecomte. “From Optimization to Learning: a unified perspective on control algorithms”. In: *Flow Control*. Ed. by M. A. Mendez and S. Discetti. In preparation. von Karman Institute for Fluid Dynamics, 2026.
- [2] M. A. Mendez, R. Poletti, L. Schena, S. Randino, F. Monteiro, T. De Maria, and Y. Lecomte. “Reinforcement Twinning: Towards a Bidirectional Learning Framework for Model Updating and Policy Optimization”. In: *Flow Control*. Ed. by M. A. Mendez and S. Discetti. In preparation. von Karman Institute for Fluid Dynamics, 2026.
- [3] M. A. Mendez. “Fundamentals of Regression”. In: *Machine Learning for Fluid Mechanics*. Ed. by M. A. Mendez and A. Parente. von Karman Institute for Fluid Dynamics, 2025. URL: www.arxiv.org/abs/2512.01920.
- [4] M. A. Mendez, J. van den Berghe, M. Ratz, M. Fiore, and L. Schena. “Learning with Physics Constraints”. In: *Machine Learning for Fluid Mechanics*. Ed. by M. A. Mendez and A. Parente. von Karman Institute for Fluid Dynamics, 2025. arXiv: [2512.00104](https://arxiv.org/abs/2512.00104).

- [5] M. A. Mendez, R. Poletti, and L. Schena. “Fundamentals of Dimensionality Reduction”. In: *Machine Learning for Fluid Mechanics*. Ed. by M. A. Mendez and A. Parente. von Karman Institute for Fluid Dynamics, 2025.
- [6] M. A. Mendez, M. Ratz, and D. Rigutto. “Statistical Methods and Modal Decompositions for Gridded and Scattered Data: Meshless Statistics and Meshless Data-Driven Modal Analysis”. In: *Particle Image Velocimetry*. Ed. by S. Discetti and M. A. Mendez. von Karman Institute for Fluid Dynamics, 2024. arXiv: [2502.04765](https://arxiv.org/abs/2502.04765).
- [7] M. A. Mendez. “Continuous and Discrete Linear Time-Invariant Systems”. In: *Data-Driven Fluid Mechanics: Combining First Principles and Machine Learning*. Ed. by M. A. Mendez, A. Ianiro, B. R. Noack, and S. L. Brunton. Cambridge University Press, 2023. DOI: [10.1017/9781108896214.003](https://doi.org/10.1017/9781108896214.003). arXiv: [2208.11891](https://arxiv.org/abs/2208.11891).
- [8] M. A. Mendez. “Generalized and Multiscale Modal Analysis”. In: *Data-Driven Fluid Mechanics: Combining First Principles and Machine Learning*. Ed. by M. A. Mendez, A. Ianiro, B. R. Noack, and S. L. Brunton. Cambridge University Press, 2023. DOI: [10.1017/9781108896214.004](https://doi.org/10.1017/9781108896214.004). arXiv: [2208.12630](https://arxiv.org/abs/2208.12630).
- [9] M. A. Mendez. “Statistical Treatment, Fourier and Modal Decompositions”. In: *Fundamentals and Recent Advances in Particle Image Velocimetry and Lagrangian Particle Tracking*. Ed. by S. Discetti and M. A. Mendez. von Karman Institute for Fluid Dynamics, 2021. ISBN: 978-2-87516-181-9. arXiv: [2201.03847](https://arxiv.org/abs/2201.03847).
- [10] M. A. Mendez, M. Fiore, and F. Pino. “Machine Learning for Fluid Mechanics: Challenges, Opportunities and Perspectives”. In: *Optimization Methods for Computational Fluid Dynamics*. Ed. by Jacques Périault and Tom Verstraete. von Karman Institute for Fluid Dynamics, 2022. URL: <https://arxiv.org/abs/2202.12577>.

Conference Proceedings

- [1] D. Rigutto, D. Reviglio, B. Scheid, and M. A. Mendez. “An experimental investigation of dynamic wetting at high Weber numbers: interface dynamics and flow-field analysis”. In: *European Coating Symposium (ECS)*. A Coruña, Spain, 2025.
