Curriculum Vitæ of Marco Martins Afonso

August, 2026 (Français and Português versions follow at the end of this document)

Personal data

Name :	Marco
Surname :	Martins Afonso
Birth :	Genoa (Italy), Friday September 21, 1979
Nationality :	Italian
Languages :	Italian, English, French, Portuguese, Genoese, Latin

Academic Institution

Address :	SIT Technologies; Università di Genova, DIME-MASET-TPG; via Montallegro 1, 16145 Genova, Italy (Villa Cambiaso - padiglioni F.019 F.037)
Membership :	Centro de Matemática da Universidade do Porto, CMUP; Departamento de Matemática da Faculdade de Ciências, FCUP; Rua do Campo Alegre, 687; 4169-007 Porto; Portugal
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Studies and positions

2024 –	Research fellowship at DIME-MASET-TPG, University of Genova (Italy).
2024	External consultancy at "SIT Technologies", University of Genova (Italy).
2022 – 2023	Research contract at the Centro de Matemática da Universidade do Porto (Portugal).
2015 – 2020	Post-doc position at the Centro de Matemática da Universidade do Porto (Portugal). Supervisor : Sílvio Marques de Almeida Gama.
2013 – 2014	Post-doc position in the group Instabilité Turbulence et Contrôle, Laboratoire de Mécanique Modélisation et Procédés Propres (Marseille, France). Supervisor : Eric Serre.
2011 – 2013	Post-doc position in the group Analyse Calcul Scientifique Industriel et Optimisation de Montpellier, Institut de Mathématiques et de Modélisation de Montpellier (France). Supervisor : Franck Nicoud.

2009 – 2011	Post-doc position in the group Particules Spray et Combustion, Institut de Mécanique des Fluides de Toulouse (France). Supervisor : Olivier Simonin.
2007 – 2008	Post-doc research scholarship at the Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (USA). Supervisor : Charles Meneveau.
2006 – 2007	Post-doc fellowship at the Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israel). Supervisor : Gregory Falkovich.
2006	Ph.D. thesis: *Analytical models of turbulence: from large scales to small scales, and beyond*. Advisors : Roberto Festa, Andrea Mazzino, Guido Boffetta. Defence : Genova, May 22, 2006.
2003 – 2006	Ph.D. in Physics: University of Genova.
2002	Laurea thesis: "Un modello risolubile analiticamente di Large-Eddy Simulation di campi scalari passivi" (*An analytically solvable model of large-eddy simulation of passive scalar fields*). Advisors : Roberto Festa, Andrea Mazzino. Defence : Genova, July 10, 2002.
1997 – 2002	Undergraduate studies in Physics: University of Genova, final mark 110/110 cum laude.
1997	High-school degree: Scientific High School "G.D. Cassini" - Genova, final mark 60/60 cum laude.

Stages in foreign laboratories

- *Centro de Matemática da Universidade do Porto* (Portugal). November–December 2019. Collaboration with S.M.A. Gama on issues related to tracer and inertial particles.

- *Laboratoire Jean-Alexandre Dieudonné*, Nice (France). January 2019, February 2020, November 2021. Collaboration with D. Vincenzi on issues related to magnetohydrodynamics and polymers.

- *University of Helsinki* (Finland). August–September 2011. Collaboration with Dr. Paolo Muratore-Ginanneschi on issues related to diffusion of inertial particles.

- *Weizmann Institute of Science*, Rehovot (Israel). January 2006. Collaboration with Prof. Gregory Falkovich on issues related to passive-scalar turbulence.

- *Observatoire de la Côte d'Azur*, Nice (France). December 2004–April 2005. Collaboration with Prof. Uriel Frisch on issues related to the multifractal theory of turbulence.

- *Institut Non-Linéaire de Nice*, Valbonne-Sophia-Antipolis (France). February–May 2004. Collaboration with Dr. Antonio Celani on issues related to scalar turbulent transport.

Keywords of my research activity

- Passive-scalar turbulence, tracer statistics in Kraichnan model
- Coarse-grained description, large-eddy simulations
- Non-ideal turbulence: compressibility, anisotropy, inhomogeneity (point source)
- Polymers, FENE model
- Inertial particles: aerosols, droplets, bubbles
- Transport properties: settling velocity, eddy diffusivity
- Multiple-scale expansion, second-quantization algorithm
- Multifractal formalism, large-deviation theory
- Statistics of the velocity field, closure models for its gradient tensor
- Effect of turbulence on biological systems (microorganisms in bioreactors)
- Falling granular jets, mesoscopic approach, two-fluid model
- Red blood cells, biological membranes (capsules, vesicles)
- Electrostatic field in diphasic flows, turbulent magnetic dynamo (Kazantsev)
- Stability analysis and separation control on aerodynamic profiles
- 2D point vortices, nanofluids
- Compressor stall and surge, energy harvesting from sea waves
- Theoretical, nonlinear and statistical physics
- Fluid mechanics, Lagrangian and Eulerian dynamics

List of publications

International journals

[31] *Random forest and XGBoost network learning on Darcy–Forchheimer magneto-bioconvection and entropy generation in a ferrofluid-filled porous wavy enclosure*
T. Islam, S. Gama and **M. Martins Afonso**
Journal of Thermal Analysis and Calorimetry, pp. 1-34 (8\)(2026).

[30] *Stretching and breaking of particles in compressible random flows*
D. Roy, **M. Martins Afonso**, J.R. Picardo and D. Vincenzi
Journal of Fluid Mechanics **1040**, no. A2, pp. 1-27 (2026).

[29] *Thermal Optimization of Magneto-Nanofluid Convection in Wavy Circular Enclosure Using Response Surface Method*
T. Islam, **M. Martins Afonso** and S. Gama
AppliedMath **6** (6), no. 96, pp. 1-28 (2026).

[28] *Experimental Investigation on the Dynamic Response of a Vaned Diffuser Compressor in Innovative Heat-Pump Systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont du Haut Champ, F. Reggio, A. Traverso and C. Halbe
Journal of Engineering for Gas Turbines and Power **148** (2), no. 021017, pp. 1–13 (2026).

[27] *Advanced machine learning analysis of bioconvection in nanofluid with oxytactic microorganisms in a porous wavy enclosure under inclined periodic magnetic effects*
T. Islam, S. Gama and **M. Martins Afonso**
Physics of Fluids **37** (8), no. 082070, pp. 1–34 (2025).

[26] *Artificial Neural Network and Response Surface Methodology-Driven Optimization of Cu-Al_2O_3/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama and **M. Martins Afonso**
Mathematics **13** (1), no. 78, pp. 1–44 (2024).

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** and S. Gama
IEEE *Control Systems Letters* **7**, 1760–1765 (2023).

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra and D. Vincenzi
Proceedings of the Royal Society A **475** (2223), no. 20180591, pp. 1–17 (2019).

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga and E. Serre
Fluids **4** (1), no. 33, pp. 1–16 (2019).

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso and S.M.A. Gama
European Physical Journal E **42** (1), no. 10, pp. 1–8 (2019).

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama and A. Mazzino
Physical Review Fluids **3** (4), no. 044501, pp. 1–21 (2018).

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso and S.M.A. Gama
Comptes Rendus Mécanique **346** (2), 121–131 (2017).

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino and S. Gama
Journal of Statistical Mechanics, 103205, pp. 1–17 (10\)(2016).

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** and A. Mazzino
Journal of Statistical Mechanics, P10023, pp. 1–21 (10\)(2015).

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89** (6), no. 063021, pp. 1–8 (2014).

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez and F. Nicoud
Journal of Fluid Mechanics **746**, 300–331 (2014).

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato and D. Pugliese
Europhysics Letters **102** (1), no. 14003, pp. 1–5 (2013).

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain and P. Schmitz
Chemical Engineering Science **81**, 8–19 (2012).

[13] *Eddy diffusivities of inertial particles under gravity*
M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
Journal of Fluid Mechanics **694**, 426–463 (2012).

[12] *Point-source inertial particle dispersion*
M. Martins Afonso and A. Mazzino
Geophysical and Astrophysical Fluid Dynamics **105** (6), 553–565 (2011).

