Francesco Romanò

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GitHub	github.com/fromano88
Nationality	Italian
Year of birth	1988
Languages	English (C1), French (C1)
	German (B1/B2), Italian (mother tongue)
Research profile	Google Scholar, ORCID

1 Research Activity

1.1 Career

Period	September 2019 – present
Position	*Associate Professor*, Fluid Mechanics and Energetics
Affiliation	Arts et Métiers, Lille Fluid Mechanics Laboratory, Lille (France)

Period	April 2018 – August 2019
Position	*Post-Doctoral Fellow,* Biomedical Engineering
Affiliation	University of Michigan, Department of Biomedical Engineering, Ann Arbor, MI (USA)

Period	October 2016 – March 2018
Position	*Post-Doctoral Fellow,* Mechanical Engineering
Affiliation	Technische Universität Wien, Institute of Fluid Mechanics and Heat Transfer, Vienna (Austria)

Period	October 2012 – September 2016
Position	*PhD,* Mechanical Engineering
Affiliation	Technische Universität Wien, Institute of Fluid Mechanics and Heat Transfer, Vienna (Austria)

1.2 Education

Degree	Habilitation in Science for Engineers
Defended on	July 4th, 2024
Thesis Title	*Stability, mixing and asymptotic modeling in flows with well-separated length scales*
Affiliation	Arts et Métiers, Department of Fluid Mechanics and Energetics, Lille (France)

Degree	*PhD,* Mechanical Engineering, full marks and distinction
Period	October 2012 – September 2016
Defended on	September 27th, 2016
Thesis Title	*Particle accumulation structures in boundary-driven flows*
Supervisor	Prof. Hendrik C. Kuhlmann
Affiliation	Technische Universität Wien, Institute of Fluid Mechanics and Heat Transfer, Vienna (Austria)

Degree	*MSc,* Aerospace Engineering, full marks and highest honors
Period	October 2010 – July 2012
Defended on	July 10th, 2012
Thesis Title	*Analysis of some streaks generation method in a Blasius boundary layer*
Affiliation	University of Pisa, Department of Aerospace Engineering, Pisa (Italy)

Degree	*BSc,* Aerospace Engineering, full marks
Period	September 2007 – October 2010
Defended on	October 12th, 2010
Thesis Title	*Transient of Poiseuille flow simulation using FreeFEM++*
Affiliation	University of Pisa, Department of Aerospace Engineering, Pisa (Italy)

1.3 Scientific Production

A comprehensive list of publications is included in the detailed Curriculum Vitæ that follows.

	Book Chapters	Papers	Proceedings	Conferences	Invited Lectures
total	1	61 (+14)	17	65	40
as sole author/speaker	–	6	–	2	40
with Ph.D. supervisor	1	25	9	29	–
with supervised Ph.D. students	–	9 (+10)	4	12	–
since joining Arts et Métiers	–	47 (+14)	10	35	32

1.4 Awards

- Medal for graduation with honors, University of Pisa, 2012
- Honorary Franklin Membership, Membership ID #YG60806, 2018
- Qualification as Maître de Conférences #19260330790, 2019
- Featured Paper on *Chaos* **30**, 2020
- Honorary Rosalind Member of London Journals Press, Membership ID #WQ06394, 2020
- Cover Page, *Int. J. Turbomach. Propuls. Power*, **6**(4), 2022
- Guest Professorship, Jiangsu University, October 2023 – present

1.5 Grants as (co-)PI

A comprehensive list of grants is included in the detailed Curriculum Vitæ that follows.

	Granting organization	Role	Grant amount	Grant duration
fellowships	TU Wien	Scholar	PostDoc salary	1.5 years
	Univ. Mich.	Scholar	PostDoc salary	1.5 years
clusters	TU Wien	Scholar	$\approx$ 3M CPUh on VSC2 & VSC3	3 years
	Univ. Mich.	Scholar	$\approx$ 2M CPUh on Flux	2 years
	GENCI	Co-PI	$\approx$ 19M CPUh on IDRIS clusters	6 years
project grants	FFG	Co-PI	$\approx$ 160k€ (1 PhD)	3 years
	CSC-ParisTech	Co-PI	$\approx 5 \times$ 140k€ (5 PhDs)	5×4 years
	ENSAM	Co-PI	$\approx 2 \times$ 120k€ (1 PhD)	3 years
	ANR-JCJC	PI	$\approx$ 230k€ (1 PhD + 1 PostDoc)	4 years
	SuperGrid	Co-PI	$\approx$ 200k€ (1 PostDoc)	1 year
	CIFRE-Safran	Co-PI	$\approx$ 200k€ (1 PhD)	3 years
	CHU Lille	Co-PI	$\approx$ 200k€ (1 PhD)	6 years
	BPI France	Co-PI	$\approx$ 1.3M€ (1 PhD + Engineers)	3 years
	ANR Réclassif	Co-PI	$\approx$ 130k€ (1 PhD)	3 years

2 Teaching and Supervision Activity

2.1 Teaching Experience

A comprehensive list of the courses taught is included in the detailed Curriculum Vitæ that follows.

	Third year Bachelor	First year Master	Second year Master	Projects
total courses	7	3	2	
since joining Arts et Métiers	7	2	2	
total hours	943	546	170	75
since joining Arts et Métiers	943	400	170	75

2.2 Mentoring and Supervision Activity

A comprehensive list of supervisions and mentoring is reported in the detailed Curriculum Vitæ that follows.

	Internships	Exchange programs	Bachelor's theses	Master's theses	PhD theses
Total	22	2	2	21	13
at national scale	20	–	1	17	12
at international scale	2	2	1	4	1

Research Profile

Research Career Summary

Since September 2019, I have been an Associate Professor at the Fluid Mechanics and Energetics Department at Arts et Métiers, Lille (France), where my research focuses on theoretical and numerical studies in fluid mechanics. I earned my Bachelor's and Master's degrees in Aerospace Engineering from the University of Pisa (Italy) and completed a PhD in Mechanical Engineering at TU Wien (Austria). My doctoral work addressed hydrodynamic instabilities, the Lagrangian topology of three-dimensional flows, and the formation of particle coherent structures. Following a 1.5-year PostDoctoral position in the same group, I joined the University of Michigan, Ann Arbor (USA), for another 1.5-year PostDoc, where I worked on interfacial instabilities, viscoelastic and elastoviscoplastic thin films, and capillary-driven phenomena relevant to pulmonary flows.

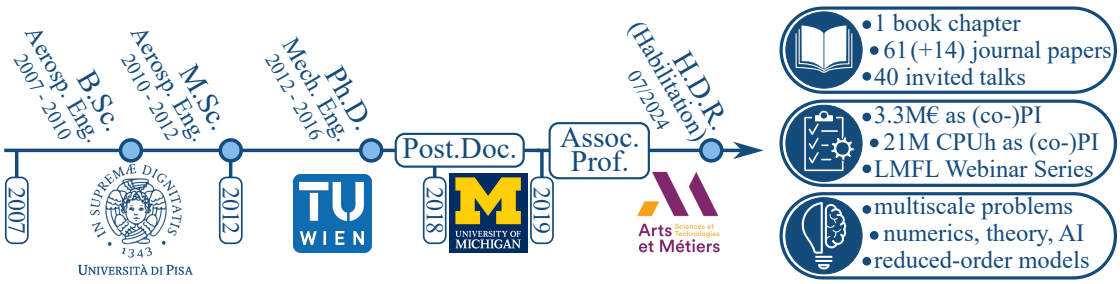
Research Outcome and Leadership

I serve as Reviewer Editor for Frontiers in Space Technologies, Microgravity and as an Editorial Board Member and Section Editor for Discover Fluid Mechanics (Springer). Since December 2020, I have also been organizing the LMFL Fluid Mechanics Webinar, an internationally recognized seminar series active roughly 40 weeks per year and featuring speakers from leading institutions worldwide.

My scientific production includes 1 book chapter, 61 journal papers, and over 15 conference proceedings. I have delivered 40 invited talks in Europe, Asia, and North America, received several awards and contributed to research grants exceeding 6M€ in total volume, including more than 3M€ acquired as PI or co-PI, complemented by more than 20M CPU hours awarded through the GENCI program for large-scale numerical simulations. Beyond academic collaborations, I maintain active partnerships with industrial actors such as Safran, PopcornFX, and the SuperGrid Institute. These collaborations support ongoing funded research personnel, including two co-supervised PhD students. Another co-supervised PhD student is directly involved in designing and testing turbomachines for cardiac applications, in collaboration with the hospital in Lille (CHU-Lille). Additional international links are fostered through travel-funded collaborations with IIT Guwahati, Koç University, the Finnish Meteorological Institute, and the University of Michigan, partially supported by the NIH fellowship funding my PostDoctoral work.

Research Interests

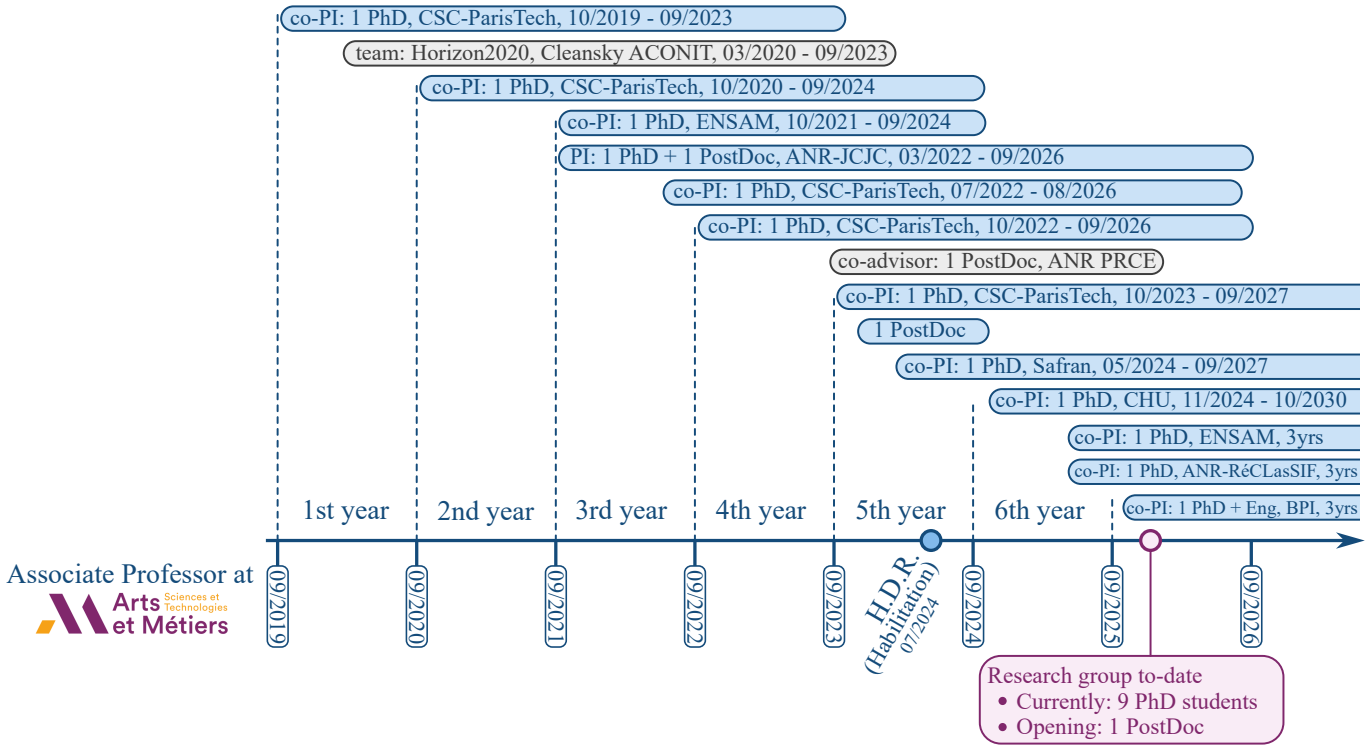
My research vision combines theory, high-fidelity numerical simulations, and artificial intelligence, while integrating experimental collaborations whenever possible. This multidisciplinary approach allows me to address problems spanning several scales and physical regimes. On the theoretical side, I work on the stability and bifurcation analysis of fluid flows, asymptotic modeling in regimes with well-separated length scales, and nonlinear dynamical systems. Numerically, I develop and apply high-resolution Navier–Stokes solvers, interface-capturing methods for multiphase flows, and reduced-order models tailored to complex geometries. These tools support a broad range of applications: chaotic mixing in microfluidics, clustering of particulate pollutant, non-Newtonian biological flows, pulmonary dynamics, turbomachinery instabilities, and multiphase transport in porous media. Ultimately, my aim is to build predictive, physics-grounded tools that support digital twins and model-driven engineering, as elaborated in my habilitation manuscript.



