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Current Position

Feb, 2018 - present	Associate Professor in Fluid Dynamics (ING-IND/06) Department of Mechanical and Aerospace Engineering (DIMEAS) Politecnico di Torino, Torino, Italy
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Current Research Interests

- Cardiovascular fluid dynamics: multiscale modeling and CFD analysis
- Space medicine and gravitational physiology
- Spatio-temporal analysis of turbulent and transitional flows

Publications

Journal Papers

- [J1] V. N. Bhargav, N. Francescato, H. Mettelsiefen, A. Y. Usmani, S. Scarsoglio, and V. Raghav, "Spatio-temporal relationship between three-dimensional deformations of a collapsible tube and the downstream flowfield," *Journal of Fluids and Structures*, vol. 127, p. 104122, 2024. doi: [10.1016/j.jfluidstructs.2024.104122](https://doi.org/10.1016/j.jfluidstructs.2024.104122).
- [J2] D. Canova, S. Roatta, A. Saglietto, S. Scarsoglio, N. R. Gianotto, A. Piccotti, G. M. De Ferrari, L. Ridolfi, and M. Anselmino, "A quantitative assessment of cerebral hemodynamic perturbations associated with long R-R intervals in atrial fibrillation: A pilot-case-based experience," *Medicina*, vol. 60(4), p. 531, 2024. doi: [10.3390/medicina60040531](https://doi.org/10.3390/medicina60040531).
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- [J5] A. Saglietto, S. Scarsoglio, F. Tripoli, J. J. M. Zwanenburg, G. J. Biessels, G. M. De Ferrari, L. Ridolfi, and M. Anselmino, "Atrial fibrillation hemodynamic effects on lenticulostriate arteries identified at 7-tesla cerebral MRI," *Clinical and Translational Medicine*, vol. 13, p. e1367, 2023. doi: [10.1002/ctm2.1367](https://doi.org/10.1002/ctm2.1367).
- [J6] S. Scarsoglio, M. Fois, and L. Ridolfi, "Increased hemodynamic pulsatility in the cerebral microcirculation during parabolic flight-induced microgravity: A computational investigation," *Acta Astronautica*, vol. 211, p. 344–352, 2023. doi: [10.1016/j.actaastro.2023.06.018](https://doi.org/10.1016/j.actaastro.2023.06.018).
- [J7] G. Iacobello, S. Chowdhuri, L. Ridolfi, L. Rondoni, and S. Scarsoglio, "Coherent structures at the origin of time irreversibility in wall turbulence," *Communications Physics*, vol. 6(1), p. 91, 2023. doi: [10.1038/s42005-023-01215-y](https://doi.org/10.1038/s42005-023-01215-y).
- [J8] A. Saglietto, S. Scarsoglio, D. Canova, G. M. De Ferrari, L. Ridolfi, and M. Anselmino, "Beat-to-beat finger photoplethysmography in atrial fibrillation patients undergoing electrical cardioversion," *Scientific Reports*, vol. 13, p. 6751, 2023. doi: [10.1038/s41598-023-33952-z](https://doi.org/10.1038/s41598-023-33952-z).
- [J9] D. Perrone, J. G. M. Kuerten, L. Ridolfi, and S. Scarsoglio, "Investigating the magnitude and temporal localization of inertial particle mixing in turbulent channel flows," *International Journal of Multiphase Flow*, vol. 165, p. 104489, 2023. doi: [10.1016/j.ijmultiphaseflow.2023.104489](https://doi.org/10.1016/j.ijmultiphaseflow.2023.104489).
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Book Chapters