[11] *Recent Fluid Deformation closure for velocity gradient tensor dynamics in turbulence: time-scale effects and expansions*
M. Martins Afonso and C. Meneveau
Physica D **239**, 1241–1250 (2010).

[10] *Renormalized transport of inertial particles in surface flows*
M. Martins Afonso, A. Mazzino and P. Olla
Journal of Physics A **42** (27), no. 275502, pp. 1–18 (2009).

[9] *The terminal velocity of sedimenting particles in a flowing fluid*
M. Martins Afonso
Journal of Physics A **41** (38), no. 385501, pp. 1–15 (2008).

[8] *Fluid-particle separation in a random flow described by the telegraph model*
G. Falkovich and **M. Martins Afonso**
Physical Review E **76** (2), no. 026312, pp. 1–5 (2007).

[7] *Point-source scalar turbulence*
A. Celani, **M. Martins Afonso** and A. Mazzino
Journal of Fluid Mechanics **583**, 189–198 (2007).

[6] *Coarse-grained description of a passive scalar*
A. Celani, **M. Martins Afonso** and A. Mazzino
Journal of Turbulence **7**, no. 52, pp. 1–18 (2006).

[5] *Does multifractal theory of turbulence have logarithms in the scaling relations?*
U. Frisch, **M. Martins Afonso**, A. Mazzino and V. Yakhot
Journal of Fluid Mechanics **542**, 97–103 (2005).

[4] *Structure of temperature fluctuations in turbulent convective boundary layers*
M. Antonelli, **M. Martins Afonso**, A. Mazzino and U. Rizza
Journal of Turbulence **6**, no. 35, pp. 1–34 (2005).

[3] *Nonlinear elastic polymers in random flows*
M. Martins Afonso and D. Vincenzi
Journal of Fluid Mechanics **540**, 99–108 (2005).

[2] *Inhomogeneous anisotropic passive scalars*
M. Martins Afonso and M. Sbragaglia
Journal of Turbulence **6**, no. 10, pp. 1–13 (2005).

[1] *Large-eddy-simulation closures of passive scalar turbulence: a systematic approach*
M. Martins Afonso, A. Celani, R. Festa and A. Mazzino
Journal of Fluid Mechanics **496**, 355–364 (2003).

Conference proceedings

[XIII] *Non-Intrusive Load Monitoring of a Two-Stage Dynamic Compressor in a Heat Pump*
P. Silvestri, **M. Martins Afonso**, L. Mantelli, F. Reggio, A. Traverso and V. Sishtla
In press on: *Proceedings of the 2026* ASME *International Mechanical Engineering Congress and Exposition*, Vancouver, BC (Canada), November 8–12, 2026, GT2025-151820, pp. 1-15.

[XII] *Compressor Surge Identification in a Refrigerant Closed-Loop System by Means of Approximate-Entropy Estimation*
M. Zahid, **M. Martins Afonso**, G. Liskiewicz, P. Korbel, P. Silvestri, A. Traverso and V. Sishtla
In: *Proceedings of the 2026* ASME *Turbo Expo Conference*, Milano (Italy), June 15–19, 2026, GT2026-177945, pp. 1-14.

[XI] *Instability Detection of a Two-Stage E-Driven Dynamic Compressor in an Industrial-Size Heat-Pump Loop*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso and V. Sishtla
In: *Proceedings of the 2026* ASME *Turbo Expo Conference*, Milano (Italy), June 15–19, 2026, GT2026-176515, pp. 1-14.

[X] *Experimental investigation on the dynamic response of a vaned diffuser compressor in innovative heat-pump systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso and C. Halbe
In: *Proceedings of the 2025* ASME *Turbo Expo Conference*, Memphis, TN (United States of America), June 16–20, 2025, GT2025-151820, V004T06A003, pp. 1-14.

[IX] *Application of multidimensional Hermite polynomials to fluid mechanics*
M. Martins Afonso and S.M.A. Gama
In: *Proceedings of SymComp2019* (ECCOMAS), Porto (Portugal), April 11–12, 2019 (eds.: Maria Amélia Loja, Joaquim Infante Barbosa, José Alberto Rodrigues and Paulo B. Vasconcelos), pp. 337–342, APMTAC.

[VIII] *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
M. Martins Afonso, S.M.A. Gama and A. Mazzino
In: *Proceedings of the 9th Turbulence, Heat and Mass Transfer Conference* (ICHMT), Rio de Janeiro (Brazil), July 10–13, 2018 (eds.: A.P. Silva Freire, K. Hamjalić, K. Suga, D. Borello and M. Hadžiabdić), pp. 175–178 (printed) & 141–152 (online), Begell House, Danbury.

[VII] *Inertial-particle dispersion and diffusion*
M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
In: *Advances in Turbulence XIII*, Proceedings of the 13th EUROMECH European Turbulence Conference, Warsaw (Poland), September 12–15, 2011, *Journal of Physics: Conference Series*, vol. 318, no. 052014, pp. 1–4.

[VI] *Renormalized transport of inertial particles*
M. Martins Afonso, A. Celani, A. Mazzino and P. Olla
In: *Advances in Turbulence XII*, Proceedings of the 12th EUROMECH European Turbulence Conference, Marburg (Germany), September 7–10, 2009 (ed.: B. Eckhardt), Springer Proceedings in Physics, vol. 132, pp. 505–508, Springer, Heidelberg.

[V] *Settling velocity of inertial particles*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), June 25–28, 2007 (eds.: J.M.L.M. Palma and A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 61–63, Springer, Heidelberg.

[IV] *Mixing of a passive scalar emitted from a random-in-time point source*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), June 25–28, 2007 (eds.: J.M.L.M. Palma and A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 206–208, Springer, Heidelberg.

[III] *Punctual emission of a passive scalar in turbulent flows*
A. Celani, **M. Martins Afonso** and A. Mazzino
To appear in a special issue of *Physics of Particles and Nuclei, Letters*, proceedings of the conference Mathematical Modeling and Computational Physics 2006, Tatranská Štrba (Slovakia), August 28–September 1, 2006.

[II] *Coarse-grained scalar transport: closures and large-eddy simulations*
A. Celani, **M. Martins Afonso** and A. Mazzino
In: *Progress in Turbulence II*, Proceedings of the iTi Conference on Turbulence, Bad Zwischenahn (Germany), September 25–28, 2005 (eds.: M. Oberlack, S. Guenther, T. Weller, G. Khujadze, A. Osman, M. Frewer and J. Peinke), Springer Proceedings in Physics, vol. 109, pp. 229–233, Springer, Heidelberg.

[I] *Closures for large-eddy simulations of passive scalars*
M. Martins Afonso, A. Celani and A. Mazzino
In: *Advances in Turbulence X*, Proceedings of the 10th European Turbulence Conference, Trondheim (Norway), June 29–July 2, 2004 (eds.: H.I. Andersson and P.A. Krogstad), pp. 319–322, CIMNE, Barcelona.

Book chapters

[00bis] *YALES2BIO : un solveur dédié aux écoulements sanguins*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic and F. Nicoud
Invited contribution in: *Écoulements biologiques dans les grands vaisseaux : dialogue entre modélisations numériques et études expérimentales in vitro/in vivo* (eds.: V. Deplano, J.-M. Fullana and C. Verdier), Sciences—Mécanique—Mécanique du vivant, ch. 7, pp. 185–208, ISTE, London (2023).

[00] *YALES2BIO: A General Purpose Solver Dedicated to Blood Flows*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic and F. Nicoud
Invited contribution in: *Biological Flow in Large Vessels: Dialog Between Numerical Modeling and In Vitro/In Vivo Experiments* (eds.: V. Deplano, J.-M. Fullana and C. Verdier), Sciences—Mechanics—Biomechanics, ch. 7, pp. 183–206, John Wiley & Sons, Hoboken, NJ (2022).

[0] *Flow-driven renormalization of transport and sedimentation for inertial particles*
M. Martins Afonso
Invited contribution in: *Mathematical Analysis and Applications in Engineering, Aerospace and Sciences* (ed.: S. Sivasundaram), Mathematical Problems in Engineering Aerospace and Sciences, vol. 5, no. 13, pp. 187–201, Cambridge Scientific Publishers, Cambridge (2012).