Funding Record

I began developing my project-writing skills during my PhD by co-authoring, with H. C. Kuhlmann, a proposal funded by the ESA. This enabled me to secure funding to remain for 1.5 years at TU Wien as a postdoctoral researcher. Subsequently, I was awarded a fellowship to join J. B. Grotberg's team at the University of Michigan for another 1.5-year period. During my PhD and postdoctoral work, I also contributed to three projects funded by the Austrian agencies FFG (×2) and FWF (×1).

During my first year at Arts et Métiers, funding was secured for a first PhD student to study hydrodynamic instabilities in centrifugal pumps. The following year, a second PhD student joined my group to work on cavitation bubbles near a wall, and I became involved in the Horizon 2020 CleanSky ACONIT project on flow control in axial compressors. In the third year, ANR funding supported a three-year PhD and a postdoctoral position on multiscale flows through weakly porous grids, and two additional PhD projects were launched on pulmonary flows and machine learning for active control of axial compressors. In the fourth year, I secured a second PhD grant on laser-induced cavitation bubbles near walls. In the fifth year, two new PhD projects were funded on elastic turbulence and axial compressor dynamics, along with two postdoctoral positions (ANR chaotic mixing; SuperGrid and General Electric contracts on two-phase flows in pump-turbines). Finally, in the sixth year, I secured four PhD grants: (i) a six-year PhD on centrifugal pumps for cardiac applications (CHU Lille), (ii) a PhD on instabilities in turbomachinery (ENSAM), (iii) an experimental/numerical PhD on pollutant filtration in water (ANR RéCLasSIF), and (iv) a PhD on reduced-order modeling of thin films and smoke transport.



Mentoring Experience

My supervisory experience includes 22 internships, 2 international exchanges, 2 undergraduate (Bachelor's-level) internships, 21 Master's internships, and 12 PhD theses. Overall, I have mentored students from more than 15 countries across four continents, reflecting the international, open, and collaborative nature of my research group. This diversity is further strengthened by numerous interactions with international teams, providing students with direct exposure to a wide range of scientific approaches.

Inclusivity is also a key component of my supervision: approximately 20% of the students I have supervised are women, which is more than double their proportion in the cohorts I teach (8–10%). Their active participation in ambitious projects demonstrates my concrete commitment to promoting women in science and advancing gender equality in STEM fields.

From a scientific perspective, I strive to create a strongly multidisciplinary environment, where topics such as heat transfer, chaos theory, control and stability, deep learning, and two-phase flows intersect and mutually reinforce one another. This approach supports robust scientific development, enabling students to advance their research projects while gaining a broader conceptual perspective that fosters creativity and innovation.

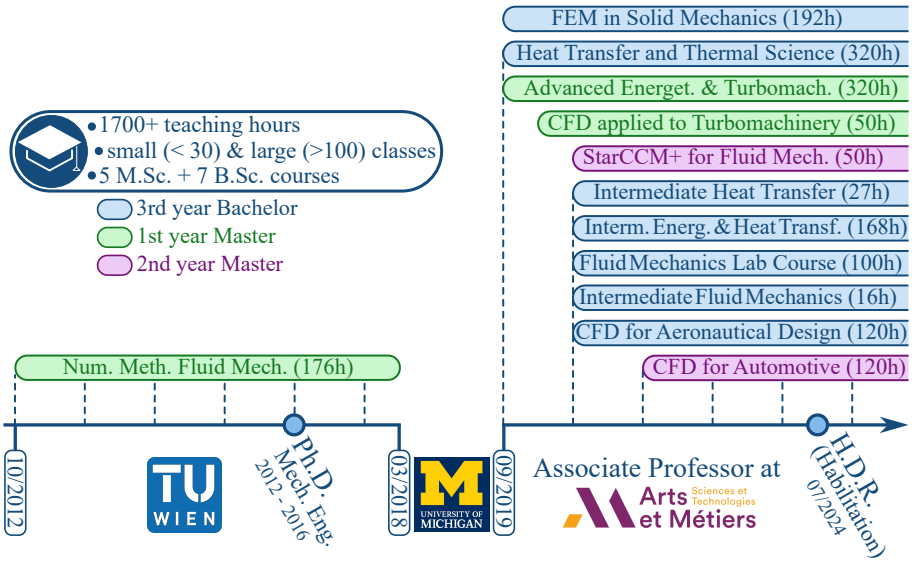
Teaching Profile

Teaching Experience

Since 2012, I have been actively involved in designing and teaching courses in fluid mechanics and numerical methods. I began my academic career at the Department of Fluid Mechanics and Heat Transfer, TU Wien (Austria), where I developed and taught the course "Numerical Methods for Fluid Dynamics" for six years (totaling 176 hours). This course introduced numerical techniques for solving fluid dynamics and heat transfer problems, emphasizing the theoretical foundations and practical implications of methods such as finite difference, finite volume, finite element, and spectral methods. Applications included solving parabolic, elliptic, and hyperbolic PDEs, addressing phenomena such as heat diffusion, wave propagation, boundary layers, and both laminar and turbulent flows. Hands-on implementation and project-based learning was central, with numerical solvers built using Matlab, FreeFEM++, and OpenFOAM. Topics also covered advanced areas such as linear stability analysis, structural sensitivity, compressible flows (supersonic and transonic), and immiscible multiphase flows. All course materials are available on my website.

Later, during my PostDoc at the Biomedical Engineering Department, University of Michigan (USA), I contributed Matlab solvers for biological flow models to the "Fluid Dynamics in Biological Flows" course. These solvers were included in the textbook "Biofluid Mechanics" by James B. Grotberg. Since September 2019, I have been an Associate Professor at the Fluid Mechanics and Energetics Department at Arts et Métiers, Lille (France), where I have taught fundamental and advanced courses for a total of 1500+ hours. Throughout my teaching career, my goal has been to integrate theoretical knowledge with practical application, training students to critically analyze problems and address real-world engineering challenges effectively. My teaching emphasizes a balance of theoretical rigor and hands-on practical skills, structured into three main categories:

- **Fundamental and advanced classes:** These focus on core concepts, fostering deep understanding through interconnected theoretical and physical principles. Examples include "Intermediate Energetics and Heat Transfer," "Intermediate Fluid Mechanics," "CFD Applied to Fluid Mechanics," and "Finite Element Methods in Solid Mechanics."
- **Hands-on technically guided classes:** In these sessions, I guide students step-by-step through complex simulations, helping them build problem-solving skills while addressing technical challenges. This includes "CFD Applied to Turbomachinery" and "Advanced Energetics and Turbomachinery."
- **Project-based classes:** Students are introduced to essential theoretical foundations and then apply them collaboratively to solve real-world problems. Examples include "CFD Applied to Automobile Engines" and "Design of Aeronautical Structures: CFD of an Airplane Wing."



Class-Tailored Teaching

Through a variety of teaching experiences, I have learned to adapt both my technical language and lecture structure to suit the audience's level. For Bachelor's courses, I rely on grounded examples and fundamental language to make concepts accessible. In advanced courses, I enhance the theoretical and technical complexity, and expect students to express themselves using technical language, as mastering complex concepts is a key part of learning advanced topics. I believe that this aligns with a well-rounded education capable of fostering theoretical, technical, and cultural growth.

Throughout my career, I have taught classes ranging from 10 to 150 students, which taught me the importance of tailoring lectures not only to the academic level, but also to class size. With smaller classes (< 30 students), I adopt an interactive approach by providing pre-solved tasks, such as pre-coded numerical solvers or pre-computed simulations. This reduces the pressure on students to deliver solutions and allows for an "inverse-class" approach, where I ask them to explain or critique the decisions made in the pre-solved examples. These discussions are not graded, but give me opportunity to address students' questions, correct their misconceptions, and dive deeper into pertinent physical and technical insights. When the goal of the class is skill acquisition, I tend to present a problem similar to the one we tackled during a previous class, encouraging the students to make significant modifications to the codes and solvers provided in the previous classes. In my experience, this approach fosters students' confidence, confronts them with a manageable challenge, and provides a well-defined starting point to avoid confusion.

In larger classes (> 30 students), this interactive approach can become too unwieldy. Instead, I focus on engaging students through multimedia content and real-world examples related to the lecture topic. I source content from reputable, peer-reviewed journals and conferences such as the Gallery of Fluid Motion (APS-DFD), which offers outstanding examples of scientific advances explained in minutes through high-quality, graphically compelling representations.

National and International Workshops

I believe that extending the university's regular curriculum with advanced courses tailored for PhD students, postdoctoral researchers, and senior scholars could further foster academic excellence and international recognition, enhancing the university's visibility. These initiatives further play a crucial role in mentoring students at a higher level. Providing structured mentorship opportunities through specialized courses allows PhD students and postdoctoral researchers to refine their problem-solving skills, engage in high-level discussions, and receive guidance from leading international experts. This exposure not only accelerates their research progress but also helps them develop the collaboration skills necessary for academic and industry careers.

To put this vision into practice, I have actively organized and contributed to international workshops and courses that promote advanced learning, cross-disciplinary dialogue, and sustained collaboration. These efforts include two one-day workshops on complex fluids held in France (Nantes in 2023 and Lille in 2024), designed to bring together researchers from fluid mechanics, rheology, and applied mathematics to discuss recent advances and emerging challenges.

In addition, I co-organize a one-week advanced course at CISM in Udine, Italy (scheduled for summer 2026), aimed at providing young researchers and doctoral students with a high-level training platform on the mechanics of deep lungs, combining theory, numerical modeling, and biomedical applications. Moreover, I am co-organizing a 1.5-month TSVP Thematic Program at OIST in Japan (2026/2027), which will gather international experts working on multiphase flows in multiscale porous media. This extended program is conceived to foster long-term scientific interactions, encourage joint research initiatives, and serve as a catalyst for new collaborations across institutions and fields. Together, these initiatives provide environments where graduate scholars from diverse backgrounds and career stages can exchange ideas, develop shared expertise, and collectively advance high-level education and research in fluid mechanics and complex flows.

Detailed
Currilum Vitæ

List of Publications and Scientific Contributions

	Book Chapters	Papers	Proceedings	Conferences	Invited Lectures
total	1	61 (+14)	17	65	40
as sole author/speaker	–	6	–	2	40
with Ph.D. supervisor	1	25	9	29	–
with supervised Ph.D. students	–	9 (+10)	4	12	–
since joining Arts et Métiers	–	47 (+14)	10	35	32

Google Scholar: `https://scholar.google.com/citations?user=-iZeEIQAAAAJ&hl=it`
ORCID: `https://orcid.org/0000-0002-9511-4718`

Selected publications

As indicated in the application form, the five selected publications are: B1, J8, J46, J47, and J61 (colored in blue, see below). I believe that they are a representative picture of my research:

B1 H. C. Kuhlmann, F. Romanò, *The lid-driven cavity* , Computational Modelling of Bifurcations and Instabilities in Fluid Dynamics, Springer, **50** (2019) 233–310.

A well-known paradigmatic flow used in fluid mechanics to study confined complex dynamics is discussed. Our review book chapter deals with the evolution of the lid-driven cavity flow as the Reynolds number increases, covering two-dimensional flows, periodic flows in one direction, and fully three-dimensional flows. The main focus is on the singularities, the instabilities and the flow topology observed in such a system.

J8 F. Romanò, H. C. Kuhlmann, *Finite-size Lagrangian coherent structures in thermocapillary liquid bridges*, Phys. Rev. Fluids, **3** (2018) 094302.

In this research paper, we deal with Finite-Size Coherent Structures (FSCS) in a supercritical thermocapillary liquid bridge. The Lagrangian flow topology is discussed in details and correlated to the accumulation of particles corresponding to the FSCS. We explain the particle accumulation as a transfer of particles from chaotic to regular regions of the flow. This is numerically demonstrated by using an heuristic particle–boundary interaction model coupled to the Maxey–Riley equation. Comparison with corresponding experiments is satisfactorily demonstrated.

J46 J. B. Grotberg, F. Romanò, *Computational pulmonary edema: A microvascular model of alveolar capillary and interstitial flow*, APL Bioeng., **7** (2023), 036101.