- [B1] F. Jeltsch, L. Turnbull, S. Scarsoglio, C. L. Alados, F. Gallart, E. N. Mueller, N. Barbier, J. D. A. Millington, J. Wainwright, M. Wiczorek, and V. Grimm, "Chapter 3: Resilience, Self-Organization, Complexity and Pattern Formation," in *Patterns of Land Degradation in Drylands: Understanding Self-Organized Ecogeomorphic Systems* (E. N. Mueller, J. Wainwright, A. J. Parsons, L. Turnbull, ed.), pp. 55–84, ISBN: 978–94–007–5726–4, Springer, 2014. doi: [10.1007/978-94-007-5727-1_3](https://doi.org/10.1007/978-94-007-5727-1_3).
- [B2] L. Turnbull, T. Hochstrasser, M. Wiczorek, A. Baas, J. Wainwright, S. Scarsoglio, B. Tietjen, F. Jeltsch, and E. N. Mueller, "Chapter 7: Approaches to Modelling Ecogeomorphic Systems," in *Patterns of Land Degradation in Drylands: Understanding Self-Organized Ecogeomorphic Systems* (E. N. Mueller, J. Wainwright, A. J. Parsons, L. Turnbull, ed.), pp. 171–209, ISBN: 978–94–007–5726–4, Springer, 2014. doi:[10.1007/978-94-007-5727-1_7](https://doi.org/10.1007/978-94-007-5727-1_7).
- [B3] L. Ridolfi, P. D'Odorico, and F. Laio, "Chapter 5: Noise-induced pattern formation," in *Noise-Induced Phenomena in the Environmental Sciences* (Cambridge University Press, New York, ed.), pp. 167–239, ISBN: 978–0–521–19818–9, 2011. Contribution to the numerical simulations and the analysis of the results (see Preface). www.cambridge.org/9780521198189.

Proceedings and Conference Presentations (Speaker underlined)

- [PC1] Fois, M., A. Diaz-Artiles, S. Y. Zaman, L. Ridolfi, and S. Scarsoglio, "An in silico-in vivo framework for the acute ocular and cardiovascular response to 6° head-down tilt," in *XII Italian Chapter of the European Society of Biomechanics*, vol. 12, (XII Annual Meeting of the Italian Chapter of the European Society of Biomechanics, Torino, Italy, September 18-19, 2023), p. 1, 2023.
- [PC2] Tripoli, F., A. Saglietto, J. Zwanenburg, G. J. Biessels, G. M. De Ferrari, M. Anselmino, L. Ridolfi, and S. Scarsoglio, "Impact of vessel morphology on hemodynamics of lenticulostriate arteries during atrial fibrillation," in *XII Italian Chapter of the European Society of Biomechanics*, vol. 12, (XII Annual Meeting of the Italian Chapter of the European Society of Biomechanics, Torino, Italy, September 18-19, 2023), p. 1, 2023.

- [PC3] Saglietto, A., S. Scarsoglio, F. Tripoli, J. Zwanenburg, G. Biessels, G. M. Ridolfi, L. ana De Ferrari, and M. Anselmino, "Cerebral hemodynamics during atrial fibrillation: computational fluid dynamics (CFD) analysis of lenticulostriate arteries using 7T high-resolution magnetic resonance imaging," in *European Heart Journal, ESC Congress 2022, Oxford University Press*, vol. 43, Issue suppl. 2, (European Society of Cardiology Congress, Barcelona, Spain, 26-29 August, 2022), p. 501, 2022. doi: [10.1093/eurheartj/ehac544.501](https://doi.org/10.1093/eurheartj/ehac544.501).
- [PC4] Iacobello, G., S. Chowdhuri, L. Ridolfi, L. Rondoni, and S. Scarsoglio, "Multiscale analysis of time irreversibility in wall turbulence," in *European Fluid Mechanics Conference 14 Book of Abstracts*, vol. 14, (14th European Fluid Mechanics Conference, Athens, Greece, September 13-16, 2022), p. 866, 2022.
- [PC5] Fois, M., L. Ridolfi, and S. Scarsoglio, "Cardiovascular response to orthostatic stress: multiscale modeling with focus on the coronary circulation," in *CMBE 2022 Proceedings Vol. 1*, vol. 7, (7th International Conference on Computational and Mathematical Biomedical Engineering, Milan, Italy, June 27-29, 2022), pp. 336–339, 2022.
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- [PC46] Allamano, P., E. Bartolini, P. Claps, F. Laio, and S. Scarsoglio, "Spatial interpolation of extreme-precipitation with intermittent records," in *Geophysical Research Abstracts EGU2011*, vol. 13, (European Geosciences Union, General Assembly 2011, Vienna, Austria, April 3-8, 2011), p. 12207, 2011.
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- [PC52] Scarsoglio, S., D. Tordella, and W. O. Criminale, "Temporal dynamics of small perturbations for a 2D growing wake," in *Advances in Turbulence XI. ETC11, CIMNE (ESP)*, vol. 117, (11th Euromech European Turbulence Conference, Porto, Portugal, June 25-29, 2007), pp. 221-223, ISBN: 978-3-540-72603-6, 2007. doi: [10.1007/978-3-540-72604-3_70](https://doi.org/10.1007/978-3-540-72604-3_70).
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- [PC54] Tordella, D., S. Scarsoglio, and M. Belan, "A synthetic perturbative hypothesis for multiscale analysis of bluff-body wake instability," in *European Fluid Mechanics Conference 6 Book of Abstracts*, vol. 6, (Euromech Fluid Mechanics Conference 6, Stockholm, Sweden, June 26-30, 2006), p. 317, 2006.
- [PC55] Scarsoglio, S., D. Tordella, and M. Belan, "Analysis of the convective instability of the 2D wake," in *22nd IFIP TC 7 Conference on System Modeling and Optimization*, vol. 1, (22nd IFIP TC 7 Conference on System Modeling and Optimization, Torino, Italy, July 18-22, 2005), p. 77 (5 pages), 2005.