Survey articles

[∅] *Applications of mathematics in fluid dynamics*
M. Martins Afonso
Invited contribution in: CIM *Bulletin* **36**, 26–31 (March 2016).

Papers in online archives only

[ii] "Analyse théorique de stabilité linéaire d'un jet granulaire tombant" (*Theoretical analysis of linear stability for a falling granular jet*)
M. Martins Afonso
`HAL`: hal-00769571 (2013).

[i] *Fluid-particle separation in the Batchelor regime with telegraph model of noise*
M. Martins Afonso
`arXiv`: nlin.CD/0703056 (2007).

Editorials

- *Editorial for Special Issue "Multiscale Turbulent Transport"*
  M. Martins Afonso and S.M.A. Gama
  Fluids **4** (4), no. 185, pp. 1–2 (2019).

Volumes as editor and contributor

- *"Multiscale Turbulent Transport"*
  M. Martins Afonso and S. Gama
  10 chapters, 200 pages, MDPI (2020).
  Personal contributions: editorial pp. 1–2, article pp. 11–26.

Submitted manuscripts

- *Centrifugal compressor surge in closed loop systems: modelling and comparison with experiments*
  S. Purushothaman, A. Traverso, F. Reggio, **M. Martins Afonso**, C. Halbe and V. Sishtla
  submitted to: *International Journal of Refrigeration* (2026).

Communications in books of abstracts only

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  M. Martins Afonso, S.M.A. Gama, A. Mazzino and P. Muratore-Ginanneschi
  EUROMECH ETC17, no. 331, s2-r10 (2019).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  M. Martins Afonso
  WNA2019, pp. 16–17 (2019).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  M. Martins Afonso
  WOPA2017, p. 16 (2017).

- *Effective diffusivity of short-correlated random flows*
  M. Martins Afonso, A. Mazzino and S. Gama
  EUROMECH ETC16, no. 28722, C7-5 (2017).

- *Eddy diffusivity of short-correlated random flows: effects of helicity, molecular diffusion and mean streaming*
  M. Martins Afonso
  Flowing Matter 2017, p. 39 (2017).

- *Renormalized transport and diffusion of tracer and inertial particles*
  M. Martins Afonso, A. Mazzino and S. Gama
  ENSPM2016, p. 214 (2016).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  M. Martins Afonso and A. Mazzino
  EUROMECH ETC15, no. 331, M-TM1-5 (2015).

- *Optimal transient growth in flow past a slanted surface*
  M. Martins Afonso, P. Meliga and E. Serre
  APS Bulletin, vol. 59, no. 20, p. 413, R21.0005 (2014).

- *Stokes drift for inertial particles transported by water waves*
  F. Santamaria, G. Boffetta, **M. Martins Afonso**, M. Onorato and A. Mazzino
  EUROMECH ETC14, no. 147, MD1-PT6-1 (2013).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  M. Martins Afonso, A. Mazzino and P. Muratore-Ginanneschi
  EUROMECH ETC14, no. 133, TD1-PT8-3 (2013).

- *Renormalized transport of inertial particles*
  M. Martins Afonso, A. Celani, A. Mazzino and P. Olla
  APS Bulletin, vol. 55, no. 16, p. 196, GV.00001 (2010).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  M. Martins Afonso, J. Morchain and P. Fede
  II FERMaT–IMPACT meeting, p. 10 (2009).

- *Terminal velocity of inertial particles*
  A. Celani, **M. Martins Afonso** and A. Mazzino
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 48, 51/III[6] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso and C. Meneveau
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 36, 37/IV[7] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso and C. Meneveau
  APS Bulletin, vol. 53, no. 2, p. 151, D9.00002 (2008).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  G. Falkovich and **M. Martins Afonso**
  XXIII IUPAP International Conference on Statistical Physics, p. 346, 5C-164 (2007).

Posters

- *Study of the dynamics of the velocity gradient tensor*
  "Symposium on Fluid Science and Turbulence", May 30–31, 2008, Johns Hopkins University, Baltimore, MD (USA).

- *First-principle closures for passive-scalar turbulence*
  INFM National Course on "Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi", September 13–17, 2004, ISI - Villa Gualino, Torino (Italy).

Oral presentations

- *Effective transport of inertial particles in fluid flows*
  "Applied Mathematics: Analysis, Numerics and Computing" Seminar (Faculdade de Engenharia da Universidade do Porto), July 14, 2023, Porto (Portugal).

- *Effective and anomalous diffusion of inertial particles in fluid flows*
  "Dynamical Systems" Seminar (Centro de Matemática da Universidade do Porto), March 6, 2020, Porto (Portugal).

- *Renormalized transport of inertial particles*
  "Applied Mathematics and Numerical Analysis" Seminar (Instituto Superior Técnico), October 16, 2019, Lisboa (Portugal).

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  17th EUROMECH European Turbulence Conference, September 3–6, 2019, Torino (Italy).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  Invited speaker: WNA2019 "Workshop on Numerical Analysis", July 15, 2019, Porto (Portugal).

- *Application of multidimensional Hermite polynomials to fluid mechanics*
  4th International Conference on Numerical and Symbolic Computation: Developments and Applications (SymComp2019), April 11–12, 2019, Porto (Portugal).

- *Effective transport of inertial particles in fluid flows*
  "Interfaces" Seminar (Laboratoire Jean-Alexandre Dieudonné), January 25, 2019, Nice (France).

- *Renormalized transport of inertial particles*
  "Systems and Control" Seminar (Centro de Investigação e Desenvolvimento em Matemática e Aplicações), November 21, 2018, Aveiro (Portugal).

- *Renormalized transport of inertial particles*
  "Fluid Dynamics" Seminar (Instituto de Matemática Pura e Aplicada), July 11, 2018, Rio de Janeiro (Brazil).

- *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
  9th Turbulence, Heat and Mass Transfer Conference, July 10–13, 2018, Rio de Janeiro (Brazil).

- *Renormalized transport of inertial particles*
  Seminar (Centro de Matemática e Aplicaçoẽs, Universidade da Beira Interior), May 9, 2018, Covilhã (Portugal).

- *Applications of mathematics in fluid dynamics*
  Post-Doc Meeting (Centro de Matemática da Universidade do Porto), April 27, 2018, Porto (Portugal).

- *Settling velocity and eddy diffusivity of quasi-neutrally-buoyant inertial particles*
  Flowing Matter (COST Action MP 1305), February 5–9, 2018, Lisboa (Portugal).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  Invited speaker: WOPA2017 "Workshop on Orthogonal Polynomials and Applications", September 5, 2017, Porto (Portugal).

- *Effective diffusivity of short-correlated random flows*
  16th EUROMECH European Turbulence Conference, August 21–24, 2017, Stockholm (Sweden).

- *Renormalized transport of inertial particles*
  "Numerical Analysis and Optimization" Seminar (Centro de Matemática da Universidade de Coimbra), March 22, 2017, Coimbra (Portugal).

- *Eddy diffusivity of short-correlated random flows*
  Flowing Matter (COST Action MP1305), January 23–27, 2017, Porto (Portugal).

- *Effective and anomalous diffusion of tracer and inertial particles in flowing fluids*
  "Dynamical Systems" Seminar (Centro de Matemática da Universidade do Porto), September 30, 2016, Porto (Portugal).

- *Renormalized transport and diffusion of tracer and inertial particles*
  "Encontro Nacional da Sociedade Portuguesa de Matemática", July 11–13, 2016, Barreiro (Portugal).

- *Renormalized transport of inertial particles*
  Post-Doc Meeting (Centro de Matemática da Universidade do Porto), December 18, 2015, Porto (Portugal).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  15th EUROMECH European Turbulence Conference, August 25–28, 2015, Delft (Netherlands).

- *Optimal transient growth in flow past a slanted surface*
  67th APS–DFD Meeting, November 23–25, 2014, San Francisco, CA (USA).

- *Effective transport of inertial particles*
  Seminar (Department of Physics, University of Roma II "Tor Vergata"), February 13, 2014, Roma (Italy).

- *Transport effectif de particules inertielles*
  Seminar (Institut de Recherche sur les Phénomènes Hors Équilibre, Aix-Marseille Université), November 21, 2013, Marseille (France).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  14th EUROMECH European Turbulence Conference, September 1–4, 2013, Lyon (France).