An original asymptotic model is derived in this paper to predict the occurrence of pulmonary edema in the septal tract between an alveolus and a capillary. The application of such a model to various edema conditions is tested, proving its potential in predicting pathological conditions and treatment efficacy. Moreover, a further simplification of the model is derived for making it readily applicable in clinical praxis.

J47 M. Fan, A. Dazin, G. Bois, F. Romanò, *Instabilities in a turbulent swirling source flow between parallel rings*, Phys. Fluids, **365** (2023), 101701.

In this letter, we identify the primary and secondary flow instabilities in a vaneless radial diffuser of a centrifugal pump near design conditions. The presence of a small radial gap between the pump impeller and the radial diffuser inlet is responsible of creating a leakage flow that strongly affects the occurrence of instabilities in the diffuser. This was the first time such instabilities have been clearly identified and correlated to a critical radial gap.

J61 F. Romanò, *Human lungs fluid mechanics: An overview of current modeling techniques*, Eur. Phys. J., **in press** (2026).
Fluid mechanics plays a central role in respiratory physiology, governing airflow, particle transport, airway stability, and related processes. This paper reviews the wide range of models developed to describe these phenomena across multiple scales, highlighting the multiscale and multiphysics nature of the lung. It also discusses key challenges, model coupling strategies, and future needs such as benchmark cases and clinically relevant validation metrics.

Book chapters

B1. H. C. Kuhlmann, F. Romanò, *The lid-driven cavity* , Computational Modelling of Bifurcations and Instabilities in Fluid Dynamics, Springer, **50** (2019) 233–310.

Scientific papers

J1. F. Romanò, H. C. Kuhlmann, *Numerical investigation of the interaction of a finite-size particle with a tangentially moving boundary*, Int. J. Heat Fluid Fl., **62** (A) (2016) 75–82.

J2. F. Romanò, H. C. Kuhlmann, *Smoothed-profile method for momentum and heat transfer in particulate flows*, Int. J. Numer. Meth. Fluids, **83** (6) (2017) 485–512.

J3. F. Romanò, H. C. Kuhlmann, *Particle–boundary interaction in a shear-driven cavity flow*, Theor. Comp. Fluid Dyn., **31** (4) (2017) 427–445.

J4. F. Romanò, A. Hajisharifi, H. C. Kuhlmann, *Cellular flow in a partially filled rotating drum: regular and chaotic advection*, J. Fluid Mech., **825** (2017) 631–650.

J5. F. Romanò, S. Albensoeder, H. C. Kuhlmann, *Topology of three-dimensional steady cellular flow in a two-sided anti-parallel lid-driven cavity*, J. Fluid Mech., **826** (2017) 302–334.

J6. F. Romanò, H. C. Kuhlmann, M. Ishimura, I. Ueno *Limit cycles for the motion of finite-size particles in axisymmetric thermocapillary flows in liquid bridges*, Phys. Fluids, **29** (2017) 093303.

J7. C. Kuehn, F. Romanò, H. C. Kuhlmann, *Tracking particles in flows near invariant manifolds via balance functions*, Nonlinear Dyn., **92** (2018) 983–1000.

J8. F. Romanò, H. C. Kuhlmann, *Finite-size Lagrangian coherent structures in thermocapillary liquid bridges*, Phys. Rev. Fluids, **3** (2018) 094302.

J9. F. Romanò, *Oscillatory switching centrifugation: dynamics of a particle in a pulsating vortex*, J. Fluid Mech., **857** (2018) R3.

J10. F. Romanò, H. Wu, H. C. Kuhlmann, *A generic mechanism for finite-size coherent particle structures*, Int. J. Multiphase Flow, **111** (2019) 42–52.

J11. F. Romanò, H. C. Kuhlmann, *Heat transfer across the free surface of a thermocapillary liquid bridge*, Tech. Mech., **39** (2019) 72–84.

J12. F. Romanò, Parvathy K. K., H. C. Kuhlmann, *Finite-size Lagrangian coherent structures in a two-sided lid-driven cavity*, Phys. Rev. Fluids, **4** (2019) 024302.

J13. F. Romanò, H. C. Kuhlmann, *Finite-size coherent structures in thermocapillary liquid bridges: A review*, Int. J. Microgravity Sci. Appl., **36** (2019) 360201.

J14. M. Muradoglu, F. Romanò, H. Fujioka, J. B. Grotberg, *Effects of surfactant on propagation and rupture of a liquid plug in a tube.*, J. Fluid Mech., **872** (2019) 407–437.

J15. F. Romanò, H. Fujioka, M. Muradoglu, J. B. Grotberg, *Liquid plug formation in an airway closure model*, Phys. Rev. Fluids, **4** (2019) 093103.

J16. F. Romanò, *Reconstructing the unperturbed fluid flow by tracking of large particles*, Phys. Rev. Fluids, **4** (2019) 104301.

J17. Y. Hu, F. Romanò, J. B. Grotberg, *Effects of Surface Tension and Yield Stress on Mucus Plug Rupture: A Numerical Study*, J. Biomech. Eng., **142** (2020) 061007.

J18. F. Romanò, P.-E. des Boscs, H. C. Kuhlmann, *Forces and torques on a sphere moving near a dihedral corner in creeping flow*, Eur. J. Mech. - B/Fluids, **84** (2020) 110–121.

J19. F. Romanò, T. Türkbay, H. C. Kuhlmann, *Lagrangian chaos in lid-driven cavities*, Chaos, **30** (2020) 073121. **Featured Paper**

J20. F. Romanò, V. Suresh, P. A. Galie, J. B. Grotberg, *Peristaltic flow in the glymphatic system*, Nature – Sci. Rep., **10** (2020), 21065.

J21. I. Barmak, F. Romanò, P. Kunchi Kannan, H. C. Kuhlmann, *Coherent particle structures in high-Prandtl-number liquid bridges*, Micrograv. Sci. Tech., **33** (2021), 1-10.

J22. F. Romanò, M. Muradoglu, H. Fujioka, J. B. Grotberg, *The effect of viscoelasticity in an airway closure model*, J. Fluid. Mech., **913** (2021), A31.

J23. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of a finite-size particle in a two-sided lid-driven cavity*, J. Fluid. Mech., **906** (2021), A4.

J24. F. Romanò, *Stability of generalized Kolmogorov flow in a channel*, Phys. Fluids, **33** (2021), 024106.

J25. F. Romanò, *Particle Coherent Structures in Confined Oscillatory Switching Centrifugation*, Crystals, **11** (2021), 183.

J26. F. Romanò, P.-E. des Boscs, H. C. Kuhlmann, *Stokesian motion of a spherical particle near a right corner made by tangentially moving walls*, J. Fluid Mech., **927** (2021), A41.

J27. I. Barmak, F. Romanò, H. C. Kuhlmann, *Finite-size coherent particle structures in high-Prandtl-number liquid bridges*, Phys. Rev. Fluids, **6** (2021), 084301.

J28. F. Romanò, A. Charles, F. Dottori, A. S. Bahrani, *Transition to turbulence in a heated non-Newtonian pipe flow*, Phys. Fluids, **33** (2021), 091702.

J29. A. Baretter, B. Godard, P. Joseph, O. Roussette, F. Romanò, R. Barrier, A. Dazin, *Experimental and numerical analysis of a compressor stage under flow distortion*, Int. J. Turbomach. Propuls. Power, **6** (2021), 43. **Cover Page**

J30. E. P. Beretta, F. Romanò, G. A. Sancini, J. B. Grotberg, G. F. Nieman, G. A. Miserocchi, *Pulmonary interstitial matrix and lung fluid balance from normal to the acutely injured lung*, Front. Physiol., **12** (2021), 781874.

J31. O. Erken, F. Romanò, J. B. Grotberg, M. Muradoglu, *Capillary instability of a two-layer annular film: An airway closure model*, J. Fluid Mech., **934** (2022), A7.

J32. S. A. Bahrani, S. Hamidouche, M. Moazzen, K. Seck, C. Duc, M. Muradoglu, J. B. Grotberg, F. Romanò, *Propagation and rupture of elastoviscoplastic liquid plugs in airway reopening model*, J. Non-Newt. Fluid Mech., **300** (2022), 104718.

J33. F. Romanò, *Reconstructing the neutrally-buoyant particle flow near a singular corner*, Acta Mech. Sinica, **38** (2022), 1-8.

J34. H. Fujioka, F. Romanò, M. Muradoglu, J. B. Grotberg, *Splitting of a three-dimensional liquid plug at an airway bifurcation*, Phys. Fluids, **34** (2022), 081907.

J35. F. Romanò, M. Muradoglu, H. Fujioka, J. B. Grotberg, *The effect of surfactant in an airway closure model*, Phys. Rev. Fluids, **7** (2022), 093103.

J36. A. Charles, F. Romanò, T. Ribeiro, S. Azimi, V. Rocher, J.-C. Baudez, S. A. Bahrani, *Laminar-turbulent intermittency in pipe flow for an Herschel-Bulkley fluid: Radial receptivity to finite-amplitude perturbations*, Phys. Fluids, **34** (2022), 111703.

J37. M. Stojanović, F. Romanò, H. C. Kuhlmann, *Stability of thermocapillary flow in liquid bridges fully coupled to the gas phase*, J. Fluid Mech., **949** (2022), A5.

J38. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of a finite-size particle in a cubic lid-driven cavity*, J. Fluid Mech., **955** (2023), A16.

J39. O. Erken, B. Fazla, D. Izbassarov, F. Romanò, J. B. Grotberg, M. Muradoglu, *Effects of elastoviscoplastic properties of mucus on airway closure in healthy and pathological conditions*, Phys. Rev. Fluids, **8** (2023), 053102.

J40. M. Fan, A. Dazin, G. Bois, F. Romanò, *Effect of inlet leakage flow on the instability in a radial vaneless diffuser*, Phys. Fluids, **35** (2023), 014105.

J41. M. Fan, A. Dazin, G. Bois, F. Romanò, *Instabilities identification based on a new centrifugal 3D impeller outflow model*, Aerosp. Sci. Technol., **140** (2023), 108466.

J42. M. A. Elhawary, F. Romanò, J.-C. Loiseau, A. Dazin, *Machine learning for optimal flow control in an axial compressor*, The Europ. Phys. J. E, **46** (2023), 28.

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J44. Y. Hu, F. Romanò, J. B. Grotberg, *Entropic lattice Boltzmann model for surface tension effects on liquid plug rupture in two-and three-dimensional channels*, Phys. Rev. Fluids, **8** (2023), 073603.

J45. M. Stojanović, F. Romanò, H. C. Kuhlmann, *MaranStable: A linear stability solver for multiphase flows in canonical geometries*, SoftwareX, **23** (2023), 101405.

J46. J. B. Grotberg, F. Romanò, *Computational pulmonary edema: A microvascular model of alveolar capillary and interstitial flow*, APL Bioeng., **7** (2023), 036101.

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J49. M. Stojanović, F. Romanò, H. C. Kuhlmann, *Instability of axisymmetric flow in thermocapillary liquid bridges: Kinetic and thermal energy budgets for two-phase flow with temperature-dependent material properties*, European J. Appl. Math., **35** (2024), 267–293.

J50. H. Viola, V. Vasani, K. Washington, J. Hoon Lee, C. Selva, A. Li, C. J. Llorente, Y. Murayama, J. B. Grotberg, F. Romanò, S. Takayama, *Liquid plug propagation in computer-controlled microfluidic airway-on-a-chip with semi-circular microchannels*, Lab on a Chip, **24** (2024), 197–209.

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J52. M. Stojanović, F. Romanò, H. C. Kuhlmann, *Flow instability in high-Prandtl-number liquid bridges with fully temperature-dependent thermophysical properties*, J. Fluid Mech., **978** (2024), A17.

J53. F. Romanò, M. Stojanović, H. C. Kuhlmann, *Scaling and modeling of the heat transfer across the free surface of a thermocapillary liquid bridge*, Int. J. Num. Meth. Heat Fluid Flow, **34** (2024), 1528–1566.

J54. B. Fazla, O. Erken, D. Izbassarov, F. Romanò, J. B. Grotberg, M. Muradoglu, *Effect of kinematic hardening of mucus polymers in an airway closure model*, J. Non-Newt. Fluid Mech., **330** (2024), 105281.

J55. A. Baretter, P. Joseph, O. Roussette, A. Dazin, F. Romanò, *Scaling laws at stall in an axial compressor with an upstream perturbation*, J. Prop. Power, **41** (2025), 82–98.

J56. J. B. Grotberg, F. Romanò, J. C. Grotberg, *Flow Mechanisms of the Air-Blood Barrier*, PLoS Comput. Biol., **21** (2025), e1012917.