PhD Thesis

- [T1] S. Scarsoglio, *Hydrodynamic linear stability of the two-dimensional bluff-body wake through modal analysis and initial-value problem formulation*. PhD thesis, Politecnico di Torino, Torino, Italy, 2008.

Invited Talks

- May 23, 2023 *Human spaceflight alterations: a journey from experiments to computational modeling*, Missione Spazio: come orbitano corpo e mente, Politecnico di Torino, Torino, Italy (hosted by AESA Torino).
- Jun 24-25, 2020 *Complex Networks Approach to Wall-Bounded Turbulence*, Workshop on Network Science for Fluid Dynamics, online at UCLA, Los Angeles, California USA (hosted by Prof. K. Taira and Dr. M. Munson).
- Feb 18, 2015 *Lumped-parameter modeling of the cardiovascular system*, "Città della Salute e della Scienza" Hospital, University of Turin, Division of Cardiology, Torino, Italy (hosted by Dr. M. Anselmino and Prof. F. Gaita).
- Jun 22, 2011 *Spatial pattern formation induced by stochastic processes*, Systems Biomedicine, Department of Experimental Oncology, Campus IFOM-IEO, Milan, Italy (hosted by Dr. A. D'Onofrio).
- Apr 6, 2011 *Hydrodynamic stability and energy spectrum power-law decay of linearized perturbed systems: the 2D bluff-body wake*, Computational Science and Engineering Laboratory, ETH Zurich, Zurich, Switzerland (hosted by Prof. P. Koumoutsakos).
- Jun 7-10, 2010 *Noise-induced spatial pattern formation*, European Science Foundation Workshop "Self-organised ecogeomorphic systems: confronting models with data for land-degradation in drylands". Poster presentation and seminar session. Potsdam, Germany.
- May 6, 2010 *Hydrodynamic linear stability of the two-dimensional bluff-body wake through modal analysis and initial-value problem formulation and Noise-induced spatial pattern formation in dynamical systems*, DICAT, Università degli Studi di Genova, Genova, Italy (hosted by Prof. A. Bottaro).
- Sep 4, 2007 *Instability and turbulence in flows of automotive and aeronautical interest*, Research Projects between Unione Industriale Torino and Politecnico di Torino. Unione Industriale Torino, Torino, Italy.

Apr 6, 2006 *Absolute and convective instability of the two-dimensional wake*, Applied and Computational Mathematical Sciences Seminars, University of Washington, Seattle, Washington USA (hosted by Dr. C. Lind and Prof. W. O. Criminale).