- [2] D. Rigutto, B. Scheid, and M. A. Mendez. “Real-time interface reconstruction of a falling liquid film using deflectometry”. In: *European Coating Symposium (ECS)*. A Coruña, Spain, 2025.
- [3] M. Ratz, C. Schram, A. Sciacchitano, and M. A. Mendez. “Flow development over a low-Reynolds propeller in accelerating conditions”. In: *16th International Symposium on Particle Image Velocimetry (ISPIV)*. Tokyo, Japan, 2025.
- [4] M. Ratz, S. Ahizi, A. Parente, and M. A. Mendez. “A framework for meshless data-driven decompositions with RBF-based inner products”. In: *2nd ERCOFTAC Workshop on Machine Learning for Fluid Dynamics*. London, United Kingdom, 2025.
- [5] U. Zuchelli, M.A. Mendez, A. Urbano, S.V. Bonniew, P. Wenderski, and F. Sanfedino. “Closed-loop control of sloshing fuel in a spinning spacecraft”. In: *11th European Conference for Aeronautics and Space Sciences (EUCASS)*. Rome, Italy, 2025.
- [6] T. De Maria, F. Monteiro, S. Ahizi, R. Abarca, G. C. A. Caridi, and M. A. Mendez. “Experimental analysis of sloshing-induced thermal mixing in horizontally oriented cylindrical tanks subjected to vertical acceleration”. In: *11th European Conference for Aeronautics and Space Sciences (EUCASS)*. Rome, Italy, 2025.
- [7] F. Monteiro, T. De Maria, S. Ahizi, R. Abarca, G. C. A. Caridi, and M. A. Mendez. “Data-driven modal decomposition and automatic classification of parametric sloshing regimes in horizontal cylindrical tanks”. In: *11th European Conference for Aeronautics and Space Sciences (EUCASS)*. Rome, Italy, 2025.

- [8] S. Ahizi and M. A. Mendez. "Meshless POD for sloshing-mode identification in non-canonical tank geometries". In: *AI & Fluids*. Chania, Greece, 2025.
- [9] S. Randino, L. Schena, N. Coudou, E. Garone, and M. A. Mendez. "Real-time data assimilation for the digital twinning of wind farms". In: *AI & Fluids*. Chania, Greece, 2025.
- [10] D. Rigozzo, M. Ratz, and M. A. Mendez. "Anisotropic and multi-resolution RBFs for meshless data assimilation of scattered data". In: *AI & Fluids*. Chania, Greece, 2025.
- [11] J. Van den Berghe, M. A. Mendez, and Y. Bartosiewicz. "A 1D ejector model based on the compound flow theory". In: *2nd European Fluid Dynamics Conference (EFDC2)*. Dublin, Ireland, 2025.
- [12] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and M. Lema. "Coupling of a thin-film solver with OpenFOAM to resolve liquid–gas interactions". In: *26th International Congress of Theoretical and Applied Mechanics (ICTAM 2024)*. Daegu, Republic of Korea, 2024.
- [13] J. Van den Berghe, R. Debroeyer, M. A. Mendez, and Y. Bartosiewicz. "A one-dimensional model for supersonic ejectors based on the compound flow theory". In: *1st Belgian Symposium of Thermodynamics*. Liège, Belgium, 2024.
- [14] D. Rigozzo, B. Scheid, and M. A. Mendez. "Étude expérimentale de la dynamique d'interface et du champ de vitesse autour de la ligne de contact d'une plaque immergée". In: *18ème Congrès Francophone de Techniques Laser (CFTL)*. Lyon, France, 2024.
- [15] F. Pino, B. Scheid, M. A. Mendez, and D. Papageorgiou. "Linear feedback control of a liquid film over a substrate moving against gravity". In: *26th International Congress of Theoretical and Applied Mechanics (ICTAM 2024)*. Daegu, Republic of Korea, 2024.
- [16] F. Pino, M. A. Mendez, and B. Scheid. "Absolute and convective instabilities in a liquid film over a substrate moving against gravity". In: *European Fluid Dynamics Conference (EFDC1)*. Aachen, Germany, 2024.