J57. M. Elkarii, F. Romanò, S. A. Bahrani, *Helical and chaotic heat exchangers: Flow regimes and efficiency*, Phys. Fluids **37**, 043602 (2025).

J58. R. Hao, D. Izbassarov, M. Muradoglu, J. B. Grotberg, T. Lacassagne, S. A. Bahrani, F. Romanò, *Non-Newtonian and surfactant effects on the liquid plug rupture in an airway reopening model*, J. Fluid Mech., **1023**, A14 (2025).

J59. Z. Yang, B. Wang, F. Romanò, *Bubble collapse near a wall: A numerical study on the impact of physical mechanisms for a bubble initially at rest*, International Journal of Multiphase Flow, **196**, 105567 (2025).

J60. B. Wang, Z. Yang, F. Romanò, *Cavitation bubble near a wall: Sensitivity to modeling conditions*, Technische Mechanik, **46**, 66–77 (2026).

J61. F. Romanò, *Human lungs fluid mechanics: An overview of current modeling techniques*, Eur. Phys. J., **in press** (2026).

Submitted and in-preparation scientific papers

W1. R. K. Subramanian, Z. Yang, F. Romanò, O. Coutier-Delgosha, *Single- and two-bubble collapse near a wall: Pressure wave and microjet impact*, **submitted**.

W2. F. Romanò, M. Riedl, *Entropy of state transitions in macroscopic active matter*, **submitted**.

W3. Z. Hou, S. Berti, T. Burghelea, F. Romanò, *Nonhomogeneous elastic turbulence in the two-dimensional Taylor-Couette flow*, **submitted**.

W4. M. Fan, A. Dazin, G. Bois, F. Romanò, *Two- and three-dimensional stability of a modulated swirling flow between parallel rings*, **submitted**.

W5. H. Abdelaziz, S. Pramanik, F. Romanò, *Pressure drop scaling for extruded grids of arbitrary cross section in low-Reynolds-number flow*, **submitted**.

W6. P. Joseph, F. Romanò, O. Roussette, A. Dazin, *A new method to characterise stall inception of axial compressors: application to active flow control strategies*, **submitted**.

W7. J. C. Grotberg, F. Romanò, J. B. Grotberg, *The alveolar edema equation*, **submitted**.

W8. C. Darquenne, M. Alved, B. R. Bzdek, J. Camphuijsen, M. de Winter, L. Golshahi, S. Gurzing, A. Haddrell, A. Lancmanova, J. Londhal, A. Marin, M. Muradoglu, F. Romanò, G. Spasov, A. Syrakos, C. E. Wagner, S. Zaleski, A.-C. Olin, *Formation of Respiratory Aerosols: Modeling and Experiments (FRAME)*, **submitted**.

W9. P.G. Koullapis, S.C. Kassinos, Z. Yang, J. B. Grotberg, M. Muradoglu, F. Romanò, A. Syrakos, *Assessment of performance of two-phase solvers for surface tension dominated flows related to lung airways*, **submitted**.

W10. B. Wang, Z. Yang, K. Wang, O. Coutier-Delgosha, F. Romanò, *Cavitation bubble collapse near a wall: A numerical study on a bubble initially generated by laser*, **submitted**.

W11. R. Hao, D. Izbassarov, M. Muradoglu, J. B. Grotberg, F. Romanò, *Non-Newtonian effects on the two-liquid-layer plug rupture in an airway reopening model*, **submitted**.

W12. R. Subburaj, T. Maric, F. Romanò, R. Hao, M. Muradoglu, D. Izbassarov, *Numerical Study of Droplet Size Distribution out of Liquid plug Rupture Inside Bronchioles*, **submitted**.

W13. D. Izbassarov, M. Niethammer, R. Subburaj, D. Bothe, F. Romanò, R. Hao, M. Muradoglu, T. Maric, *A robust un-split geometrical VOF approach for viscoelastic two-phase flows*, **submitted**.

W14. F. Romanò, V. Wattiez, E. Fodor, J. Brugues, M. Riedl, *Tracking and Harvesting Energy Flows in Collectively Moving Systems*, **in preparation**.

Conference proceedings

P1. F. Romanò, H. C. Kuhlmann, *Interaction of a finite-size particle with the moving lid of a cavity*, PAMM, **15** (1) (2015) 519–520.

P2. H. C. Kuhlmann, F. Romanò, H. Wu, S. Albensoeder, *Particle-motion attractors due to particle–boundary interaction in incompressible steady three-dimensional flows*, The 20th Australasian Fluid Mechanics Conference (ed. G. Ivey, T. Zhou, N. Jones, S. Draper), Australasian Fluid Mechanics Society (2016), pp. 102, paper no. 449.

P3. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of finite-size particles in a two-sided lid-driven cavity*, PAMM, **17** (2017) 669–670.

P4. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of finite-size particles in a lid-driven cavity*, **25**. Fachtagung Experimentelle Strömungsmechanik, (2017), 62.

P5. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of finite-size particles in a two-sided anti-parallel lid-driven cavity*, ICEFM (2018), 1–6.

P6. P.-E. des Boscs, F. Romanò, H. C. Kuhlmann, *Forces and torques exerted by a Stokes corner flow on a moving sphere*, IFMC, (2019) 1–2.

P7. H. C. Kuhlmann, F. Romanò, *Finite-size coherent structures: a universal phenomenon?*, IFMC, (2019) 1–2.

P8. I. Barmak, F. Romanò, H. C. Kuhlmann, *Particle accumulation in high-Prandtl-number liquid bridges*, PAMM, **1** (2019) e201900058.

P9. M. Stojanovic, F. Romanò, H. C. Kuhlmann, *Modeling the heat transfer across the liquid-gas interface of a thermocapillary high-Prandtl-number liquid bridge*, IPHMT20 (2020).

P10. A. Dazin, P. Joseph, F. Romanò, Q. Gallas, J. Marty, G. Aigouy, M. Stoßel. and R. Niehuis, *The ACONIT project: an innovative design approach of active flow control for surge prevention in gas turbines*, IOP Conf. Ser.: Mater. Sci. Eng. **1024** (2021), 012068.

P11. M. Fan, G. Bois, A. Dazin, F. Romanò, *Effect of leakage on the performance of a centrifugal pump with a vaneless diffuser*, CMFF'22 (2022).

P12. A. Baretter, P. Joseph, O. Roussette, F. Romanò, A. Dazin, *Experimental Analysis of an Axial Compressor Operating under Flow Distorsion*, Turbomachinery Technical Conference and Exposition GT2022 (2022).

P13. M. A. Elhawary, F. Romanò, J.-C. Loiseau, and A. Dazin, *Deep neural networks for predicting and analyzing the performance of air-jets for active flow control in an axial compressor*, Proceedings of 15th European Conference on Turbomachinery Fluid dynamics Thermodynamics (2023).

P14. F. Romanò, C. Rannou, A. Baretter, J. Marty, P. Joseph, A. Dazin, *How inlet flow inhomogeneities can affect the transition to stall in an axial compressor?*, Proceedings of 16th European Conference on Turbomachinery Fluid dynamics Thermodynamics (2025).

P15. R. Subburaj, T. Marić, M. H. Asghar, F. Romanò, J. B. Grotberg, M. Muradoglu, D. Izbassarov, *Effects of viscoelasticity on droplet generation and its granularity PDF in airways*, Proceedings of 12th International Conference on Multiphase Flow (2025).

P16. D. Izbassarov, R. Subburaj, T. Marić, M. H. Asghar, R. Hao, F. Romanò, M. Muradoglu, , *Three dimensional viscoelastic liquid plug rupture in a capillary tube*, Proceedings of 12th International Conference on Multiphase Flow (2025).

P17. B. Wang, Z. Yang, F. Romanò, *Cavitation bubble near a wall: Sensitivity to modeling conditions*, CMFF'25, Budapest, Hungary, August 2025.

Conference participations

C1. F. Romanò, H. C. Kuhlmann, *SEM & DG-FEM applied to Fluid Dynamics*, 19th ERCOFTAC ADA-Pilot Center Meeting, Udine, Italy, May 2014.

C2. F. Romanò, H. C. Kuhlmann, *Interaction of a finite-size particle with the moving lid of a cavity*, GAMM 86th Annual Scientific Conference, Lecce, Italy, March 2015.

C3. F. Romanò, H.C. Kuhlmann, *Smoothed profile method for particle-laden flows*, 21st ERCOFTAC ADA-Pilot Center Meeting, Vienna, Austria, May 2015.

C4. F. Romanò, H. C. Kuhlmann, *Numerical investigation of the interaction of a finite-size particle with a tangentially moving boundary*, CMFF'15, Budapest, Hungary, September 2015.

C5. F. Romanò, H. C. Kuhlmann, *Modelling the motion of finite-size particles near a thermocapillary free-surface by a two-way-coupling approach*, ISPS-6/ITTW2015, Kyoto, Japan, September 2015.

C6. H. C. Kuhlmann, S. Masoudi, F. Romanò, *Multi-phase flow through converging nozzles*, 20th ERCOFTAC ADA-Pilot Center Meeting, Maribor, Slovenia, November 2015.

C7. F. Romanò, S. Albensoeder, H. C. Kuhlmann *Topology of three-dimensional steady cellular flow in a two-sided lid-driven cavity*, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, USA, November 2015.

C8. H. C. Kuhlmann, F. Romanò, S. Albensoeder, *Flow topology and attractors for the motion of finite-size particles in a three-dimensional steady cavity flow*, 9th International Conference on Multiphase Flow, Firenze, Italy, May 2016.

C9. F. Romanò, H. C. Kuhlmann, *Modelling the motion of finite-size particles near a moving wall by a two-way coupling approach*, 9th International Conference on Multiphase Flow, Firenze, Italy, May 2016.

C10. F. Romanò, M. Ishimura, H. C. Kuhlmann, I. Ueno *On the role of the heat transfer in modelling axisymmetric particle accumulation in thermocapillary liquid bridges*, 8th Conference of the International Marangoni Association, Bad Honnef, Germany, June 2016.

C11. M. Ishimura, F. Romanò, H. C. Kuhlmann, I. Ueno *Experimental study on the finite-size particle behavior in a steady flow in a thermocapillary liquid bridge*, 8th Conference of the International Marangoni Association, Bad Honnef, Germany, June 2016.

C12. F. Romanò, H. C. Kuhlmann *Particle accumulation structures in steady closed flows driven by surface forces*, 11th European Conference of Fluid Dynamics, Seville, Spain, September 2016.

C13. F. Romanò, H. C. Kuhlmann *Topology of azimuthally travelling waves in thermocapillary liquid bridges*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, USA, November 2016.

C14. H.C. Kuhlmann, F. Romanò, H. Wu, S. Albensoeder, *Particle-motion attractors due to particle-boundary interaction in incompressible steady three-dimensional flows*, The 20th Australasian Fluid Mechanics Conference, Perth, Australia, December 2016.

C15. H. Wu, F. Romanò, H. C. Kuhlmann, *Attractors for the motion of finite-size particles in a two-sided lid-driven cavity*, GAMM 88th Annual Scientific Conference, Weimar, Germany, March 2017.

C16. F. Romanò, H.C. Kuhlmann, *Finite-size coherent structures in thermocapillary liquid bridges*, 25th ERCOFTAC ADA-Pilot Center Meeting, Vienna, Austria, April 2017.

C17. F. Romanò, H.C. Kuhlmann, *Instability of the flow in suspended thermocapillary thin films*, The 7th International Symposium "Bifurcations and Instabilities in Fluid Dynamics", The Woodlands, USA, July 2017.

C18. F. Romanò, H. C. Kuhlmann *Lagrangian finite-size coherent structures in thermocapillary liquid bridges*, ISPS-7/ELGRA-25, Juan les Pines, France, October 2017.

C19. H. Wu, F. Romanò, H. C. Kuhlmann *Attractors for the motion of finite-size particles in a lid-driven cavity*, Fachtagung "Experimentelle Strömungsmechanik", Karlsruhe, Germany, September 2017.

C20. F. Romanò, H. C. Kuhlmann *Finite-size Lagrangian coherent particle structures in thermocapillary liquid bridges*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, November 2017.

C21. H. Wu, F. Romanò, H.C. Kuhlmann, *Attractors for the motion of finite-size particles in two-sided lid driven cavities*, 26th ERCOFTAC ADA-Pilot Center Meeting, Graz, Austria, November 2017.