Qualifications

2023 National Scientific Qualification (ASN – "Abilitazione Scientifica Nazionale") as full professor in Aeronautical, Aerospace and Marine Engineering, 09/A1
Validity: 6th February 2023 through 6th February 2033

Institutional Academic Roles

2020 Member of the Scientific Board for PhD Admission Examination (Politecnico di Torino, 36 Cycle, Aerospace Engineering)

2017-present Member of the PolitoBIOMed Lab - Biomedical Engineering Lab, Politecnico di Torino

2017-present Student Tutoring Service for the MSc and BSc Degrees in Aerospace Engineering, Politecnico di Torino

2017-present Reference Teacher within the AVA-ANVUR Procedure (Italian National Agency for the Evaluation of the University and Research Systems) for the BSc Degree in Aerospace Engineering, Politecnico di Torino

2017-present Member of the Scientific Boards for Assistant Professor positions (Researcher A-Type) in Fluid Dynamics (University of Bologna, University of Naples, Politecnico di Torino)

2017-present Member of the Scientific Board for PhD Final Examination (Politecnico di Torino and Università degli Studi di Udine)

2020 Member of the Scientific Board for PhD Admission Examination (Politecnico di Torino)

2015-2016 Aggregate member (Aerospace Engineering) of the Committee for the Professional Engineering Qualifying Examination (Esami di stato per l'abilitazione all'esercizio della professione di Ingegnere), I and II sessions, Politecnico di Torino

2015-present Erasmus+ and Extra-UE Mobility Coordinator for the MSc Degree in Aerospace Engineering, Politecnico di Torino

2016-present "Young Talent Project" Mobility Coordinator for the BSc Degree in Aerospace Engineering, Politecnico di Torino

2015-present Member of the Scientific Board for Post-graduate and Post-doc research fellowships, Politecnico di Torino

2015-present Effective Member of the Scientific Board for the PhD School in Aerospace Engineering, Politecnico di Torino

2014 Aggregate Member of the Scientific Board for the PhD School in Aerospace Engineering, Politecnico di Torino

2013-2014 Aggregate Member of the Scientific Board for the PhD School in Environmental Engineering, Politecnico di Torino

2012-present Member of the Degree Board for Aerospace Engineering (MSc and BSc), Mechanical Engineering (MSc and BSc), Civil Engineering (MSc), Biomedical Engineering (MSc), Politecnico di Torino

2012-present Member of the Examination Board for Aerospace Engineering Courses (Aeroelasticity, Applied Aerodynamics, Aerodynamics, Aero-acoustics, Applied thermodynamics and heat transfer), and Mathematical Engineering Courses (Fluid Dynamics), Politecnico di Torino

Previous Positions

Oct, 2014 - **Assistant Professor with tenure in Fluid Dynamics**
Jan, 2018 Department of Mechanical and Aerospace Engineering
Politecnico di Torino, Torino, Italy

Oct, 2011 - **Assistant Professor in Fluid Dynamics**
Oct, 2014 Department of Mechanical and Aerospace Engineering
Politecnico di Torino, Torino, Italy

Jul, 2011 - **Term-Contract Worker**
Sep, 2011 CIFS, Interuniversity Consortium for Space Physics, Torino, Italy
Scientific Advisor: Prof. D. Tordella.

Jul, 2009 - **Post-Doctoral Research Fellow**
May, 2011 Department of Water Engineering, Politecnico di Torino, Torino, Italy
Project: Spatial pattern formation induced by stochastic processes.
Scientific Advisors: Prof. F. Laio and Prof. L. Ridolfi.

May, 2008 - **Fluid Dynamics and Mechanical Analyst**
May, 2009 Fiat Research Center, Powertrain Technologies and Research, Torino, Italy
Finite element modelling, thermal and thermo-structural analysis. Engine components analysis for automotive Diesel and gasoline applications

Feb-May, 2008 **Post-Doctoral Research Fellow**
Department of Aeronautics and Space Engineering, Politecnico di Torino
Project: Regione Piemonte Research Grant E59 "Aerodynamic simulation of an ultra-light airfoil".
Scientific Advisor: Prof. D. Tordella.