- [17] J. Van den Berghe, Y. Bartosiewicz, and M. A. Mendez. "Choking of parallel compressible streams with shear and wall friction". In: *26th International Congress of Theoretical and Applied Mechanics (ICTAM 2024)*. Daegu, Republic of Korea, 2024.
- [18] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. "A meshless method to compute the POD and its variants from scattered data". In: *21st International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics (LXLASER24)*. Lisbon, Portugal, 2024.
- [19] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. "A full meshless algorithm for super-resolution in image velocimetry based on KNN-PTV and constrained RBFs". In: *21st International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics (LXLASER24)*. Lisbon, Portugal, 2024.
- [20] D. Rigozzo, Y. Lecomte, J.-M. Buchlin, B. Scheid, and M. A. Mendez. "Experimental investigation of the gas–liquid interface and flow-field dynamics near the contact line in an immersing flat surface". In: *21st International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics (LXLASER24)*. Lisbon, Portugal, 2024.
- [21] M. Ratz and M. A. Mendez. "A meshless and binless approach to compute statistics in 3D ensemble PTV". In: *21st International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics (LXLASER24)*. Lisbon, Portugal, 2024.
- [22] P. A. Marques, A. Simonini, M. Delsipée, and M. A. Mendez. "Characterization of cryogenic sloshing via image velocimetry and free-surface detection with physics-constrained RBFs". In: *21st International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics (LXLASER24)*. Lisbon, Portugal, 2024.

- [23] P. A. Marques, F. Monteiro, A. Simonini, L. Carbonnelle, and M. A. Mendez. “Data-driven thermodynamic modeling of microgravity sloshing: outcomes from the 83rd ESA parabolic flight campaign”. In: *28th European Low Gravity Research Association (ELGRA) Symposium*. Liverpool, United Kingdom, 2024.
- [24] F. Monteiro, P. A. Marques, A. Simonini, L. Carbonnelle, and M. A. Mendez. “Experimental characterisation of sloshing-induced thermal mixing under gravity-dominated and microgravity conditions for space applications”. In: *28th European Low Gravity Research Association (ELGRA) Symposium*. Liverpool, United Kingdom, 2024.
- [25] S. Randino, L. Schena, E. Gillyns, N. Coudou, and M. A. Mendez. “Real-time data assimilation for the digital twinning of wind farms”. In: *1st European Fluid Dynamics Conference (EFDC1)*. Aachen, Germany, 2024.
- [26] R. Antonissen and A. Mendez. “Reinforcement Twinning algorithms for dynamic propeller control”. In: *1st European Fluid Dynamics Conference (EFDC1)*. Aachen, Germany, 2024.
- [27] S. Ahizi, P. A. Marques, and M. A. Mendez. “A multi-environment formulation for data assimilation in cryogenic storage tanks”. In: *European Fluid Dynamics Conference (EFDC1)*. Aachen, Germany, 2024.
- [28] S. Ahizi, M. Fiore, L. Koloszar, and M. A. Mendez. “Data-driven, scale-adaptive turbulence-closure modeling”. In: *European Fluid Dynamics Conference (EFDC1)*. Aachen, Germany, 2024.
- [29] P. A. Marques, A. Simonini, M. Delsipée, and M. A. Mendez. “Experimental characterization of heat and mass transfer in cryogenic storage tanks”. In: *9th World Congress on Momentum, Heat and Mass Transfer (MHMT 2024)*. doi: 10.11159/icmfht24.153. London, United Kingdom, 2024.
- [30] P. A. Marques, A. Simonini, M. Delsipée, and M. A. Mendez. “Model-based analysis of heat and mass transfer in cryogenic storage measurements”. In: *3AF International Conference on Space Propulsion*. submitted. Glasgow, United Kingdom, 2024.
- [31] F. Monteiro, P. A. Marques, L. Carbonnelle, A. Simonini, and M. A. Mendez. “Non-isothermal sloshing for space applications: experimental characterization under reduced-gravity conditions”. In: *3AF International Conference on Space Propulsion*. submitted. Glasgow, United Kingdom, 2024.