C22. H. Wu, F. Romanò, H. C. Kuhlmann *Attractors for the motion of finite-size particles in a two-sided anti-parallel lid-driven cavity*, ICEFM18, Munich, Germany, July 2018.

C23. F. Romanò, H. C. Kuhlmann *Heat transfer across the free surface of a thermocapillary liquid bridge*, CMFF'18, Budapest, Hungary, September 2018.

C24. F. Romanò, P.-E. des Boscs, H. C. Kuhlmann *Forces and torques on a spherical particle moving near the edge made by two rectangular walls in Stokes flow*, EFMC12, Vienna, Austria, September 2018.

C25. H. Wu, F. Romanò, H. C. Kuhlmann *Motion of finite-size particles in a lid-driven cubic cavity*, EFMC12, Vienna, Austria, September 2018.

C26. F. Romanò, H. Fujioka, M. Muradoglu, J. B. Grotberg, *CFD model of airway closure*, BMES, Atlanta, USA, October 2018.

C27. M. Muradoglu, F. Romanò, H. Fujioka, J. B. Grotberg, *Effects of soluble surfactant on plug propagation and rupture in airways*, BMES, Atlanta, USA, October 2018.

C28. H. Fujioka, F. Romanò, M. Metin, J. B. Grotberg, *Effect of gravity on the split of liquid plug at pulmonary bifurcation*, BMES, Atlanta, USA, October 2018.

C29. I. Barmak, F. Romanò, H. C. Kuhlmann *Particle accumulation in high-Prandtl-number liquid bridges*, 28th ERCOFTAC ADA Pilot Centre Meeting, Maribor, Slovenia, November 2018.

C30. F. Romanò, H. Fujioka, M. Metin, J. B. Grotberg, *Liquid plug formation in an airway closure model*, 71th Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, November 2018.

C31. M. Metin, F. Romanò, H. Fujioka, J. B. Grotberg, *Effects of coughing on a surfactant-laden liquid plug in distal airways*, 71th Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, November 2018.

C32. F. Romanò, H. Fujioka, M. Muradoglu, J. B. Grotberg, *Effect of viscoelasticity and surfactant in airway closure model*, BMES, Phyladelphia, USA, October 2019.

C33. V. Suresh, F. Romanò, P. A. Galie, J. B. Grotberg, *Peristaltic flow in the glymphatic system*, BMES, Phyladelphia, USA, October 2019.

C34. H. Fujioka, F. Romanò, M. Muradoglu, J. B. Grotberg, *Effect of surfactant on the split of liquid plug at lung airway bifurcation*, BMES, Phyladelphia, USA, October 2019.

C35. F. Romanò, H. Fujioka, M. Muradoglu, J. B. Grotberg, *Effect of viscoelasticity and surfactant on an airway closure model*, APS, Seattle, USA, November 2019.

C36. M. Muradoglu, F. Romanò, H. Fujioka, J. B. Grotberg, *Effect of viscoelasticity and surfactant on the propagation and rupture of a liquid plug in an airway*, APS, Seattle, USA, November 2019.

C37. M. Stojanovic, F. Romanò, H. C. Kuhlmann, *Stability of axisymmetric thermocapillary flow in high-Prandtl-number liquid bridges based on a Biot function approach for the liquid-gas heat transfer*, IMA10, Iași, Romania, June 2020.

C38. M. Stojanovic, F. Romanò, H. C. Kuhlmann, *Modeling the heat transfer across the liquid-gas interface of a thermocapillary high-Prandtl-number liquid bridge*, IPHMT20, Marseille, France, July 2020.

C39. A. Dazin, P. Joseph, F. Romanò, Q. Gallas, J. Marty, G. Aigouy, M. Stoßel. and R. Niehuis, *The ACONIT project: an innovative design approach of active flow control for surge prevention in gas turbines*, 10th EASN 2020, Virtual Conference, September 2020.

C40. C. Carré, T. Lacassagne, S. Hamidouche, F. Romanò, and A Bahrani, *Dynamique et rupture de bouchons liquides non-newtoniens en géométrie bifurquée*, Journée du GDR Micro et Nano Fluidique : Ondes, Fluides, Interfaces, Paris, France, September 2021.

C41. F. Romanò, O. Erken, M. Muradoglu, H. Fujioka, and J. B. Grotberg, *Surfactant, viscoelasticity, elasto-viscoplasticity and two-layer lining in an airway closure model*, APS, Phoenix, USA, November 2021.

C42. M. Stojanovic, H. C. Kuhlmann, and F. Romanò, *Impact of dynamic surface deformations on the flow instability in high-Prandtl-number liquid bridges*, APS, Phoenix, USA, November 2021.

C43. M. A. Elhawary, F. Romanò, J.-C. Loiseau, A. Dazin, *Machine learning for optimal flow control in an axial compressor*, Challenges and Benchmarks for quantitative AI in Complex Fluids and Complex Flows, Rome, Italy, June 2022.

C44. A. Baretter, P. Joseph, O. Roussette, F. Romanò, A. Dazin, *Experimental Analysis of an Axial Compressor Operating under Flow Distortion*, Turbomachinery Technical Conference and Exposition GT2022, June 2022, Rotterdam, Netherlands.

C45. M. Fan, G. Bois, A. Dazin, F. Romanò, *Effect of leakage on the performance of a centrifugal pump with a vaneless diffuser*, CMFF'22, Budapest, Hungary, September 2022.

C46. B. Fazla, O. Erken, F. Romanò, M. Muradoglu, *A viscoplastic mucus model with kinematic hardening for airway closure*, EFMC14, Athens, Greece, September 2022.

C47. J. B. Grotberg, F. Romanò, *Computational Pulmonary Edema*, APS, Indianapolis, USA, November 2022.

C48. M. Elhawary, F. Romanò, J.-C. Loiseau, and A. Dazin, *Deep neural networks for predicting and analyzing the performance of air-jets for active flow control in an axial compressor*, 15th European Conference on Turbomachinery Fluid dynamics Thermodynamics, Budapest, Hungary, April 2023.

C49. F. Romanò, *Instabilities, mixing and turbulence in single- and multi-phase systems*, Journées Scientifiques, Fluides et écoulements complexes : des solutions pour l'avenir, Nantes, France, June 2023.

C50. P. Koullapis, A. Syrakos, F. Stylianou, S. Kassinos, M. Muradoglu, Z. Yang, F. Romanò, J. B. Grotberg, *Assessment of 2-phase solvers for low capillary number flows in lung airways*, International Congress on Rheology, Athens, Greece, July 2023.

C51. F. Romanò, *A Microvascular Model of Alveolar Capillary and Interstitial Flow*, Journée Thématique M2VC Axe Biomécanique/Bio-ingénierie de la Fédération Lilloise de Mécanique, Lille, France, September 2023.

C52. J. B. Grotberg, F. Romanò, J. C. Grotberg, *A Computational Model of Pulmonary Edema*, APS, Washington, USA, November 2023.

C53. B. Fazla, O. Erken, D. Izbassarov, F. Romanò, J. B. Grotberg, M. Muradoglu, *Airway Closure: Elastoviscoplastic and Kinematic Hardening Effects in a Mucus Model*, APS, Washington, USA, November 2023.

C54. R. K. Subramanian, Z. Yang, F. Romanò, O. Coutier-Delgosha, *Pressure measurement with shock wave, and liquid jet visualization of a cavitation bubble collapsing near the hard surface*, APS, Washington, USA, November 2023.

C55. F. Romanò, J. C. Grotberg, J. B. Grotberg, *A Computational Model of Pulmonary Edema*, EFDC1, Aachen, Germany, September 2023.

C56. H. Abdelaziz, S. Pramanik, F. Romanò, *Extruded grids of arbitrary cross section in creeping flow*, EFDC1, Aachen, Germany, September 2023.

C57. Z. Yang, O. Coutier-Delgosha, F. Romanò, *Cavitation bubble near a wall: Comparison between experiments and simulations*, EFDC1, Aachen, Germany, September 2023.

C58. J. B. Grotberg, F. Romanò, J.C. Grotberg, *Pulmonary Edema, Reabsorption, and Clearance*, APS, Salt Lake City, USA, November 2024.

C59. R. Hao, D. Izbassarov, M. Muradoglu, J. B. Grotberg, T. Lacassagne, A. Bahrani, F. Romanò, *Elastoviscoplastic effects on liquid plug propagation and rupture in an airway model*, APS, Salt Lake City, USA, November 2024.

C60. V. Musy, H. Abdelaziz, A.L. Hantson, D. Thomas, J.C. Baudez, F. Romanò, T. Lacassagne, *Study of fractal oscillating grid turbulence using Direct Numerical Simulation and Particle Image Velocimetry*, APS, Salt Lake City, USA, November 2024.

C61. R. Subburaj, T. Marić, M. H. Asghar, F. Romanò, J. B. Grotberg, M. Muradoglu, D. Izbassarov, *Effects of viscoelasticity on droplet generation and its granularity PDF in airways*, ICMF 2025, Toulouse, France, May 2025.

C62. D. Izbassarov, R. Subburaj, T. Marić, M. H. Asghar, R. Hao, F. Romanò, M. Muradoglu, , *Three dimensional viscoelastic liquid plug rupture in a capillary tube*, ICMF 2025, Toulouse, France, May 2025.

C63. B. Wang, Z. Yang, R. K. Subramanian, K. Wang, O. Coutier-Delgosha, F. Romanò, *Cavitation bubble near a wall: Sensitivity to modeling conditions*, CMFF'25, Budapest, Hungary, August 2025.

C64. M. Riedl, F. Romanò, *A Bottom-Up Approach to Thermodynamics in Active Matter*, SOEAM25, Dresden, Germany, September 2025.

C65. B. Wang, Z. Yang, K. Wang, O. Coutier-Delgosha, F. Romanò, *Cavitation bubble near a wall: A numerical study on a bubble initially generated by laser*, Journées SHF "Cavitation, machines et transitoires hydrauliques", Grenoble, France, March 2026.

Invited talks

S1. F. Romanò, *Particle accumulation structures in thermocapillary liquid bridges*, Tokyo University of Science, Tokyo, Japan, March 2016.

S2. F. Romanò, *A universal mechanism for rapid particle accumulation in fluids*, PPrime, Poitiers, France, November 2017.

S3. F. Romanò, *Lagrangian chaos: mixing and coherent structures*, Institute of Science and Technology, Vienna, Austria, January 2018.

S4. F. Romanò, *Liquid plug formation in an airway closure model*, Institute of Science and Technology, Vienna, Austria, September 2018.

S5. F. Romanò, *Airway closure in microscopic bronchioles* (talk held within the framework of the course BIOMEDE 476 001 WN 2019), University of Michigan, Ann Arbor, USA, April 2019.*

S6. F. Romanò, *Particle coherent structures in incompressible fluid flows*, Technische Universität München, Munich, Germany, June 2019.

S7. F. Romanò, *Peristaltic flow in the glymphatic system*, Technische Universität Wien, Vienna, Austria, June 2019.

S8. F. Romanò, *Peristaltic flow in the glymphatic system*, Institute of Science and Technology, Vienna, Austria, June 2019.

S9. F. Romanò, *Finite-Size Lagrangian coherent structures*, University of Lille, Lille, France, September 2019.*

S10. F. Romanò, *Effect of viscoelasticity and surfactant in an airway closure model*, University of Lille, Lille, France, May 2020.

S11. F. Romanò, *Flow Mixing and Particle Transport in Cavities*, **Keynote speaker**, 5th Jin Shan International Symposium on Fluids Machinery and Engineering, Zhenjiang, China, November 2020.

S12. F. Romanò, *Reconstructing the fluid flow by tracking of large particles*, **Invited symposium speaker**, 1st BICTAM-CISM Symposium on Dispersed Multiphase Flows, Beijing, China, March 2021.

S13. F. Romanò, *Airway closure: the effects of surfactant, viscoelasticity, elastoviscoplasticity and two-layer lining*, University of Udine, Udine, Italy, November 2021.

S14. F. Romanò, *Airway closure: the effect of surfactant, viscoelasticity, elastoviscoplasticity and two-layer lining*, **Keynote speaker**, Mathematics and Physics of Fluids 2021, IIT Gandhinagar, India, November 2021.

S15. F. Romanò, *The Fluid Mechanics of Lung Clogs in the Bronchioles*, Institute of Science and Technology, Vienna, Austria, November 2021.

S16. F. Romanò, *The Fluid Mechanics of Lung Clogs in the Bronchioles*, VirginiaTech, Roanoke, Virginia, USA, November 2021.