Visiting Positions

Oct, 2011 - **Visiting assistant professor**
Dec, 2011 Massachusetts Institute of Technology, Cambridge MA, USA
Mathematics Department, Prof. G. Staffilani

Jan, 2006 - **Visiting graduate student**
Jan, 2007 University of Washington, Seattle WA, USA
Department of Applied Mathematics, Prof. W. O. Criminale

Organization of scientific meetings

Oct, 2009 **Member of the Organizing Committee**
Euromech Colloquium 512, *Small Scale Turbulence and Related Gradient Statistics* (www.euromech512.polito.it/), Accademia delle Scienze di Torino, Torino, Italy.

Referee Activity

Referee for the following ISI journals:

- Scientific Reports, Journal of Fluid Mechanics, Annals of Biomedical Engineering, PLoS ONE, Computer Methods and Programs in Biomedicine, Computers in Biology and Medicine, Journal of Computational Physics, Chaos, Physics Letters A, Fluid Dynamics Research, Journal of Fluids Engineering, International Journal of Bifurcation and Chaos, Frontiers in Human Neuroscience, Hydrology and Earth System Sciences, Ecological Complexity, Stochastic Environmental Research and Risk Assessment, Discrete Dynamics in Nature and Society

Memberships of Scientific Societies

- 2006-present Member of the European Mechanics Society
2006-present Member of the American Physical Society

Teaching Experience

Teacher

- 2023-present Teacher, *Biofluid dynamics and space medicine* (Master Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2022-present Teacher, *Thermo-fluid dynamics* (Undergraduate Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2018-2023 Teacher (together with Dr. D. D'Ambrosio), *Fluid dynamics in space flight* (Master Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2016-2022 Teacher, *Applied thermodynamics and heat transfer* (Undergraduate Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2015-2016 Teacher (together with Prof. E. Carrera), *Aeroelasticity* (Master Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2007-2008 Teacher (together with Prof. D. Tordella and Dr. G. Khujadze), *Hydrodynamic Stability* (PhD course, Politecnico di Torino, Torino, Italy)

Teaching Assistant

- 2012-2023 *Aerodynamics* (teacher: Prof. R. Arina, Undergraduate Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2014-2015 *Gas dynamics* (teacher: Prof. G. Iuso, Master Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2012-2015 *Applied aerodynamics* (teacher: Prof. G. M. Di Cicca, Undergraduate Course, Aerospace Engineering, Politecnico di Torino, Torino, Italy)
- 2011-2014 *Fluid dynamics* (teacher: Prof. D. Tordella, Master Course, Mathematical Engineering, Politecnico di Torino, Torino, Italy)
2007-2008

Thesis and Research Project Advisership

PhD Students

- Mar, 2024 - present
Luca Congiu
Research Topic: "Cerebral fluid dynamics: an integrated clinical-computational approach to investigate the link between atrial fibrillation and dementia".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXIX Cycle (Advisor: S. Scarsoglio, Co-Advisor: L. Ridolfi)
- Nov, 2023 - present
Francesco Tripoli
Research Topic: "Optimizing countermeasures against cardiovascular deconditioning and cerebral hemodynamics changes in long-term human spaceflights".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXIX Cycle (Advisor: S. Scarsoglio, Co-Advisor: L. Ridolfi)
- Nov, 2020 - Apr, 2024
Matteo Fois
Research Topic: "Impact of posture and gravity on the cardiovascular system: a validated multiscale modeling approach for ground-based and spaceflight applications".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXVI Cycle (Advisor: S. Scarsoglio, Co-Advisor: L. Ridolfi)
- May, 2020 - May 2024
Davide Perrone
Research Topic: "Lagrangian dynamics in wall-bounded transitional and turbulent flows: particle tracking and network-based analyses".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXVI Cycle (Advisor: S. Scarsoglio, Co-Advisor: L. Ridolfi)
- Nov, 2017 - Jan, 2021
Caterina Gallo
Research Topic: "A multiscale modelling of the cardiovascular fluid dynamics for clinical and space applications".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXIII Cycle (Advisor: S. Scarsoglio, Co-Advisor: L. Ridolfi)
- Nov, 2016 - Apr, 2020
Giovanni Iacobello
Research Topic: "Spatio-temporal analysis of wall-bounded turbulence: A multidisciplinary perspective via complex networks".
PhD School in Aerospace Engineering, Politecnico di Torino, XXXII Cycle (Advisor: S. Scarsoglio)