- [32] S. Ahizi, P. Marques, F. Monteiro, L. Gonzalez, F. Gamboli, H. Scheufler, R. Abarca, and M. Mendez. “Scaling laws of sloshing-induced thermodynamic fluctuations in a horizontal cylindrical tank”. In: *International Ocean and Polar Engineering Conference (ISOPE)*. Rhodes, Greece, 2024.
- [33] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. “A combination of KNN-PTV and physics-constrained RBFs for super-resolution in image velocimetry”. In: *15th International Symposium on Particle Image Velocimetry (ISPIV 2023)*. San Diego, USA, 2023.
- [34] I. Tirelli, M. A. Mendez, A. Ianiro, and S. Discetti. “A combination of KNN-PTV and physics-constrained RBFs for super-resolution in image velocimetry”. In: *20th International Symposium on Flow Visualization (ISFV20)*. Delft, Netherlands, 2023.
- [35] M. Ratz, A. Simonini, and M. A. Mendez. “Physics-constrained and meshless data assimilation of three-dimensional particle tracking velocimetry”. In: *20th International Symposium on Flow Visualization (ISFV20)*. Delft, Netherlands, 2023.
- [36] D. Rigutto, J.-M. Buchlin, and M. A. Mendez. “Experimental analysis of dynamic menisci in dip coating”. In: *20th International Symposium on Flow Visualization (ISFV20)*. Delft, Netherlands, 2023.
- [37] D. Rigutto, J.-M. Buchlin, and M. A. Mendez. “Experimental analysis of dynamic menisci in dip coating”. In: *15th European Coating Symposium (ECS 2023)*. Paris, France, 2023.
- [38] D. Barreiro-Villaverde, A. Gosset, M. Lema, and M. A. Mendez. “High- and low-fidelity models to understand the physics of air-knife coating”. In: *15th European Coating Symposium (ECS 2023)*. Paris, France, 2023.

- [39] D. Barreiro-Villaverde, M. Lema, A. Gosset, and M. A. Mendez. “Implementation of a solver to simulate industrial galvanization”. In: *V XoveTIC Conference (XoveTIC 2022)*. A Coruña, Spain, 2023.
- [40] J. Van den Berghe, M. Delsipée, P. Planquart, Y. Bartosiewicz, and M. A. Mendez. “Calibration of a 1D ejector model from full-scale experiments”. In: *8th Thermal and Fluids Engineering Conference (TFEC)*. 2023.
- [41] J. Van den Berghe, B. R. B. Dias, Y. Bartosiewicz, and M. A. Mendez. “Unsteady 1D gas dynamics in ejectors: a pipeline analogy”. In: *22nd Computational Fluid Dynamics Conference (CFD)*. 2023.
- [42] J. Van den Berghe, J. B. Vemula, Y. Bartosiewicz, and M. A. Mendez. “A machine-learning-based calibration of a 1D ejector model from CFD”. In: *36th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS)*. 2023.
- [43] S. Ahizi, P. Marques, and M. A. Mendez. “Modelling and scaling laws of cryogenic tank thermal response to sloshing”. In: *36th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS)*. 2023.
- [44] D. Fiorini, L. Carbonnelle, A. Simonini, J. Steelant, D. Seveno, and M. A. Mendez. “Characterization of a capillary-driven flow in microgravity by means of optical techniques”. In: *11th International Conference on Multiphase Flow (ICMF 2023)*. 2023.
- [45] D. Fiorini, A. Gosset, J. Steelant, D. Seveno, and M. A. Mendez. “On the capillary rise of low-surface-tension liquids in microgravity: numerical analysis and experiments”. In: *10th European Conference for Aeronautics and Space Sciences (EUCASS)*. 2023.
- [46] C. Esposito, M. A. Mendez, J. Steelant, and M. R. Vetrano. “Analyse modale multi-échelle pour l’identification des mécanismes clés caractérisant un écoulement cavitant”. In: *17ème Congrès Francophone de Techniques Laser (CFTL)*. Leuven, Belgium, 2022.