S17. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, LMFL Fluid Mechanics Webinar, LMFL, Lille, France, February 2022. `YouTube`*

S18. F. Romanò, *Mixing and Accumulation of Particles in Cavities at Low and Moderate Reynolds Numbers*, LTEN, Polytech Nantes, Nantes, France, April 2022.

S19. F. Romanò, *Rotating instabilities in a centrifugal pump*, Lille Turbulence Program, LMFL, Lille, France, July 2022.*

S20. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, DynFluid, Arts et Métiers, Paris, France, November 2022.

S21. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, Department of Physics, University of Rome Tor Vergata, Rome, Italy, January 2023.

S22. F. Romanò, *Hydrodynamic Instability in Thermocapillary Liquid Bridges*, LEGI, Université Grenoble Alpes, Grenoble, France, January 2023.

S23. F. Romanò, *Hydrodynamic Instability in Thermocapillary Liquid Bridges*, ETSIAE-UPM and Numath's group, Spain, February 2023.

S24. F. Romanò, *Mixing and Accumulation of Particles in Cavities at Low and Moderate Reynolds Numbers*, VirginiaTech, Roanoke, Virginia, USA, May 2023.

S25. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, Department of Biomedical Engineering, Atlanta, GeorgiaTech, Georgia, USA, May 2023.

S26. F. Romanò, *Interstitial Flow: Two Elucidating Examples of First-Principle Modeling applied to Microscale Bioflows*, **Invited speaker**, Nano S&T-2023, Osaka, Japan, May 2023.

S27. F. Romanò, *Machine Learning for Optimal Flow Control in an Axial Compressor*, **Keynote speaker**, Artificial Intelligence meets Fluid Dynamics, India, July 2023. `YouTube`

S28. F. Romanò, *Pulmonary Edema: A Microvascular Septal Tract Model*, Institute of Fluid Mechanics and Heat Transfer, TUWien, Vienna, Austria, July 2023.

S29. F. Romanò, *Instabilities in a Centrifugal Pump*, **Plenary speaker**, 17th Asian International Conference on Fluid Machinery (AICFM17), Zhenjiang, China, October 2023.

S30. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, FAST, Université Paris-Saclay, Paris, France, October 2023.

S31. F. Romanò, *Self-organizing particles in a chaotic thermocapillary liquid bridge*, TU Dresden, Dresden, Germany, March 2024.

S32. F. Romanò, *Limitations of current modeling for formation of respiratory aerosol*, **Invited speaker**, Workshop "Modeling the formation of respiratory aerosols", Lorentz Center, Leiden, The Netherlands, September 2024.

S33. F. Romanò, *Non-Newtonian Effects on the Liquid Plug Rupture in an Airway Reopening Model*, University of Twente, Enschede, The Netherlands, February 2025.

S34. F. Romanò, *Rotating instabilities in a centrifugal pump*, Shandong Shuanglun Co., China, March 2025.

S35. F. Romanò, *The Fluid Mechanics of Airway Closure in the Bronchioles*, Université Aix-Marseille, Marseille, France, March 2025.

S36. F. Romanò, *Rotating instabilities in a centrifugal pump*, Budapest University of Technology and Economics, Budapest, Hungary, May 2025.

S37. F. Romanò, *Rotating instabilities in a centrifugal pump*, **Invited speaker**, Workshop "Advances in Biomedical Flows", CMFF'25, Budapest, Hungary, August 2025.

S38. F. Romanò, *Non-Newtonian and Surfactant Effects on the Liquid Plug Rupture in an Airway Reopening Model*, KTH, Stockholm, Sweden, October 2025.

S39. F. Romanò, *Elastic Turbulence in Two-Dimensional Taylor-Couette Flow*, LTEN, Polytech Nantes, Nantes, France, November 2025.

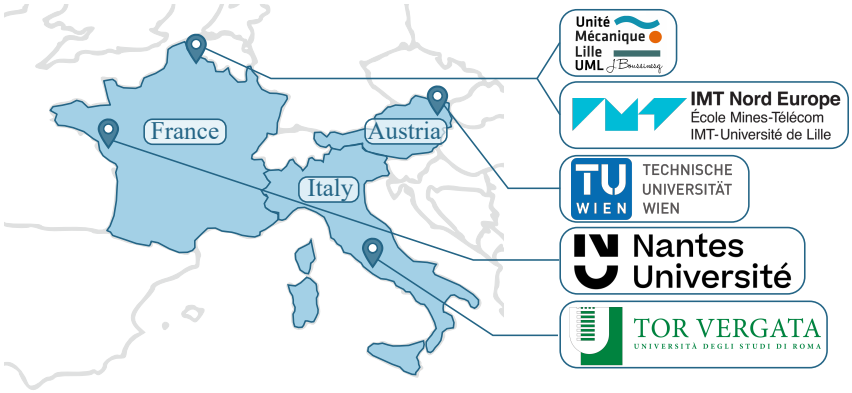
S40. F. Romanò, *A Bottom-Up Approach to Thermodynamics in Active Matter*, Physics Theory Group, Warwick University, UK, February 2026.

* = invited talks internal to the same affiliation

Overview of Collaborations over the last Five Years

The collaborations with universities (U), research organizations (RO) and industrial companies (IC) are presented below sorting them by topic. Three macro-categories are identified, which find a correspondence with the research projects I carried out over my career.

Chaotic mixing and particle-laden flows



(U) Hendrik C. Kuhlmann
Full Professor (now retired)
TU Wien (AT)

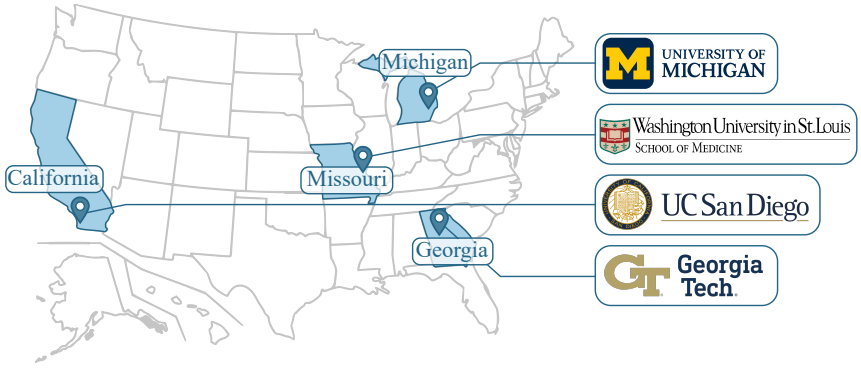
(U) Luca Biferale
Full Professor
University Tor Vergata (IT)

(U) Stefano Berti
Associate Professor
University of Lille (FR)

(U) Teodor Burghelea
Research Director
Nantes University (FR)

(U) Tom Lacassagne
Associate Professor
IMT Nord-Europe (FR)

Biomedical engineering

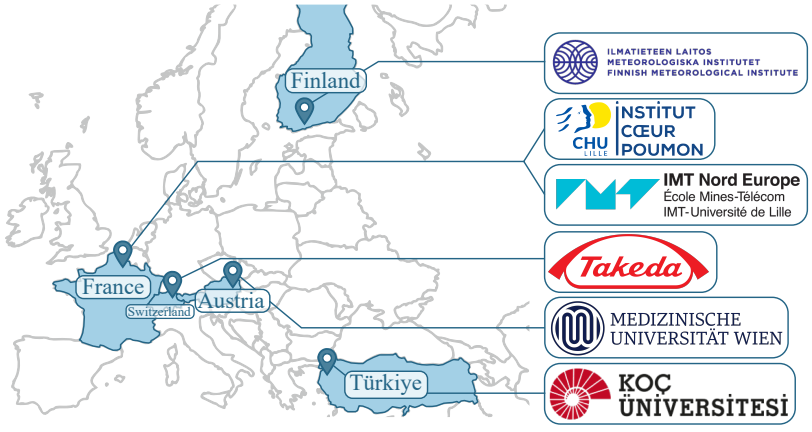


(U) Chantal Darquenne
Full Professor
UC San Diego (US)

(U) James B. Grotberg
Full Professor
University of Michigan (US)

(U) John C. Grotberg
Medical Doctor
Washington University (US)

(U) Shuichi Takayama
Full Professor
Georgia Tech. (US)



(U) Amir Bahrani
Associate Professor
IMT Nord-Europe (FR)

(RO) Daulet Izbassarov
Senior Scientist
Finnish Meteorol. Inst. (FI)

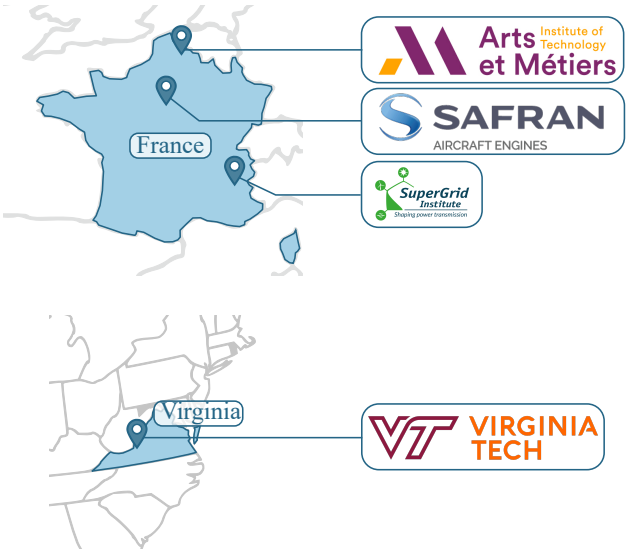
(U) Frank P. Assen
Post Doctoral Researcher
Med. Univ. Wien (AT)

(U) Metin Muradoglu
Full Professor
Koç University (TR)

(U) Mouhamed Moussa
Medical Doctor
CHU de Lille (FR)

(IC) Saeed Masoudi
R&D Team Leader
Takeda (CH)

Turbomachinery and cavitation



(U) Antoine Dazin
Full Professor
Arts et Métiers (FR)

(IC) Eric Lippinois
R&D Team Leader
Safran Aircraft Engines (FR)

(U) Gérard Bois
Full Professor (now retired)
Arts et Métiers (FR)

(U) Kevin Wang
Associate Professor
Virginia Tech. (US)

(U) Olivier Coutier-Delgosha
Full Professor
Virginia Tech. (US)

(U) Pierric Joseph
Associate Professor
Arts et Métiers (FR)

(RO) Renaud Guillame
R&D Team Leader
SuperGrid Institute (FR)

Organizing, Editing and Reviewing Activity

Workshops, seminars, and scientific team coordinations

Workshops	Scientific Committee Member for 1-day workshop "Complex Fluids and Flows", Nantes, 2023 Scientific Committee Member for 1-day workshop "Complex Fluids and Flows", Lille, 2024 Co-Organizer of 1-day workshop "Complex Fluids and Flows", Lille, 2024 Co-Organizer of 1-week Course at CISM, Italy:"Mechanics of the Deep Lungs", Udine, 2026 Co-Organizer of 1.5-month TSVP Thematic Program at OIST, Japan: "Multiphase Flows in Multiscale Porous Media: Modeling, Simulations and Asymptotic", Okinawa, 2026/2027
Scientific Coordinator	Féderation de Mécanique de Lille, Topic: Modeling Complex Flows, Lille, 2021-present Research topic "Health" in the Department, AMSante Network, ENSAM, 2024-present
Seminars	Organizer of Scientific Seminars at Laboratoire de Mécanique des Fluides de Lille, 2019–2026 Organizer of the Multimedia Footage, LMFL Fluid Mechanics Webinars, `YouTube`, 2020–2026

Conferences

Organizing Committee	International Marangoni Association (IMA7), Vienna, 2014 European Fluid Mechanics Conference (EFMC12), Vienna, 2018
Scientific Committee	Conference on Modelling Fluid Flow (CMFF'18), Budapest, 2018 Conference on Modelling Fluid Flow (CMFF'22), Budapest, 2022 Conference on Modelling Fluid Flow (CMFF'25), Budapest, 2025
Reviewer	Conference on Modelling Fluid Flow (CMFF'18), Budapest, 2018 Int. Conference on Multiphase Flow (ICMF2019), Rio de Janeiro, 2019 Conf. Mechanical, Electric and Industrial Eng. (MEIE 2019), China, 2018 Conference on Physics, Mathematics and Statistics (ICPMS2019), China, 2019 European Conference on Turbomachinery (ECT14), Gdansk, 2021 Conference on Modelling Fluid Flow (CMFF'22), Budapest, 2022 European Conference on Turbomachinery (ECT15), Budapest, 2023 European Conference on Turbomachinery (ECT16), Hannover, 2025 Conference on Modelling Fluid Flow (CMFF'25), Budapest, 2025
Session Chairman	"Control and Drag Reduction 4", EFMC12, Vienna, 2018 "Aerosol Generation from Film Bursting", Workshop at Lorentz Center, 2024 "Respiratory Flow I", APS, Salt Lake City, 2024 "Biomedical Flows", CMFF'25, Budapest, 2025