Master Degree

- ongoing
M. Mastrogiacomo, *Quantifying paravalvular leakage (PVL) after transcatheter aortic valve replacement (TAVR) using particle image velocimetry (PIV)*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: Auburn University/Polito, Advisors: S. Scarsoglio, V. Raghav)
- Apr, 2024
A. Molinas, *Analysis of the human body cooling system inside spacesuits during ExtraVehicular Activities*, MSc in Aerospace Engineering, Politecnico di Torino (Advisor with F. Gentile)

- Jul, 2023 G. Santanatoglia, *A fluid dynamics study using image processing of scallops on dissolving hard candy*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: University of Twente/Polito, Advisors: S. Scarsoglio, S. Huisman)
- Apr, 2023 N. Francescato, *Self-excited oscillations in collapsible tubes*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: Auburn University/Polito, Advisors: S. Scarsoglio, V. Raghav)
- Jul, 2022 F. Tripoli, *Computational hemodynamics of lenticulostriate arteries during atrial fibrillation*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Mar, 2022 C. Viazzo, *Analysis of historical temperature time-series*, MSc in Mathematical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi and P. Salizzoni)
- Mar, 2022 M. Perrone, *Innovative analysis of turbulent transport*, MSc in Mathematical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi and G. Iacobello)
- Dec, 2021 F. Montanari, *Methods for planning the logistical operations of a vehicle fleet to support a production line*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: Institut Supérieur de Mécanique de Paris/Polito, Advisors: R. Arina, S. Scarsoglio, P. Leclaire, A. Bit-Monnot)
- Dec, 2021 M.C. Arminio, *CFD analysis of lenticulostriate arteries in presence of cardiac arrhythmias*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi and G. Dubini)
- Dec, 2019 D. Perrone, *Lagrangian analysis of the turbulent mixing*, MSc in Aerospace Engineering, Politecnico di Torino (Advisor with L. Ridolfi)
- Jul, 2019 L. Capello, *Recurrence plot analysis of turbulent boundary layers with passive scalar dispersion*, MSc in Mechanical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi and G. Iacobello)
- Mar, 2019 M. Grumo, *Complex network analysis of wind tunnel experiments on the passive scalar dispersion in a turbulent boundary layer*, MSc in Aerospace Engineering, Politecnico di Torino (Advisor with L. Ridolfi and G. Iacobello)
- Dec, 2018 A. Pasino, *Innovative analyses of meteorological data*, MSc in Mathematical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi and G. Iacobello)
- Dec, 2018 F. Dallari, *Complex-network analysis of turbulent channel flow: effects of the Reynolds number*, MSc in Aerospace Engineering, Politecnico di Torino (Advisor with L. Ridolfi and G. Iacobello)
- Oct, 2018 I. Ferrandino, *Heartbeat sequence extraction from cerebral NIRS measures*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Oct, 2018 M. Assale, *Network analysis of MRI-based aortic blood flow*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Oct, 2017 M. Bivona, *Validation of a 3D thermo-hydraulic code for the steam generation*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: École Centrale de Lyon/Polito, Advisors: S. Scarsoglio, and J.M. Vignon)
- Oct, 2017 M. Nicoletti, *Implementation of a wake detector and wind farm control algorithm for wind tunnel tests*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: Technical University of Munich/Polito, Advisors: S. Scarsoglio, R. Arina, and J. Schreiber)