- [47] M. A. Mendez. “La décomposition modale pour l’analyse de visualisation d’écoulements”. In: *17ème Congrès Francophone de Techniques Laser (CFTL)*. Leuven, Belgium, 2022.
- [48] D. Meneghella, P. Marques, M. A. Mendez, and A. Simonini. “Comparaison d’amortissement libre de liquides soumis à ballottement par la POD”. In: *17ème Congrès Francophone de Techniques Laser (CFTL)*. Leuven, Belgium, 2022.
- [49] M. Ratz, S. Sachs, M. A. Mendez, and C. Cierpka. “Radial basis function regression of Lagrangian three-dimensional particle-tracking data”. In: *20th International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics*. Lisbon, Portugal, 2022.
- [50] P. Sperotto, S. Pieraccini, and M. A. Mendez. “A RANS approach to the meshless computation of pressure fields from image velocimetry”. In: *20th International Symposium on Applications of Laser and Imaging Techniques to Fluid Mechanics*. Lisbon, Portugal, 2022.
- [51] F. Pino, B. Scheid, and M. A. Mendez. “Absolute/convective instability threshold in inverted falling film through linear stability analysis”. In: *20th Conference of Numerical Analysis and Applied Mathematics (ICNAAM)*. Heraklion, Greece, 2022.
- [52] C. Merhaben, B. Dias, M. A. Mendez, and A. Turchi. “Determination of trajectory-based ground-testing conditions for space-debris material by means of a data-driven approach”. In: *FAR 2022 — 2nd International Conference on Flight Vehicles, Aerothermodynamics and Re-entry Missions and Engineering*. Heilbronn, Germany, 2022.
- [53] D. Fiorini, M. A. Mendez, A. Simonini, D. Seveno, and J. Steelant. “Dynamic contact angle analysis using inverse methods”. In: *10th International Conference on Inverse Problems in Engineering*. Malta, 2022.
- [54] M. A. Mendez, J. Dominique, M. Fiore, F. Pino, P. Sperotto, and J. Van den Berghe. “Challenges and Opportunities for Machine Learning in Fluid Mechanics”. In: *19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH)*. 2022.

- [55] L. Schena, E. Gillyns, W. Munters, S. Buckingham, and M. A. Mendez. “Wind Turbine Control using Machine Learning techniques”. In: *ECCOMAS 2022*. 2022.
- [56] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and M. Lema. “High-fidelity simulations of the wiping of low-viscosity liquid films”. In: *14th European Fluid Mechanics Conference (EFMC14)*. 2022.
- [57] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and M. Lema. “Multiscale analysis of 3D VOF-LES simulations of the jet-wiping process”. In: *4th Iberian Meeting of OpenFOAM Users (Foam@Iberia 2022)*. 2022.
- [58] D. Barreiro-Villaverde, A. Gosset, M. Lema, and M. A. Mendez. “Implementation of a solver to simulate industrial galvanization”. In: *5th XoveTIC Conference*. 2022.
- [59] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and M. Lema. “On the jet wiping of high-Kapitza liquid films”. In: *17th OpenFOAM Workshop (OFW17)*. 2022.
- [60] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and M. Lema. “High- and low-fidelity approaches to investigate instabilities in jet wiping”. In: *1st Spanish Fluid Mechanics Conference (SFMC22)*. 2022.
- [61] D. Fiorini, L. Carbonnelle, A. Simonini, J. Steelant, D. Seveno, and M. A. Mendez. “Capillary rise in a divergent U-tube during parabolic flight”. In: *27th European Low Gravity Research Association (ELGRA) Biennial Symposium and General Assembly*. 2022.
- [62] D. Fiorini, M. A. Mendez, A. Simonini, J. Steelant, and D. Seveno. “On the impact of contact-line acceleration in the spreading of perfectly wetting fluids”. In: *14th European Fluid Mechanics Conference (EFMC14)*. 2022.
- [63] D. Fiorini, M. A. Mendez, A. Simonini, J. Steelant, and D. Seveno. “Dynamic wetting experiment with cryogenic nitrogen”. In: *Experimental Fluid Mechanics (EFM)*. 2022.