Journal editing and reviewing activities

Editor	Reviewer Editor for Frontiers in Space Technologies, Microgravity Associate Editor for Journal of Drainage and Irrigation Machinery Engineering Editorial Board Member for Discover Fluid Mechanics, Springer Nature Section Editor "Biofluids and Microfluidics" for Discover Fluid Mechanics, Springer Nature
Reviewer ($\approx$ 100 papers)	ACS Omega Acta Mechanica Applied Mathematics and Computation ASME Journal of Verification, Validation and Uncertainty Quantification Chemical Engineering Science Chaos: An Interdisciplinary Journal of Nonlinear Science Coatings Dynamics of Atmospheres and Oceans Energies European Journal of Mechanics / B Fluids

Frontiers in Space Technologies, Microgravity
International Journal of Heat and Mass Transfer
International Journal of Multiphase Flow
International Journal of Non-Linear Mechanics
International Journal of Thermal Science
International Journal of Turbomachinery, Propulsion and Power
Journal of Applied Mathematics and Computational Mechanics
Journal of Engineering and Technological Sciences
Journal of Fluid Mechanics
Journal of Scientific Computing
Langmuir
Mathematics and Computers in Simulation
Meccanica
Microgravity Science and Technolology
Philosophical Transactions of the Royal Society A
Physics of Fluids
Proceedings of the National Academy of Sciences
Science Progress
Scientific Reports
Springer Nature Applied Science
Symmetry
Theoretical and Computational Fluid Dynamics
The European Physical Journal Plus
Waves in Random and Complex Media
World Journal of Mechanics

Evaluation committees

Selection Committees	Assistant Professors at Sorbonne Université, Paris, April/May 2025
	Assistant Professors at University of Lille, Lille, May 2026
Ph.D. Committes	Ph.D. Candidate Committee, Alberto Baretter, Arts et Métiers/ONERA
	Ph.D. Candidate Committee, Hui Wang, Arts et Métiers/VirginiaTech
	Ph.D. Candidate Committee, Shuo Liu, Arts et Métiers/VirginiaTech
	Ph.D. Candidate Committee, Ali Maghouli, Arts et Métiers/VirginiaTech
	Ph.D. Candidate Committee, Clémence Rannou, Arts et Métiers/ONERA
	Ph.D. Candidate Committee, Joe El Ghossein, VirginiaTech
	Ph.D. Thesis Reviewer, Lukas Babor, TUWien
	Ph.D. Defense Committee, Lukas Babor, TUWien
	Ph.D. Defense Committee, Antoine Charles, IMT Nord Europe
	Ph.D. Pre-Defense Committee, Joe El Ghossein, VirginiaTech
	Ph.D. Defense Committee, Joe El Ghossein, VirginiaTech
	Ph.D. Candidate Committee, Dinya Meneceur, Arts et Métiers
	Ph.D. Candidate Committee, Matias Berton, Arts et Métiers/ONERA
	Ph.D. Defense Committee, Tassawar Iqbal, KTH
	Ph.D. Defense Committee, Saad Raza, Université de Lille

Funding Record

The following acronyms are used for funding agencies:

ANR	Agence Nationale de la Recherche, France (National Agency for Research)
CIFRE	Conventions Industrielles de Formation par la Recherche, France (Industrial Training Agreements through Research)
CNES	Centre National d'Études Spatiales, France (National Centre for Space Studies)
CSC	Chinese Research Council, China
ESA	European Space Agency, Europe
FFG	Förderagentur für die unternehmensnahe Forschung und Entwicklung, Austria (The Austrian Research Promotion Agency)
FWF	Österreichischer Wissenschaftsfonds, Austria (Austrian Science Fund)
GENCI	Grand Équipement National de Calcul Intensif, France (High Performance Computing National Facility)
NIH	National Institutes of Health, United States
TUBITAK	Türkiye Bilimsel ve Teknolojik araştırma Kurumunun, Türkiye (Scientific and Technological Research Council of Türkiye)

Summary of grants as (co-)PI

	Granting organization	Role	Grant amount	Grant duration
fellowships	TU Wien	Scholar	PostDoc salary	1.5 years
	Univ. Mich.	Scholar	PostDoc salary	1.5 years
clusters	TU Wien	Scholar	$\approx$ 3M CPUh on VSC2 & VSC3	3 years
	Univ. Mich.	Scholar	$\approx$ 2M CPUh on Flux	2 years
	GENCI	Co-PI	$\approx$ 19M CPUh on IDRIS clusters	6 years
project grants	FFG	Co-PI	$\approx$ 160k€ (1 PhD)	3 years
	CSC-ParisTech	Co-PI	$\approx 5 \times$ 140k€ (5 PhDs)	5×4 years
	ENSAM	Co-PI	$\approx 2 \times$ 120k€ (1 PhD)	3 years
	ANR-JCJC	PI	$\approx$ 230k€ (1 PhD + 1 PostDoc)	4 years
	SuperGrid	Co-PI	$\approx$ 200k€ (1 PostDoc)	1 year
	CIFRE-Safran	Co-PI	$\approx$ 200k€ (1 PhD)	3 years
	CHU Lille	Co-PI	$\approx$ 200k€ (1 PhD)	6 years
	BPI France	Co-PI	$\approx$ 1.3M€ (1 PhD + Engineers)	3 years
	ANR Réclassif	Co-PI	$\approx$ 130k€ (1 PhD)	3 years

Grant as (co-)PI

Project	Steam sterilisation
Role	Co-PI: Principal Investigator together with Prof. H. C. Kuhlmann
Grant No.	FFG Project #851030 (1 PhD student $\approx$ 160k€)
Duration	3 years

Project	Modelization of the turbulence
Role	Co-PI: Principal Investigator together with LMFL Team
Grant No.	GENCI Project #A0062A01741 (0.5M CPU hours)
Duration	1 year

Project	Stability analysis in a centrifugal pump
Role	Co-PI: Principal Investigator together with Prof. A. Dazin
Grant No.	CSC-ParisTech 2018 (1 PhD student $\approx$ 140k€)
Duration	4 years

Project	Modelization of the turbulence
Role	Co-PI: Principal Investigator together with LMFL Team
Grant No.	GENCI Project #A0062A01741 (1.5M CPU hours)
Duration	1 year

Project	Numerical study of a cavitating bubble near a wall
Role	Co-PI: Principal Investigator together with Prof. O. Coutier-Delgosha
Grant No.	CSC-ParisTech 2019 (1 PhD student ≈ 140k€)
Duration	4 years

Project	Design of a pintle injector
Role	Co-PI: Principal Investigator together with Assoc. Prof. P. Joseph
Grant No.	CNES: PERSEUS
Duration	5 years

Project	Design and simulation of an two-phase pipeline with a pump-turbine
Role	Co-PI: Principal Investigator together with Prof. A. Dazin
Grant No.	SuperGrid/General Electric (1 PostDoc ≈ 200k€)
Duration	1 years

Project	Modelization of turbulence
Role	Co-PI: Principal Investigator together with LMFL Team
Grant No.	GENCI Project #A0062A01741 (5M CPU hours)
Duration	1 year

Project	Numerical and experimental study of liquid plugs in human lungs
Role	Co-PI: Principal Investigator together with Assoc. Prof. A. Bahrani
Grant No.	CSC-ParisTech 2020 (1 PhD student ≈ 140k€)
Duration	4 years

Project	PINN for the physics of complex flows
Role	Co-PI: Principal Investigator together with Prof. A. Dazin
Grant No.	ENSAM AAP PhD Theses 2021 (1 PhD student ≈ 110k€)
Duration	3 years

Project	Multi-scale matching for flows with a grid
Role	PI: Principal Investigator
Grant No.	ANR-JCJC 2021 (1 PhD student + 1 PostDoc ≈ 220k€)
Duration	4 years

Project	Numerical study of multiple cavitating bubbles near a wall
Role	Co-PI: Principal Investigator together with Prof. O. Coutier-Delgosha
Grant No.	CSC-ParisTech 2022 (1 PhD student ≈ 140k€)
Duration	4 years

Project	Modelization of turbulence
Role	Co-PI: Principal Investigator together with LMFL Team
Grant No.	GENCI Project #A0062A01741 (6M CPU hours)
Duration	1 year

Project	Elastic turbulence in curvilinear geometries
Role	Co-PI: Principal Investigator together with Assoc. Prof. S. Berti
Grant No.	CSC-ParisTech 2023 (1 PhD student ≈ 140k€)
Duration	4 years

Project	Modeling of stall in axial compressors
Role	Co-PI: Principal Investigator together with Pr. A. Dazin
Grant No.	CIFRE-Safran (1 PhD student ≈ 200k€)
Duration	3 years

Project	Modelization of the turbulence
Role	Co-PI: Principal Investigator together with LMFL Team
Grant No.	GENCI Project #A0162A01741 (6M CPU hours)
Duration	1 year

Project	Improving mechanical and physiological performances of centrifugal pump based ECMO
Role	Co-PI: Principal Investigator together with Dr. M. Moussa
Grant No.	CHU Lille (1 PhD student ≈ 200k€)
Duration	6 years

Project	Analyze stability in the vaneless diffusers of centrifugal machines
Role	Co-PI: Principal Investigator together with Profs. J.C. Robinet and A. Dazin
Grant No.	ENSAM AAP PhD Theses 2025 (1 PhD student ≈ 130k€)
Duration	3 years

Project	Design of multi-modular grills for the filtration of Lagrangian particles in industrial systems
Role	Co-PI: Principal Investigator together with Assoc. Prof. A. Bahrani
Grant No.	ANR Reclassif 2025 (1 PhD student ≈ 130k€)
Duration	3 years

Project	Multi-fidelity reduced-order models for thin film and smoke transport dynamics
Role	Co-PI: Principal Investigator together with M. Dumas (PopcornFX)
Grant No.	BPI France (≈ 1.3M€)
Duration	3 years

Project	Innovative casting for power electronics cooling systems
Role	Co-PI: Principal Investigator together with A. Videt and N. Botter (Univ. Lille)
Grant No.	Énergy Électrique 4.0 & FAVI (to be defined)
Duration	1.5 years

Other grant participations

Project	Multiphase flow through converging nozzles
Role	Participant
Grant No.	FFG Innovation Check #847669 (≈ 10k€)
Duration	6 months

Project	Dynamics of suspended particles in periodic vortex flows
Role	Participant
Grant No.	ESA-SciSpace #AO-2000-091
Duration	3 years

Project	Thermocapillary oscillatory motion and interfacial heat exchange (JEREMI)
Role	Participant
Grant No.	ESA-SciSpace #AO-2004-097
Duration	3 years

Project	Modelling Support to ESA-JAXA JEREMI project on ISS
Role	Participant (1.5 year PostDoc at TU Wien)
Grant No.	ESA-SciSpace #PO-4000121111 (1 PostDoc ≈ 250k€)
Duration	3 years

Project	Microfluidic tissue engineering of small airway injuries
Role	Participant (1.5 year PostDoc at University of Michigan + consultancy)
Grant No.	NIH research Grant #1R01HL136141-01 (1 PostDoc ≈ 200k$)
Duration	5 years

Project	Stability Analysis for the JEREMI Experiment
Role	Participant
Grant No.	FFG Project "SAJE", #866027 (1 PhD student ≈ 270k€)
Duration	3 years

Project	Intricate bodies in the boundary layer – bridging fluid mechanics, morphology and ecology in larval Drusinae (Insecta: Trichoptera)
Role	Contributor to the project proposal
Grant No.	FWF Project #P30048-B29 (1 PhD student + 1 PostDoc ≈ 370k€)
Duration	3 years

Project	Horizon2020: Design and control of an axial compressor
Role	Participant
Grant No.	CleanSky: ACONIT (≈ 1.6M€)
Duration	4 years

Project	Airway closure in human lungs
Role	Participant
Grant No.	TUBITAK #119M513 (1 PhD student ≈ 70k€)
Duration	3 years