- *Inertial-particle dispersion and diffusion*
  Conference on Particles in Turbulence (COST Action), July 1–5, 2013, Eindhoven (Netherlands).

- *Transport effectif de particules inertielles*
  Seminar ITC (Laboratoire de Mécanique, Modélisation et Procédés Propres, École Centrale de Marseille & Institut Méditerranéen de Technologie), June 20, 2013, Marseille (France).

- *Méthodes numériques pour l'interaction fluide–structure : aspects physiques*
  Seminar SMOCS (I3M, UM2), December 18, 2012, Montpellier (France).

- *Inertial-particle dispersion and diffusion*
  Workshop on Particles in Turbulence (COST Action), May 14–16, 2012, Leiden (Netherlands).

- *Mise en pratique de la LBM : conditions limites et géométries complexes*
  Seminar GTCS (I3M, UM2), March 20, 2012, Montpellier (France).

- *Transport effectif de particules inertielles*
  Seminar ER1-FCI (Laboratoire de Mécanique de Lille, École Centrale de Lille), February 2, 2012, Lille (France).

- *L'équation de Boltzmann*
  Seminar ACSIOM (I3M, UM2), December 13, 2011, Montpellier (France).

- *Inertial-particle dispersion and diffusion*
  13th EUROMECH European Turbulence Conference, September 12–15, 2011, Warsaw (Poland).

- *Effective transport of inertial particles*
  Seminar LEPFM (Department of Energetics and Machines, University of Udine), July 14, 2011, Udine (Italy).

- *Renormalized transport of inertial particles*
  63rd APS–DFD Meeting, November 21–23, 2010, Long Beach, CA (USA).

- *Effective transport of inertial particles*
  Seminar DAH (Laboratoire de Mécanique des Fluides, École Centrale de Nantes), November 4, 2010, Nantes (France).

- *Renormalized transport of inertial particles*
  International School on Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds, September 2–10, 2010, Porquerolles (France).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  GDR Turbulence CNRS, May 31–June 2, 2010, Rouen (France).

- *Renormalized transport of inertial particles*
  Seminar PhyStat (Laboratoire de Physique Théorique, Université Paul Sabatier), February 9, 2010, Toulouse (France).

- *Renormalized transport of inertial particles*
  Workshop on Modeling — Particles in Turbulence (COST Action), December 2–4, 2009, Nice (France).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  2nd FERMaT–IMPACT Meeting, October 13–16, 2009, Twente University, Enschede (Netherlands).

- *Effective transport of inertial particles*
  Seminar GEP (Institut Universitaire des Systèmes Thermiques Industriels, Polytech'Marseille), October 9, 2009, Marseille (France).

- *Renormalized transport of inertial particles*
  Seminar FLUBIO (Department of Civil, Environmental and Architectural Engineering, University of Genova), September 14, 2009, Genova (Italy).

- *Trasporto efficace di particelle inerziali*
  Seminar (Department of Physics, University of Genova), September 11, 2009, Genova (Italy).

- *Renormalized transport of inertial particles*
  12th EUROMECH European Turbulence Conference, September 7–10, 2009, Marburg (Germany).

- *Renormalized transport of inertial particles*
  Seminar EEC (Institut de Mécanique des Fluides de Toulouse, Institut National Polytechnique de Toulouse), April 23, 2009, Toulouse (France).

- *Renormalized transport of inertial particles*
  Rencontres Niçoises de Mécanique des Fluides (Observatoire de la Côte d'Azur), January 26, 2009, Nice (France).

- *Trasporto rinormalizzato di particelle inerziali*
  Seminar (Department of Physics, University of Genova), January 23, 2009, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  Friday Thermo-Fluids Seminars (Department of Mechanical Engineering, Johns Hopkins University), October 3, 2008, Baltimore, MD (USA).

- *Terminal velocity of inertial particles*
  ICNPAA International Conference on "Mathematical Problems in Engineering, Aerospace and Sciences", June 25–27, 2008, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  ICNPAA International Conference on "Mathematical Problems in Engineering, Aerospace and Sciences", June 25–27, 2008, Genova (Italy).

- *Exploring the dynamics of the velocity gradient tensor*
  APS March Meeting, March 10–14, 2008, New Orleans, LA (USA).

- *On the terminal velocity of sedimenting particles in a flowing fluid*
  Seminar for the Chapman Fellowships interview (Department of Mathematics, Imperial College), February 20, 2008, London (UK).

- *Studio della dinamica del tensore gradiente e degli incrementi del campo di velocità*
  Seminar (Department of Physics, University of Genova), January 7, 2008, Genova (Italy).

- *Exploring the dynamics of velocity gradients and velocity increments*
  Friday Thermo-Fluids Seminars (Department of Mechanical Engineering, Johns Hopkins University), November 30, 2007, Baltimore, MD (USA).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  Seminar for the ITR Turbulence Meeting (Department of Physics, Johns Hopkins University), September 27, 2007, Baltimore, MD (USA).

- *Separazione fra particelle fluide nel modello a telegrafo*
  Seminar (Department of Physics, University of Genova), August 31, 2007, Genova (Italy).

- *Settling velocity of inertial particles*
  Seminar of the Fluid Dynamics group (Department of Physics of Complex Systems, Weizmann Institute of Science), August 16, 2007, Rehovot (Israel).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  StatPhys 23 Conference, July 9–13, 2007, Genova (Italy).

- *Mixing of a Passive Scalar Emitted from a Random-in-Time Point Source*
  11th EUROMECH European Turbulence Conference, June 25–28, 2007, Porto (Portugal).

- *Settling Velocity of Inertial Particles*
  11th EUROMECH European Turbulence Conference, June 25–28, 2007, Porto (Portugal).

- *Settling velocity of inertial particles*
  Seminar (Department of Aeronautics, Imperial College), May 16, 2007, London (UK).

- *Velocità di deposizione di particelle inerziali*
  Seminar (Department of Physics, University of Genova), December 22, 2006, Genova (Italy).

- *Inhomogeneous passive scalars: the point-source problem*
  Plenary speaker: Conference on "Mathematical Modeling and Computational Physics", August 28–September 1, 2006, Tatranská Štrba (Slovakia).

- *Inhomogeneous passive scalars: the point-source problem*
  Workshop on "Non-equilibrium statistical mechanics and turbulence", July 15–21, 2006, Warwick University, Coventry (UK).

- *Modelli analitici di turbolenza: lo scalare passivo*
  Seminar of the Ph.D. course (Department of Physics, University of Genova), May 18, 2006, Genova (Italy).

- *Inhomogeneous passive scalars: the point-source problem*
  Meeting of EU Networks "Fluid Mechanical Stirring and Mixing: the Lagrangian Approach" and "Physics of Nonequilibrium and Complex Systems", February 12–17, 2006, Weizmann Institute of Science, Rehovot (Israel).

- *Coarse-grained scalar transport: closures and large-eddy simulations*
  ITI Conference on Turbulence, September 25–28, 2005, Bad Zwischenahn (Germany).

- *LES: un approccio matematico. Chiusure e filtri per lo scalare passivo*
  Seminar of the group of Atmospheric and Oceanic Physics (Department of Physics, University of Genova), September 23, 2005, Genova (Italy).

- *Inhomogeneous anisotropic passive scalars*
  Meeting of EU Network "Fluid Mechanical Stirring and Mixing: the Lagrangian Approach", June 10–11, 2005, Torino (Italy).

- *Disomogeneità e anisotropie dello scalare passivo*
  "Convegno annuale nazionale informale di Fisica Teorica" INFN, May 25–28, 2005, Cortona, Arezzo (Italy).

- *Chiusure LES, disomogeneità, polimeri, grandi deviazioni e particelle inerziali*
  "Incontro annuale per il progetto PICS" (Universities of Genova, Nice and Torino), February 17–18, 2005, Acceglio, Cuneo (Italy).

- *First-principle closures for passive scalar turbulence*
  INLN Meeting on "Fluid Mechanical Stirring and Mixing: the Lagrangian Approach" and "Nonideal Turbulence", October 11–15, 2004, Nice (France).