- [64] F. Monteiro, P. Marques, A. Simonini, A. Silva, and M. A. Mendez. “Non-isothermal sloshing for space applications: from a ground-based experimental characterisation to microgravity conditions”. In: *27th European Low Gravity Research Association (ELGRA) Biennial Symposium and General Assembly*. 2022.
- [65] M. Fiore, L. Koloszar, M. A. Mendez, M. Duponcheel, and Y. Bartosiewicz. “Artificial neural networks for the modeling of turbulent heat flux in forced-convection flows”. In: *19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH)*. 2022.
- [66] M. Fiore, L. Koloszar, M. A. Mendez, M. Duponcheel, and Y. Bartosiewicz. “A physics-oriented data-driven approach to thermal-turbulence modeling”. In: *15th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics*. 2021.
- [67] M. Ratz, D. Fiorini, A. Simonini, C. Cierpka, and M. A. Mendez. “Time-resolved PIV of the flow field underneath an accelerating meniscus”. In: *15th International Symposium on Particle Image Velocimetry (ISPIV 2021)*. 2021.
- [68] F. Felis-Carrasco, D. Hess, B. B. Watz, and M. A. Mendez. “Investigation on computed pressures from PIV: how boundary definitions affect pressure accuracy”. In: *15th International Symposium on Particle Image Velocimetry (ISPIV 2021)*. 2021.
- [69] T. Ivanova, F. Pino, and M. A. Mendez. “On the downstream evolution of three-dimensional waves in liquid films over moving substrate”. In: *European Coating Symposium (ECS 2021)*. Sint-Genesius-Rode, Belgium, 2021.
- [70] D. Barreiro, A. Gosset, and M. A. Mendez. “On the undulation and the two-way coupled instability of the jet-wiping process”. In: *European Coating Symposium (ECS 2021)*. Sint-Genesius-Rode, Belgium, 2021.
- [71] D. Fiorini, M. A. Mendez, A. Simonini, and D. Seveno. “Transient dynamics of contact angles”. In: *European Coating Symposium (ECS 2021)*. Sint-Genesius-Rode, Belgium, 2021.

- [72] F. Pino, B. Scheid, and M. A. Mendez. “Modelling of magnetic wiping via integral models”. In: *European Coating Symposium (ECS 2021)*. Sint-Genesius-Rode, Belgium, 2021.
- [73] M. Ratz, D. Fiorini, A. Simonini, C. Cierpka, and M. A. Mendez. “Dynamics of a quasi-capillary channel flow in accelerating conditions”. In: *European Coating Symposium (ECS 2021)*. Sint-Genesius-Rode, Belgium, 2021.
- [74] E. Anfuso, S. Demange, A. Fagnani, F. T. Herrador, M. A. Mendez, and O. Chazot. “Multiscale modal analysis of a plasma jet: coherent structures and their observability”. In: *AIAA Aviation Forum*. 2021.
- [75] D. Fiorini, M. A. Mendez, A. Simonini, D. Seveno, and J. Steelant. “Dynamic contact angle analysis using inverse methods”. In: *10th International Conference on Inverse Problems in Engineering*. Chieti, Italy, 2021.
- [76] D. Barreiro-Villaverde, A. Gosset, M. A. Mendez, and J.-M. Buchlin. “Validation of high-fidelity CFD simulations of the jet-wiping process”. In: *European Coating Symposium (ECS 2019)*. Heidelberg, Germany, 2019.
- [77] M. A. Mendez, A. Gosset, B. Scheid, and J.-M. Buchlin. “Integral boundary-layer simulations of the jet-wiping process”. In: *European Coating Symposium (ECS 2019)*. Heidelberg, Germany, 2019.
- [78] M. A. Mendez and J.-M. Buchlin. “Multiscale proper orthogonal decomposition (mPOD) of TR-PIV data: a case study on transient flows”. In: *13th International Symposium on Particle Image Velocimetry*. Munich, Germany, 2018.