Project	Life-cycle design and systemic approach for heating storage energy efficiency
Role	Participant
Grant No.	ANR-Chaire Industrielle (1 PostDoc ≈ 80k€)
Duration	2 years

Teaching Activity

	Third year Bachelor	First year Master	Second year Master	Projects
total courses	7	3	2	
since joining Arts et Métiers	7	2	2	
total hours	943	546	170	75
since joining Arts et Métiers	943	400	170	75

Third year Bachelor

Period September 2020 – November 2025 (27 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Intermediate Energetics and Heat Transfer* (Fundamental Course)

Period May 2021 – May 2024 (100 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Intermediate Fluid Mechanics* (Laboratory Course)

Period May 2021 – January 2026 (16 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Intermediate Fluid Mechanics* (Exercise Course)

Period September 2020 – November 2025 (120 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Design of Aeronautical Structures: CFD Simulations of an Airplane Wing* (Laboratory Course)

Period September 2019 – January 2026 (192 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Finite Element Methods in Solid Mechanics* (Exercise Course)

Period March 2021 – November 2025 (168 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Intermediate Energetics and Heat Transfer* (Laboratory Course)

Period September 2019 – April 2026 (320 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Heat Transfer and Thermal Science* (Exercise Course)

First year Master

Period September 2019 – April 2026 (320 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *Advanced Energetics and Turbomachinery* (Laboratory Course)

Period March 2020 – April 2026 (50 teaching hours in total)
Qualification *External Teacher*, Univ. of Lille, Lille Fluid Mechanics Laboratory, Lille (France)
Course Title *CFD applied to Turbomachinery* (Exercise Course)

Period October 2012 – January 2018 (176 teaching hours in total)
Qualification *University Assistant*, Institute of Fluid Mechanics and Heat Transfer, TU Wien (Austria)
Course Title *Numerical Methods in Fluid Dynamics* (Exercise Course)

Second year Master

Period September 2021 – January 2026 (120 teaching hours in total)
Qualification *Associate Professor*, Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title *CFD applied to Automobile Engines* (Laboratory Course)

Period September 2020 – January 2026 (50 teaching hours in total)
Qualification *External Teacher*, Univ. of Lille, Lille Fluid Mechanics Laboratory, Lille (France)
Course Title *StarCCM+ applied to Fluid Mechanics* (Exercise Course)

Student projects

Period	September 2020 – May 2025 (75 teaching hours in total)
Qualification	*Associate Professor,* Department of Fluid Mechanics and Energetics, Arts et Métiers (France)
Course Title	*Student projects for 3rd year Bachelor's and 2nd year Master's*

Academic responsibilities

Period	September 2025 – present
Position	*Associate Professor,* Department of Fluid Mechanics and Energy, Arts et Métiers (France)
Program	*Master program: "Land Transport Engineering", Lille Campus*

Mentoring and Supervision Activity

	Internships	Exchange programs	Bachelor's theses	Master's theses	PhD theses
Total	22	2	2	21	13
at national scale	20	–	1	17	12
at international scale	2	2	1	4	1

Bachelor's theses

Student	Faraz Beladi
Period	3-months, starting during winter semester 2017
Project	Effect of non-divergence-free error in flow topology
Affiliation	TU Wien, Vienna (Austria)

Student	Parvathy K. K.
Period	3-months, starting during summer semester 2016
Project	Finite-size Lagrangian coherent structures
Affiliation	TU Wien, Vienna (Austria) Birla Institute of Technology and Science (India)

Master's theses

Student	Michael Riedl
Period	6-months, starting during winter semester 2015
Project	Lagrangian topology in rotating-lid cavities
Affiliation	TU Wien, Vienna (Austria)

Student	Vincze Mihály
Period	6-months, starting during summer semester 2015
Project	Lagrangian topology in lid-driven cavities
Affiliation	TU Wien, Vienna (Austria) Budapest University of Technology and Economics, Budapest (Hungary)

Student	Arash Hajisharifi
Period	6-months, starting during winter semester 2016
Project	Lagrangian topology in rotating drums
Affiliation	TU Wien, Vienna (Austria) University of Pisa, Pisa (Italy)

Student	Sencer Yücesan
Period	6-months, starting during summer semester 2017
Project	Effect of wall curvature on flow stability in lid-driven cavities
Affiliation	TU Wien, Vienna (Austria) Fachhochschule Wiener Neustadt, Wiener Neustadt (Austria)

Student	Charlène Phan
Period	6-months, starting during summer semester 2020
Project	Flow control in an axial compressor
Affiliation	Arts et Métiers, Lille (France) Université de Lille, Lille (France)

Student	Venkata Sai Krishna Danda
Period	6-months, starting during summer semester 2020
Project	Impingement of a liquid droplet on a solid substrate
Affiliation	Arts et Métiers, Lille (France) Universität Rostock (Germany)

Student	Intissar Benjalila
Period	6-months, starting during summer semester 2020
Project	Airway reopening in human lungs
Affiliation	Arts et Métiers, Lille (France)
	École des Mines de Douai, Douai (France)

Student	Pierre Leroux
Period	6-months, starting during summer semester 2020
Project	Design of a pintle injector
Affiliation	Arts et Métiers, Lille (France)
	Centre national d'études spatiales, Paris (France)

Student	Raj Jayeshkumar Gandhi
Period	5-months, starting during summer semester 2021
Project	Elastic turbulence in the curvilinear geometry
Affiliation	Arts et Métiers, Lille (France)

Student	Oğuzhan Erken
Period	9-months, starting during starting during summer semester 2021
Project	Three-phase airway closure in human lungs
Affiliation	Koç Üniversitesi, Istanbul (Turkey)
	Arts et Métiers, Lille (France)

Student	Oussama El Mokkadem
Period	6-months, starting during summer semester 2021
Project	Numerical simulations of injectors for flow control
Affiliation	Arts et Métiers, Lille (France)

Student	Charles Carre
Period	5-months, starting during summer semester 2022
Project	Dynamics and rupture of non-Newtonian liquids plugs in bifurcated geometry
Affiliation	Arts et Métiers, Lille (France)
	École des Mines de Douai, Douai (France)

Student	Hossameldin Abdelaziz
Period	6-months, starting during summer semester 2022
Project	Multi-scale matching for flows with a grid
Affiliation	Arts et Métiers, Lille (France)

Student	Aditya Rathore
Period	6-months, starting during summer semester 2022
Project	Simulation of interacting Coandă-effect actuators for active flow control
Affiliation	Arts et Métiers, Lille (France)

Student	Romain Peron
Period	6-months, starting during summer semester 2022
Project	Fluid-structure interaction between a flat plate and an incoming flow
Affiliation	Arts et Métiers, Lille (France)

Student	Morteza Naeini
Period	6-months, starting during summer semester 2022
Project	Elasto-inertial instabilities in a two-phase Taylor-Couette flow
Affiliation	École des Mines de Douai, Douai (France)

Student	Zhongxuan Huo
Period	6-months, starting during summer semester 2023
Project	Elastic turbulence in the curvilinear geometry
Affiliation	Arts et Métiers, Lille (France)
	Polytech Lille, Lille (France)

Student	Rami Janbeih
Period	5-months, starting during summer semester 2024
Project	Simulation of non-Newtonian centrifugal pumps
Affiliation	Arts et Métiers, Lille (France)

Student	Nesrine Tounsi
Period	6-months, starting during summer semester 2024
Project	Inlet condition sensitivity of Coandă-effect actuators for active flow control
Affiliation	Arts et Métiers, Lille (France)

Student	Vincent Wattiez
Period	6-months, starting during summer semester 2025
Project	Modeling self-organizing phenomena by mechanical analogy
Affiliation	Arts et Métiers, Lille (France)

Student	Thibaut Dumoulin
Period	6-months, starting during summer semester 2024
Project	Optimization of the performance of a centrifugal pump using Data Assimilation
Affiliation	Arts et Métiers, Lille (France)

PhD theses

Student	Christian Schmidrathner
Period	9/2016–4/2018
Supervision	50% for 1.5 years together with H.C. Kuhlmann (50%)
Project	Steam sterilization
Funding	FFG project # 851030
Affiliation	TU Wien, Vienna (Austria)

Student	Meng Fan
Period	10/2019–12/2023 (defended in 12/2023)
Supervision	50% together with A. Dazin (50%)
Project	Stability and flow characterization in centrifugal pumps
Funding	CSC-ParisTech 2018
Affiliation	Arts et Métiers, Lille (France)

Student	Zhidian Yang
Period	10/2020–12/2024 (defended in 12/2024)
Supervision	30% together with O. Delgosha-Coutier (30%) and A. Dazin (40%)
Project	Numerical simulation, analysis, and prediction of a cavitating bubble near a wall
Funding	CSC-ParisTech 2019
Affiliation	Arts et Métiers, Lille (France)

Student	Mohamed Elhawary
Period	10/2021–12/2024 (defended in 12/2024)
Supervision	30% together with J.-C. Loiseau (30%) and A. Dazin (40%)
Project	PINN for the physics of complex flows
Funding	ENSAM AAP PhD Theses 2021
Affiliation	Arts et Métiers, Lille (France)

Student	Renjie Hao
Period	7/2022–present
Supervision	70% together with A.S. Bahrani (30%)
Project	Numerical and experimental study of liquid plugs in human lungs
Funding	CSC-ParisTech 2020
Affiliation	Arts et Métiers, Lille (France)

Student	Hossameldin Abdelaziz
Period	10/2022–present
Supervision	100%
Project	Multi-scale matching for flows with a grid
Funding	ANR-JCJC 2021, "MultiMatchGrid"
Affiliation	Arts et Métiers, Lille (France)

Student	Bo Wang
Period	10/2022–present
Supervision	70% together with O. Delgosha-Coutier (30%)
Project	Numerical study of multiple cavitating bubbles near a wall
Funding	CSC-ParisTech 2022
Affiliation	Arts et Métiers, Lille (France)

Student	Zhonxuan Hou
Period	10/2023–present
Supervision	70% together with S. Berti (30%)
Project	Elastic turbulence in curvilinear geometries
Funding	CSC-ParisTech 2023
Affiliation	Arts et Métiers, Lille (France)

Student	Adou Francis Seka
Period	3/2024–present
Supervision	50% together with A. Dazin (50%)
Project	Modeling of stall in axial compressors
Funding	CIFRE-Safran
Affiliation	Arts et Métiers, Lille (France)

Student	Benoit Brassart
Period	11/2024–present
Supervision	50% together with M. Moussa (50%)
Project	Improving mechanical and physiological performances of centrifugal pump based ECMO
Funding	CHU Lille
Affiliation	CHU Lille, Lille (France)

Student	Loïs Dumoulin
Period	10/2025–present
Supervision	30% together with J.C. Robinet (30%), A. Dazin (40%)
Project	Analyze stability in the vaneless diffusers of centrifugal machines
Funding	ENSAM AAP PhD Theses 2025
Affiliation	Arts et Métiers, Lille (France)

Student	Vincent Wattiez
Period	10/2025–present
Supervision	35% together with S.A. Bahrani (35%), P. Errante (30%)
Project	Design of multi-modular grills for the filtration of Lagrangian particles in industrial systems
Funding	ANR Reclassif 2025
Affiliation	Arts et Métiers, Lille (France)

Student	Parth Patel
Period	01/2026–12/2029
Supervision	70% together with G. Dietze (30%)
Project	Multi-fidelity reduced-order models for thin film and smoke transport dynamics
Funding	BPI France 2025
Affiliation	Arts et Métiers, Lille (France)

PostDoc researchers

Student	Meng Fan
Period	02/2024–09/2024
Project	Numerical simulation of single- and multi-phase pumps
Funding	SuperGrid/General Electrics
Affiliation	Arts et Métiers, Lille (France)

Student	Marwane Elkarii
Period	09/2023–04/2025
Project	Chaotic mixing, instabilities and transition in non-isothermal pipes
Funding	ANR Chaire Industrielle, "CORENSTOCK"
Affiliation	École des Mines Nord Europe, Douai (France)

Student	Hossameldin Abdelaziz (prolongation contract pre-defense)
Period	03/2026–09/2026
Project	Multi-scale matching for flows with a grid
Funding	ANR-JCJC 2021, "MultiMatchGrid"
Affiliation	Arts et Métiers, Lille (France)

Student	to be hired
Period	09/2026
Project	Multi-scale modeling of electronic component cooling
Funding	Énergie Électrique 4.0, "F.I.R.E."
Affiliation	University of Lille, Lille (France) Arts et Métiers, Lille (France)