- *An analytically solvable model of large-eddy simulation of passive scalar fields*
  INFM Workshop on "Lagrangian problems in turbulence", June 27–28, 2003, Roma (Italy).

Schools

- SoftFlow 2012: *Biological Complex Fluids*, June 26 – July 6, 2012, Cargèse (France).

- International School: *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*, September 2–10, 2010, Porquerolles (France).

- LMS-EPSRC Short Course: *Non-equilibrium statistical mechanics and turbulence*, July 10–14, 2006, Warwick University, Coventry (UK).

- Winter School: *Minerva*, February 12–17, 2006, Weizmann Institute of Science, Rehovot (Israel).

- INFM National Course: *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi*, September 13–17, 2004, ISI - Villa Gualino, Torino (Italy).

- CIMA Summer School: *Transport in Geophysical Flows: Ten Years After*, June 14–23, 2004, Saint Oyen, Aosta (Italy).

- Summer School: *Transport, reaction and propagation in fluids*, and Conference: *Kolmogorov's legacy in physics: one century of chaos, turbulence and complexity*, September 8–17, 2003, Abdus Salam International Center for Theoretical Physics, Trieste (Italy).

Referee activity

International journals:

- *Journal of Turbulence*

- *Journal of Mathematical Physics*

- *Physical Review* E

- IMA *Journal of Applied Mathematics*

- *Europhysics Letters*

- *Physical Review Letters*

- *Physica* D

- *Physics of Fluids*
- *Meccanica*
- *Symmetry*
- *Fluids*
- *Energies*
- *International Journal of Multiphase Flow*
- *Journal of Fluid Mechanics*
- *Physical Review Research*
- *Monthly Notices of the Royal Astronomical Society*
- *Journal of Nonlinear Science*
- *Physical Review Applied*
- *Sensors*
- *Mathematics*
- *Journal of Dermatology and Skin Science*
- *Minerals*
- *Processes*
- *Electronics*
- *Inventions*
- *Physchem*
- *Microfluidics and Nanofluidics*
- *Lubricants*
- *Fractal and Fractional*
- *Axioms*
- *Sustainability*
- *Algorithms*
- *Applied Sciences*
- *Journal of Marine Science and Engineering*
- *Photonics*

- *Water*
- *Computation*
- *AppliedMath*
- *Micromachines*
- *Information*
- *Magnetochemistry*
- *Contemporary Mathematics*
- *Machines*
- *Entropy*
- *Actuators*
- *Applied System Innovation*
- *Molecular & Cellular Biomechanics*
- *Annals of Mathematics and Physics*
- *Big Data and Cognitive Computing*
- *Modern Mathematical Physics*
- *Meteorology*
- *Atmosphere*
- *IgMin Research*
- *Aerospace*
- *Modelling*
- *Journal of Nuclear Engineering*
- *Mathematical and Computational Applications*
- *Astronautics*
- *Dynamics*
- *ChemEngineering*
- *Journal of Electronics and Electrical Engineering*
- *Computer Sciences & Mathematics Forum*
- *International Journal of Energy Research*

- *Annals of Psychiatry and Treatment*
- *Energy Engineering*
- *Journal of Vibration Engineering & Technologies*
- *Nanomaterials*
- *Fluid Dynamics & Materials Processings*

Peer-reviewed conferences:

- 2020 European Control Conference
- 2024 63rd IEEE Conference on Decision and Control

Editorial activity

Guest Editor (with Sílvio Gama) of the special issue "Multiscale Turbulent Transport" of the journal *Fluids* published by MDPI (2018–2019), and of the homonym book (2020).

Financed projects: redaction and participation

- Project MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financed by *Fundação para a Ciência e a Tecnologia* in 2017 in the framework *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020
- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" financed by *Università degli Studi di Genova* in 2004

Software

- ECDL: Microsoft Office and Windows
- Good knowledge of FORTRAN, LaTeX, Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab
- Notions of HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Working-group animation

Animator of two working groups (*Lattice-Boltzmann Method* and *Fluid–Structure Interaction*) between 2011 and 2013 at I3M - UM2

Scientific habilitations

- *Qualification aux fonctions de Maître de Conférences* (France)
- *Abilitazione Scientifica Nazionale per Professore Associato* (Italy)

Participation to Ph.D.-defence committees

Doutoramento of Teresa Daniela Batista de Jesus Grilo, DM-FCUP (December 21, 2018)

Thesis supervision

- Codirector of Gil Miguel Marques's and Tarikul Islam's Ph.D. activities (CMUP, 2022–)

Curriculum vitæ de Marco Martins Afonso

Août 2026

Données personnelles

Nom de famille, prénom :	Martins Afonso, Marco
Lieu et date de naissance :	Gênes (Ligurie) [Italie] {Europe}, le 21 septembre 1979
Nationalité :	italienne
Langues :	italien, anglais, français, portugais, génois, latin

Adresse professionnelle

Adresse :	SIT Technologies ; Università di Genova, DIME—MASET—TPG ; via Montallegro 1, 16145 Genova, Italie (Villa Cambiaso - padiglioni F.019 F.037)
Membre :	Centro de Matemática da Universidade do Porto (CMUP) ; Departamento de Matemática da Faculdade de Ciências (FCUP) ; Rua do Campo Alegre, 687 ; 4169-007 Porto ; Portugal
Téléphone :	+39 0103532463 \ 0103532376
Internet :	http://marcomartinsafonso.epizy.com
E-mail :	marcomartinsafonso@yahoo.com

Formation et expérience scientifique

2024 –	DIME-MASET-TPG, Université de Gênes (Italie) : bourse de recherche.
2024	SIT Technologies, Université de Gênes (Italie) : consultant occasionnel.
2022 – 2023	Centro de Matemática da Universidade do Porto (Portugal) : contrat de recherche.
2015 – 2020	Centro de Matemática da Universidade do Porto (Portugal) : post-doc dans le groupe de Sílvio Marques de Almeida Gama.
2013 – 2014	Laboratoire de Mécanique Modélisation et Procédés Propres (Marseille), équipe Instabilité Turbulence et Contrôle : post-doc dans le groupe d'Eric Serre.
2011 – 2013	Institut de Mathématiques et de Modélisation de Montpellier, équipe Analyse Calcul Scientifique Industriel et Optimisation de Montpellier : post-doc dans le groupe de Franck Nicoud.
2009 – 2011	Institut de Mécanique des Fluides de Toulouse, équipe Particules Spray et Combustion : post-doc dans le groupe d'Olivier Simonin.
2007 – 2008	Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (Etats-Unis) : post-doc dans le groupe de Charles Meneveau.
2006 – 2007	Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israël) : post-doc dans le groupe de Gregory Falkovich.
2003 – 2006	Département de Physique, Université de Gênes (Italie) : doctorat sous la direction de Roberto Festa et Andrea Mazzino. Titre de la thèse : *Analytical models of turbulence: from large scales to small scales, and beyond.*
1997 – 2002	Département de Physique, Université de Gênes (Italie) : *laurea* sous la direction de Roberto Festa et Andrea Mazzino ; note 110/110 *cum laude*. Titre de la

thèse : *Un modello risolubile analiticamente di large-eddy simulation di campi scalari passivi.*

Séjours à l'étranger et écoles

Novembre–Décembre 2019	Centro de Matemática da Universidade do Porto (Portugal) : collaboration avec S.M.A. Gama sur particules inertielles et traceurs.
Janvier 2019, Février 2020, Novembre 2021	Laboratoire Jean-Alexandre Dieudonné, Nice : collaboration avec Dario Vincenzi sur la magnéto–hydrodynamique et les polymères.
Juin–Juillet 2012	IESC - Cargèse : SoftFlow 2012 *Biological Complex Fluids*.
Août–Septembre 2011	University of Helsinki (Finlande) : collaboration avec Paolo Muratore-Ginanneschi sur la diffusion de particules inertielles.
Septembre 2010	IGESA - Porquerolles : école internationale *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*.
Juillet 2006	Warwick University, Coventry (Royaume-Uni) : cours LMS–EPSRC *Non-equilibrium statistical mechanics and turbulence*.
Février 2006	Weizmann Institute of Science, Rehovot (Israël) : école d'hiver *Minerva*.
Janvier 2006	Weizmann Institute of Science, Rehovot (Israël) : collaboration avec Gregory Falkovich sur la turbulence du champ scalaire passif.
Décembre 2004–Avril 2005	Observatoire de la Côte d'Azur, Nice : collaboration avec Uriel Frisch sur la théorie multifractale de la turbulence.
Septembre 2004	ISI - Villa Gualino, Torino (Italie) : cours national INFM *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi*.
Juin 2004	Saint Oyen, Aosta (Italie) : école d'été CIMA *Transport in Geophysical Flows: Ten Years After*.
Février–Mai 2004	Institut Non-Linéaire de Nice : collaboration avec Antonio Celani sur le transport turbulent.
Septembre 2003	Abdus Salam International Center for Theoretical Physics, Trieste (Italie) : école d'été *Transport, reaction and propagation in fluids*.