- [79] M. A. Mendez and J.-M. Buchlin. “Analyse du procédé d’essorage au moyen de la vélocimétrie par image de particules et la technique d’absorption de lumière”. In: *16è Congrès Francophone de Techniques Laser (CFTL)*. Dourdan, France, 2018.
- [80] M. A. Mendez, A. Enache, A. Gosset, and J.-M. Buchlin. “Experimental characterization of the jet-wiping process”. In: *Experimental Fluid Mechanics (EFM)*. Mikulov, Czech Republic, 2017.
- [81] M. A. Mendez, M. T. Scelzo, A. Enache, and J.-M. Buchlin. “Fluidic vectoring of a planar incompressible jet flow”. In: *Experimental Fluid Mechanics (EFM)*. Mikulov, Czech Republic, 2017.
- [82] A. Gosset, M. A. Mendez, and J.-M. Buchlin. “Experimental characterization of the jet-wiping instability”. In: *European Coating Symposium (ECS 2017)*. Fribourg, Switzerland, 2017.
- [83] M. A. Mendez, A. Gosset, K. Myrillas, and J.-M. Buchlin. “Numerical modal analysis of the jet-wiping instability”. In: *European Coating Symposium (ECS 2017)*. Fribourg, Switzerland, 2017.
- [84] M. A. Mendez, M. Balabane, and J.-M. Buchlin. “Multiscale modal analysis of experimental and numerical data (keynote, invited)”. In: *Experiments in Fluid Mechanics*. Warsaw, Poland, 2017.
- [85] M. A. Mendez, M. Balabane, and J.-M. Buchlin. “Multi-scale proper orthogonal decomposition (mPOD)”. In: *International Conference of Numerical Analysis and Applied Mathematics (ICNAAM)*. Thessaloniki, Greece, 2017.
- [86] M. A. Mendez, B. Scheid, and J.-M. Buchlin. “Low-Kapitza falling liquid films”. In: *13th International Conference on Gas–Liquid and Gas–Liquid–Solid Reactor Engineering (GLS)*. Brussels, Belgium, 2017.
- [87] M. A. Mendez, M. Raiola, A. Masullo, S. Discetti, A. Ianiro, R. Theunissen, and J.-M. Buchlin. “Prétraitement d’images PIV par décomposition aux valeurs propres”. In: *15è Congrès Francophone de Techniques Laser (CFTL)*. Toulouse, France, 2016.
- [88] M. A. Mendez and J.-M. Buchlin. “Oscillation of a planar gas jet impinging on a deformable wall”. In: *Symposium of VKI PhD Research*. Brussels, Belgium, 2016.
- [89] M. A. Mendez and J.-M. Buchlin. “Experimental characterization of 2D travelling waves in low-Kapitza liquid film down a vertical wall”. In: *24th International Congress of Theoretical and Applied Mechanics (ICTAM 2016)*. Montreal, Canada, 2016.

- [90] M. A. Mendez, L. Nemeth, and J.-M. Buchlin. “Measurement of liquid-film thickness via light absorption and laser tomography”. In: *Experimental Fluid Mechanics (EFM 2015)*. Prague, Czech Republic, 2015.
- [91] M. A. Mendez, K. Myrillas, A. Gosset, and J.-M. Buchlin. “A research methodology to study jet-wiping processes”. In: *European Coating Symposium (ECS 2015)*. Eindhoven, Netherlands, 2015.
- [92] M. A. Mendez and J.-M. Buchlin. “Quantitative flow visualization of confinement-driven instabilities of an impinging slot jet”. In: *11th International Symposium on Particle Image Velocimetry (PIV 2015)*. Santa Barbara, USA, 2015.
- [93] M. A. Mendez and J.-M. Buchlin. “Experimental characterization of straw jets via image-processing techniques”. In: *10th Pacific Symposium on Flow Visualization and Image Processing (PSFVIP 2015)*. Naples, Italy, 2015.
- [94] M. A. Mendez and J.-M. Buchlin. “Dynamics of gas-jet impingement on vertical falling liquid films”. In: *Symposium of VKI PhD Research*. Brussels, Belgium, 2015.