- Jul, 2017 A. Cina, *Predictive models for the evolution of aortic aneurysms. Formulation and validation on the Database of the Hypertension Center "Città della Salute e della Scienza di Torino" Hospital*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Apr, 2017 C. Gallo, *Effects of arrhythmias on the arterial fluid dynamics*, MSc in Aerospace Engineering, Politecnico di Torino (Advisor with L. Ridolfi)
- Mar, 2017 F. Antigo, *Determinants of the evolution of aortic aneurysms. Multivariate analysis of the Database of the Hypertension Center "Città della Salute e della Scienza di Torino" Hospital*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Dec, 2016 T. Rossi, *Numerical analysis of surface pattern for a clutch*, MSc in Mechanical Engineering, Politecnico di Torino (Thesis abroad: Karlsruhe Institute of Technology/Polito, Advisors: S. Scarsoglio, B. Frohnäpfel, J. Kriegseis, and A. Codrignani)
- Dec, 2016 R. Giunta, *Hydraulic losses in Fontan procedure for the treatment of the univentricular heart in infants. A numerical study*, MSc in Biomedical Engineering, Politecnico di Torino (Advisor with D. Gallo, L. Ridolfi, and U. Morbiducci)
- Oct, 2016 F. Cazzato, *From time-series to complex networks: application to the cerebrovascular patterns in atrial fibrillation*, MSc in Biomedical Engineering, Politecnico di Torino (Co-advisor with L. Ridolfi)
- Oct, 2016 F. Imerti, *Lattice-Boltzmann numerical simulation of a rod in the sub-critical turbulent regime*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: École Centrale de Lyon/Polito, Advisors: S. Scarsoglio, R. Arina, and E. Lévêque)
- Jul, 2016 A. Aprile, *Modeling and simulation of irregular sea spectra*, MSc in Aerospace Engineering, Politecnico di Torino (Thesis abroad: NASA JPL CalTech/Polito, Advisors: R. Arina, S. Scarsoglio and M. B. Quadrelli)
- Apr, 2016 G. Iacobello, *New insights into spatial characterization of turbulent flows: a complex network-based analysis*, MSc in Aerospace Engineering, Politecnico di Torino
- Dec, 2015 E. Siuni, *Elastodynamics of collapsible tubes*, MSc in Civil Engineering, Politecnico di Torino (Co-advisor with C. Camporeale and L. Ridolfi)
- Jul, 2014 G. Barletta, *A complex network approach for the analysis of turbulent flows. Application to homogeneous isotropic turbulence*, MSc in Aerospace Engineering, Politecnico di Torino
- Dec, 2012 A. Boscolo, *Perturbative and mean pressure field in the 3D boundary layer*, MSc in Aerospace Engineering, Politecnico di Torino (Co-advisor with D. Tordella)
- Jul, 2011 M. Mastinu, *Collective behaviour of 3D linear perturbation waves in shear flows*, MSc in Mathematical Engineering, Politecnico di Torino (Co-advisor with D. Tordella)

Bachelor Degree

- 2010-present Advisor of more than 50 Bachelor Final Projects for the BSc in Aerospace and Mechanical Engineering, Politecnico di Torino

National and International Research Projects and Grants

- 2024 **Post-Graduate Research Fellowship**
Research Topic: "Effects of cardiac arrhythmias on the cerebral circulation: multiscale hemodynamic analysis". Fellowship awarded to Luca Congiu.
Role: Supervisor (with L. Ridolfi)
- 2023-present **MUR PRIN 2022**
Title: "Cerebral fluid dynamics: investigating the association between atrial fibrillation and dementia through an integrated in silico-in vivo framework".
Role: Principal Investigator
- 2023-present **ESA PhD co-funded Research Project Open Space Innovation Platform (OSIP)**
Title: "Optimizing countermeasures against cardiovascular deconditioning and cerebral hemodynamics changes in long-term human spaceflights".
Role: Principal Investigator
- 2023 **Post-Graduate Research Fellowship**
Research Topic: "Gravity effects on the cardiovascular system: multiscale hemodynamic analysis in micro- and hypergravity conditions for human spaceflight". Fellowship awarded to Francesco Tripoli.
Role: Supervisor (with L. Ridolfi)
- 2022-2023 **Post-Graduate Research Fellowship**
Research Topic: "Cerebral hemodynamics during cardiac arrhythmias: CFD analysis of lenticulostriate arteries through high-resolution magnetic resonance imaging". Fellowship awarded to Francesco Tripoli.
Role: Supervisor (with L. Ridolfi)
- 2020-present **Research Project**
Title: "Computational fluid dynamics of the lenticulostriate arteries during atrial fibrillation", Università degli Studi di Torino, Politecnico di Torino, Universitair Medisch Centrum Utrecht.
Role: Scientific advisor
- 2019-2020 **Post-Doc Research Fellowship**
Research Topic: "Application of the complex network theory for the analysis of wall turbulence (CNTURB)". Fellowship awarded to Giovanni Iacobello.
Role: Supervisor (with L. Ridolfi)
- Dec, 2017 **FFABR Grant**
MIUR Funds for financing fundamental research activities.