Rapporteur pour les journaux scientifiques (68+2)

- *Journal of Turbulence*, *Journal of Mathematical Physics*, *Physical Review* E, IMA *Journal of Applied Mathematics*, *Europhysics Letters*, *Physical Review Letters*, *Physica* D, *Physics of Fluids*, *Meccanica*, *Symmetry*, *Fluids*, *Energies*, *International Journal of Multiphase Flow*, *Journal of Fluid Mechanics*, *Physical Review Research*, *Monthly Notices of the Royal Astronomical Society*, *Journal of Nonlinear Science*, *Physical Review Applied*, *Sensors*, *Mathematics*, *Journal of Dermatology and Skin Science*, *Minerals*, *Processes*, *Electronics*, *Inventions*, *Physchem*, *Microfluidics and Nanofluidics*, *Lubricants*, *Fractal and Fractional*,

Axioms, *Sustainability*, *Algorithms*, *Applied Sciences*, *Journal of Marine Science and Engineering*, *Photonics*, *Water*, *Computation*, *AppliedMath*, *Micromachines*, *Information*, *Magnetochemistry*, *Contemporary Mathematics*, *Machines*, *Entropy*, *Actuators*, *Applied System Innovation*, *Molecular & Cellular Biomechanics*, *Annals of Mathematics and Physics*, *Big Data and Cognitive Computing*, *Modern Mathematical Physics*, *Meteorology*, *Atmosphere*, *IgMin Research*, *Aerospace*, *Modelling*, *Journal of Nuclear Engineering*, *Mathematical and Computational Applications*, *Astronautics*, *Dynamics*, *ChemEngineering*, *Journal of Electronics and Electrical Engineering*, *Computer Sciences & Mathematics Forum*, *International Journal of Energy Research*, *Annals of Psychiatry and Treatment*, *Energy Engineering*, *Journal of Vibration Engineering & Technologies*, *Nanomaterials* et *Fluid Dynamics & Materials Processings*.

- Conférences internationales : 2020 European Control Conference & 2024 63rd IEEE Conference on Decision and Control.

Activité éditoriale

Editeur invité (avec Sílvio Gama) du numéro spécial "Multiscale Turbulent Transport" du journal *Fluids* publié par MDPI (2018–2019) et du livre homonyme (2020)

Projets financés : redaction et participation

- Projet MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financé par *Fundação para a Ciência e a Tecnologia* en 2017 dans le cadre *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020

- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" attribués par l'*Università degli Studi di Genova* en 2004

Liste des publications

Journaux internationaux

[31] *Random forest and XGBoost network learning on Darcy–Forchheimer magnetobioconvection and entropy generation in a ferrofluidfilled porous wavy enclosure*
T. Islam, S. Gama et **M. Martins Afonso**
Journal of Thermal Analysis and Calorimetry, (**2026**).

[30] *Stretching and breaking of particles in compressible random flows*
D. Roy, **M. Martins Afonso**, J.R. Picardo et D. Vincenzi
Journal of Fluid Mechanics **1040**, n. A2 (2026).

[29] *Thermal Optimization of Magneto-Nanofluid Convection in Wavy Circular Enclosure Using Response Surface Method*
T. Islam,**M. Martins Afonso** et S. Gama
AppliedMath **6** (6), n. 96 (2026).

[28] *Experimental Investigation on the Dynamic Response of a Vaned Diffuser Compressor in Innovative Heat-Pump Systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont du Haut Champ, F. Reggio,

A. Traverso et C. Halbe
Journal of Engineering for Gas Turbines and Power **148** (2), n. 021017 (2026).

[27] *Advanced machine learning analysis of bioconvection in nanofluid with oxytactic microorganisms in a porous wavy enclosure under inclined periodic magnetic effects*
T. Islam, S. Gama et **M. Martins Afonso**
Physics of Fluids **37** (8), n. 082070 (2025).

[26] *Artificial Neural Network and Response Surface Methodology-Driven Optimization of Cu-Al_2O_3/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama et **M. Martins Afonso**
Mathematics **13**, 78 (2024).

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** et S. Gama
IEEE *Control Systems Letters* **7**, 1760 (2023).

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra et D. Vincenzi
Proceedings of the Royal Society A **475**, 20180591 (2019).

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga et E. Serre
Fluids **4**, 33 (2019).

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso et S.M.A. Gama
European Physical Journal E **42**, 10 (2019).

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama et A. Mazzino
Physical Review Fluids **3**, 044501 (2018).

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso et S.M.A. Gama
Comptes Rendus Mécanique **346**, 121 (2017).

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino et S. Gama
Journal of Statistical Mechanics, 103205 (**2016**).

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** et A. Mazzino
Journal of Statistical Mechanics, P10023 (**2015**).

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89**, 063021 (2014).

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez et F. Nicoud
Journal of Fluid Mechanics **746**, 300 (2014).

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato et D. Pugliese
Europhysics Letters **102**, 14003 (2013).

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain et P. Schmitz
Chemical Engineering Science **81**, 8 (2012).

[13] *Eddy diffusivities of inertial particles under gravity*
M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
Journal of Fluid Mechanics **694**, 426 (2012).

[12] *Point-source inertial particle dispersion*
M. Martins Afonso et A. Mazzino
Geophysical and Astrophysical Fluid Dynamics **105**, 553 (2011).

[11] *Recent Fluid Deformation closure for velocity gradient tensor dynamics in turbulence: time-scale effects and expansions*
M. Martins Afonso et C. Meneveau
Physica D **239**, 1241 (2010).

[10] *Renormalized transport of inertial particles in surface flows*
M. Martins Afonso, A. Mazzino et P. Olla
Journal of Physics A **42**, 275502 (2009).

[9] *The terminal velocity of sedimenting particles in a flowing fluid*
M. Martins Afonso
Journal of Physics A **41**, 385501 (2008).

[8] *Fluid-particle separation in a random flow described by the telegraph model*
G. Falkovich et **M. Martins Afonso**
Physical Review E **76**, 026312 (2007).

[7] *Point-source scalar turbulence*
A. Celani, **M. Martins Afonso** et A. Mazzino
Journal of Fluid Mechanics **583**, 189 (2007).

[6] *Coarse-grained description of a passive scalar*
A. Celani, **M. Martins Afonso** et A. Mazzino
Journal of Turbulence **7**, 52 (2006).

[5] *Does multifractal theory of turbulence have logarithms in the scaling relations?*
U. Frisch, **M. Martins Afonso**, A. Mazzino et V. Yakhot
Journal of Fluid Mechanics **542**, 97 (2005).

[4] *Structure of temperature fluctuations in turbulent convective boundary layers*
M. Antonelli, **M. Martins Afonso**, A. Mazzino et U. Rizza
Journal of Turbulence **6**, 35 (2005).

[3] *Nonlinear elastic polymers in random flows*
M. Martins Afonso et D. Vincenzi
Journal of Fluid Mechanics **540**, 99 (2005).

[2] *Inhomogeneous anisotropic passive scalars*
M. Martins Afonso et M. Sbragaglia
Journal of Turbulence **6**, 10 (2005).

[1] *Large-eddy-simulation closures of passive scalar turbulence: a systematic approach*
M. Martins Afonso, A. Celani, R. Festa et A. Mazzino
Journal of Fluid Mechanics **496**, 355 (2003).

Comptes rendus de conférences

[XIII] *Non-Intrusive Load Monitoring of a Two-Stage Dynamic Compressor in a Heat Pump*
P. Silvestri, **M. Martins Afonso**, L. Mantelli, F. Reggio, A. Traverso et V. Sishtla
Sous presse en : *Proceedings of the 2026* ASME *International Mechanical Engineering Congress and Exposition*, 8–12 Novembre 2026, Vancouver, BC (Canada) ; IMECE2026-192900.

[XII] *Compressor Surge Identification in a Refrigerant Closed-Loop System by Means of Approximate-Entropy Estimation*
M. Zahid, **M. Martins Afonso**, G. Liskiewicz, P. Korbel, P. Silvestri, A. Traverso et V. Sishtla
Dans : *Proceedings of the 2026* ASME *Turbo Expo Conference*, 15–19 Juin 2026, Milan (Italie) ; GT2026-177945.

[XI] *Instability Detection of a Two-Stage E-Driven Dynamic Compressor in an Industrial-Size Heat-Pump Loop*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso et V. Sishtla
Dans : *Proceedings of the 2026* ASME *Turbo Expo Conference*, 15–19 Juin 2026, Milan (Italie) ; GT2026-176515.

[X] *Experimental investigation on the dynamic response of a vaned diffuser compressor in innovative heat-pump systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso et C. Halbe
Dans : *Proceedings of the 2025* ASME *Turbo Expo Conference*, 16–20 Juin 2025, Memphis, TN (Etats-Unis d'Amérique) ; GT2025-151820, V004T06A003.

[IX] *Application of multidimensional Hermite polynomials to fluid mechanics*
M. Martins Afonso et S.M.A. Gama
Dans : *Proceedings of SymComp2019* (ECCOMAS), 11–12 avril 2019, Porto (Portugal) ; éditeurs : Maria Amélia Loja, Joaquim Infante Barbosa, José Alberto Rodrigues et Paulo B. Vasconcelos ; p. 337, APMTAC.

[VIII] *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
M. Martins Afonso, S.M.A. Gama et A. Mazzino
Dans : *Proceedings of the 9th Turbulence, Heat and Mass Transfer Conference* (ICHMT), 10–13 juillet 2018, Rio de Janeiro (Brésil) ; éditeurs : A.P. Silva Freire, K. Hamjalić, K. Suga, D. Borello et M. Hadžiabdić ; p. 175 (imprimé) & 141 (en ligne), Begell House.

[VII] *Inertial-particle dispersion and diffusion*
M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
Dans : *Advances in Turbulence XIII*, Proceedings of the 13th EUROMECH European Turbulence Conference, 12–15 septembre 2011, Varsovie (Pologne) ; *Journal of Physics: Conference Series* **318**, n. 052014.

[VI] *Renormalized transport of inertial particles*
M. Martins Afonso, A. Celani, A. Mazzino et P. Olla
Dans : *Advances in Turbulence XII*, Proceedings of the 12th EUROMECH European Turbulence Conference, 7–10 septembre 2009, Marburg (Allemagne) ; éditeur : B. Eckhardt ; Springer Proceedings in Physics **132**, 505, Springer.

[V] *Settling velocity of inertial particles*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, 25–28 juin 2007, Porto (Portugal) ; éditeurs : J.M.L.M. Palma et A. Silva Lopes ; Springer Proceedings in Physics **117**, 61, Springer.

[IV] *Mixing of a passive scalar emitted from a random-in-time point source*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, 25–28 juin 2007, Porto (Portugal) ; éditeurs : J.M.L.M. Palma et A. Silva Lopes ; Springer Proceedings in Physics **117**, 206, Springer.

[III] *Punctual emission of a passive scalar in turbulent flows*
A. Celani, **M. Martins Afonso** et A. Mazzino
Sous presse dans une édition spéciale de *Physics of Particles and Nuclei, Letters* pour les : Proceedings of the conference Mathematical Modeling and Computational Physics 2006, 28 août–1 septembre 2006, Tatranská Štrba (Slovaquie).

[II] *Coarse-grained scalar transport: closures and large-eddy simulations*
A. Celani, **M. Martins Afonso** et A. Mazzino
Dans : *Progress in Turbulence II*, Proceedings of the iTi Conference on Turbulence, 25–28 septembre 2005, Bad Zwischenahn (Allemagne) ; éditeurs : M. Oberlack, S. Guenther, T. Weller, G. Khujadze, A. Osman, M. Frewer et J. Peinke ; Springer Proceedings in Physics **109**, 229, Springer.

[I] *Closures for large-eddy simulations of passive scalars*
M. Martins Afonso, A. Celani et A. Mazzino
Dans : *Advances in Turbulence X*, Proceedings of the 10th European Turbulence Conference, 29 juin–2 juillet 2004, Trondheim (Norvège) ; éditeurs : H.I. Andersson et P.A. Krogstad ; p. 319, CIMNE.

Chapitres de livres

[00bis] *YALES2BIO : un solveur dédié aux écoulements sanguins*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic et F. Nicoud
Contribution invitée dans : *Écoulements biologiques dans les grands vaisseaux : dialogue entre modélisations numériques et études expérimentales in vitro/in vivo* ; éditeurs : V. Deplano, J.-M. Fullana et C. Verdier ; Sciences—Mécanique—Mécanique du vivant, ch. 7, p. 185–208, ISTE (2023).

[00] *YALES2BIO: A General Purpose Solver Dedicated to Blood Flows*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic et F. Nicoud
Contribution invitée dans : *Biological Flow in Large Vessels: Dialog Between Numerical Modeling and In Vitro/In Vivo Experiments* ; éditeurs : V. Deplano, J.-M. Fullana et C. Verdier ; Sciences—Mechanics—Biomechanics, ch. 7, p. 183–206, John Wiley & Sons (2022).

[0] *Flow-driven renormalization of transport and sedimentation for inertial particles*
M. Martins Afonso
Contribution invitée dans : *Mathematical Analysis and Applications in Engineering Aerospace and Sciences* ; éditeur : S. Sivasundaram ; Mathematical Problems in Engineering Aerospace and Sciences **5**, n. 13, p. 187–201, Cambridge Scientific Publishers (2012).

Articles de revue

[∅] *Applications of mathematics in fluid dynamics*
M. Martins Afonso
Contribution invitée dans : CIM *Bulletin* **36**, 26–31 (Mars 2016).

Archives en ligne

[ii] *Analyse théorique de stabilité linéaire d'un jet granulaire tombant*
M. Martins Afonso
`HAL`: hal-00769571 (2013)

[i] *Fluid-particle separation in the Batchelor regime with telegraph model of noise*
M. Martins Afonso
`arXiv`: nlin.CD/0703056 (2007)

Editoriaux

- *Editorial for Special Issue "Multiscale Turbulent Transport"*
  M. Martins Afonso et S.M.A. Gama
  Fluids **4**, 185 (2019).

Livres : édition et contribution

- Multiscale Turbulent Transport
  M. Martins Afonso et S. Gama
  10 chapitres, 200 pages, MDPI (2020).
  Contributions personnelles : éditorial p. 1, article p. 11.

Manuscrits soumis

- *Centrifugal compressor surge in closed loop systems: modelling and comparison with experiments*
  S. Purushothaman, A. Traverso, F. Reggio, **M. Martins Afonso**, C. Halbe et V. Sishtla
  soumis à : *International Journal of Refrigeration* (2026).

Papiers en préparation

- *Velocity scaling exponents in the refined advected delta-vee model*
  M. Martins Afonso

- *On the electric-field modifications induced by flowing red blood cells in Coulter-like particle-counting devices*
  M. Martins Afonso, S. Mendez et F. Nicoud

Communications en livres de résumés

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  M. Martins Afonso, S.M.A. Gama, A. Mazzino et P. Muratore-Ginanneschi
  EUROMECH ETC17, no. 331, s2-r10 (2019).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  M. Martins Afonso
  WNA2019, pp. 16–17 (2019).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  M. Martins Afonso
  WOPA2017, p. 16 (2017).

- *Effective diffusivity of short-correlated random flows*
  M. Martins Afonso, A. Mazzino et S. Gama
  EUROMECH ETC16, n. 28722, C7-5 (2017).