- 2017 **Post-Graduate Research Fellowship "Ernesto e Ben Omega Petrazzini", Accademia delle Scienze di Torino**
Research Topic: "Effects of acceleration on human blood circulation for aerospace applications". Fellowship awarded to Caterina Gallo.
Role: Supervisor
- 2017-2020 **Compagnia di San Paolo - UNITO Excellent Young PI Research Project, CSTO160444**
Title: "Cerebral hemodynamics during atrial fibrillation", Università degli Studi di Torino and Politecnico di Torino.
Role: Participant
- 2016 **Post-Graduate Research Fellowship "Ernesto e Ben Omega Petrazzini", Accademia delle Scienze di Torino**
Research Topic: "Advanced techniques for the analysis of turbulent flows: application to the complex network theory". Fellowship awarded to Giovanni Iacobello.
Role: Supervisor
- 2013-2014 **ISCRA Project Class C HP10CGPPAA, IsC15 (CINECA)**
Title: "Acoustic and turbulence numerical simulations", Politecnico di Torino.
Role: Participant
- 2012-2013 **ISCRA Project Class C HP10CKRIG3, IsC09 (CINECA)**
Title: "Technical assessment of MPI code and development and comparison of hybrid openMP/MPI code for the solution of the Navier-Stokes equations", Politecnico di Torino.
Role: Participant
- 2010-2011 **ISCRA Project Class A HP10AJ2GTB, IsA01 (CINECA)**
Title: "Turbulent mixing and diffusion", Politecnico di Torino.
Role: Participant
- 2009-2012 **MITOR Project between MIT and Politecnico di Torino**
Title: "Long term interaction in flow systems".
Role: Participant
- 2005-2010 **Regione Piemonte Project E59**
Title: "New concepts and methodologies for the development of innovative ultralight aircrafts", Politecnico di Torino.
Role: Participant
- 2006-2010 **Internationalization Programme between the Politecnico di Torino and the University of Washington**

Title: "Joint actions in the field of fundamental and applied fluid dynamics".

Role: Participant

2005-2007 **PRIN**

Title: "Mean-long term evolution of hypersonic jets: visualization, density and concentration measurements, numerical simulation. Application to the stellar jets".

Role: Participant

Computer Skills

Software Environments Matlab, Mathematica, R

Programming Languages Fortran 77, C

Commercial Software Altair HyperMesh, Abaqus, MSC Nastran, MSC Fatigue

Markup Languages LaTeX, HTML

Web Development Languages: PHP, CSS, JS. Database Management System: MySQL. Content Management System: Joomla

OS Microsoft Windows, Linux

Linguistic Knowledge

Italian Native

English Very Good (First Certificate in English, December 1999)

French Basic

Education

Mar, 2008 **Doctor of Philosophy, Fluid Dynamics**

Department of Aeronautics and Space Engineering, Politecnico di Torino (XX Cycle), Torino, Italy

Thesis: Hydrodynamic linear stability of the two-dimensional bluff-body wake through modal analysis and initial-value problem formulation

Advisor: Prof. D. Tordella

Dec, 2004 **Master of Science, Mathematical Engineering**

Politecnico di Torino, Torino, Italy

Thesis: Linear stability of non-parallel flows. Multiscale analysis applied to the bluff-body wake

Advisor: Prof. D. Tordella

Marks: 110/110 *cum laude*

- Oct, 2002 **Bachelor of Arts, Mathematics for Engineering Sciences**
Politecnico di Torino, Torino, Italy
Thesis: Finite element formulation of eddy currents in terms of the magnetic potential
Advisor: Prof. M. Repetto
Marks: 105/110
- Jul, 1999 **High School diploma**
Liceo Scientifico N. Copernico, Torino, Italy
Marks: 100/100