- *Eddy diffusivity of short-correlated random flows: effects of helicity, molecular diffusion and mean streaming*
  M. Martins Afonso
  Flowing Matter 2017, p. 39 (2017).

- *Renormalized transport and diffusion of tracer and inertial particles*
  M. Martins Afonso, A. Mazzino et S. Gama
  ENSPM2016, p. 214 (2016).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  M. Martins Afonso et A. Mazzino
  EUROMECH ETC15, n. 331, M-TM1-5 (2015).

- *Optimal transient growth in the flow past a backward-facing step*
  M. Martins Afonso, P. Meliga et E. Serre
  APS Bulletin, v. 59, n. 20, p. 413, R21.0005 (2014).

- *Stokes drift for inertial particles transported by water waves*
  F. Santamaria, G. Boffetta, **M. Martins Afonso**, M. Onorato et A. Mazzino
  EUROMECH ETC14, n. 147, MD1-PT6-1 (2013).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  M. Martins Afonso, A. Mazzino et P. Muratore-Ginanneschi
  EUROMECH ETC14, n. 133, TD1-PT8-3 (2013).

- *Renormalized transport of inertial particles*
  M. Martins Afonso, A. Celani, A. Mazzino et P. Olla
  APS Bulletin, v. 55, n. 16, p. 196, GV.00001 (2010).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  M. Martins Afonso, J. Morchain et P. Fede
  II FERMaT–IMPACT meeting, p. 10 (2009).

- *Terminal velocity of inertial particles*
  A. Celani, **M. Martins Afonso** et A. Mazzino
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 48, 51/III[6] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso et C. Meneveau
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 36, 37/IV[7] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso et C. Meneveau
  APS Bulletin, v. 53, n. 2, p. 151, D9.00002 (2008).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  G. Falkovich et **M. Martins Afonso**
  XXIII IUPAP International Conference, p. 346, 5C-164 (2007).

Posters

- *Study of the dynamics of the velocity gradient tensor*
  Pour le symposium *Fluid Science and Turbulence*, 30–31 mai 2008, Johns Hopkins University, Baltimore, MD (Etats-Unis).

- *First-principle closures for passive-scalar turbulence*
  Pour le cours national INFM *Non-equilibrium systems: the problem of turbulence in fluids and plasmas*, 13–17 septembre 2004, ISI - Villa Gualino, Torino (Italie).

Présentations orales

Conférences internationales (33)

- 17th EUROMECH *European Turbulence Conference*, 3–6 septembre 2019, Torino (Italie).
- *Orateur invité* :
  WNA2019 *Workshop on Numerical Analysis*, 15 juillet 2019, Porto (Portugal).
- 4th *International Conference on Numerical and Symbolic Computation: Developments and Applications*, 11–12 avril 2019, Porto (Portugal).
- 9th *Turbulence, Heat and Mass Transfer Conference*, 10–13 juillet 2018, Rio de Janeiro (Brésil).
- *Flowing Matter* (COST *Action*), 5–9 février 2018, Lisboa (Portugal).
- *Orateur invité* :
  WOPA2017 *Workshop on Orthogonal Polynomials and Applications*, 5 septembre 2017, Porto (Portugal).
- 16th EUROMECH *European Turbulence Conference*, 21–24 août 2017, Stockholm (Suède).
- *Flowing Matter* (COST *Action*), 23–27 janvier 2017, Porto (Portugal).
- 15th EUROMECH *European Turbulence Conference*, 25–28 août 2015, Delft (Pays-Bas).
- 67th APS–DFD *Meeting*, 23–25 novembre 2014, San Francisco, CA (Etats-Unis).
- 14th EUROMECH *European Turbulence Conference*, 1–4 septembre 2013, Lyon.
- *Conference on Particles in Turbulence* COST *Action*, 1–5 juillet 2013, Eindhoven (Pays-Bas).
- *Workshop on Particles in Turbulence* COST *Action*, 14–16 mai 2012, Leiden (Pays-Bas).
- 13th EUROMECH *European Turbulence Conference*, 12–15 septembre 2011, Warszawa (Pologne).
- 63rd APS–DFD *Meeting*, 21–23 novembre 2010, Long Beach, CA (Etats-Unis).
- Ecole internationale *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*, 2–10 septembre 2010, Porquerolles.
- *Workshop on Modeling — Particles in Turbulence* COST *Action*, 2–4 décembre 2009, Nice.
- 2nd FERMaT–IMPACT *Meeting*, 13–16 octobre 2009, Enschede (Pays-Bas).
- 12th EUROMECH *European Turbulence Conference*, 7–10 septembre 2009, Marburg (Allemagne).
- Conférence ICNPAA *Mathematical Problems in Engineering, Aerospace and Sciences* (2 présentations), 25–27 juin 2008, Genova (Italie).

- APS *March Meeting*, 10–14 mars 2008, New Orleans, LA (Etats-Unis).
- Conférence *StatPhys 23*, 9–13 juillet 2007, Genova (Italie).
- 11th EUROMECH *European Turbulence Conference* (2 présentations), 25–28 juin 2007, Porto (Portugal).
- *Orateur plénier* :
  Conférence *Mathematical Modeling and Computational Physics*, 28 août–1 septembre 2006, Tatranská Štrba (Slovaquie).
- Symposium *Non-equilibrium statistical mechanics and turbulence*, 15–21 juillet 2006, Coventry (Royaume-Uni).
- Symposium des réseaux UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach* et *Physics of Nonequilibrium and Complex Systems*, 12–17 février 2006, Rehovot (Israël).
- ITI *Conference on Turbulence*, 25–28 septembre 2005, Bad Zwischenahn (Allemagne).
- Symposium du réseau UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach*, 10–11 juin 2005, Torino (Italie).
- Rencontre annuelle pour le projet PICS des Universités de Genova, Nice et Torino, 17–18 février 2005, Acceglio, Cuneo (Italie).
- Symposium des réseaux UE *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach* et *Nonideal Turbulence*, 11–15 octobre 2004, Nice.
- Symposium *Lagrangian problems in turbulence*, 27–28 juin 2003, Roma (Italie).

Conférences nationales (3)

- *Encontro Nacional da Sociedade Portuguesa de Matemática*, 11–13 juillet 2016, Barreiro (Portugal).
- GDR *Turbulence* CNRS, 31 mai–2 juin 2010, Rouen.
- *Convegno annuale nazionale informale di Fisica Teorica* INFN, 25–28 mai 2005, Cortona, Arezzo (Italie).

Séminaires invités (38)

- *Séminaire "Mathématiques Appliquées : Analyse, Numérique et Calcul"*, 14 juillet 2023, Faculdade de Engenharia da Universidade do Porto (Portugal).
- *Séminaire "Systèmes Dynamiques"*, 6 mars 2020, Centro de Matemática da Universidade do Porto (Portugal).
- *Séminaire "Mathématiques Appliquées et Analyse Numérique"*, 16 Octobre 2019, Instituto Superior Técnico, Lisboa (Portugal).
- *Séminaire "Interfaces"*, 25 janvier 2019, Laboratoire Jean-Alexandre Dieudonné, Nice.

- *Séminaire "Systèmes et Contrôle"*, 21 novembre 2018, Centro de Investigação e Desenvolvimento em Matemática e Aplicações, Aveiro (Portugal).
- *Séminaire "Dynamique des Fluides"*, 11 juillet 2018, Instituto de Matemática Pura e Aplicada, Rio de Janeiro (Brésil).
- *Séminaire*, 9 mai 2018, Centro de Matemática e Aplicaçoës, Universidade da Beira Interior, Covilhã (Portugal).
- *Rencontre Post-Doc*, 27 avril 2018, Centro de Matemática da Universidade do Porto (Portugal).
- *Séminaire "Analyse Numerique et Optimization"*, 22 mars 2017, Centro de Matemática da Universidade de Coimbra (Portugal).
- *Séminaire "Systèmes Dynamiques"*, 30 septembre 2016, Centro de Matemática da Universidade do Porto (Portugal).
- *Rencontre Post-Doc*, 18 décembre 2015, Centro de Matemática da Universidade do Porto (Portugal).
- *Séminaire*, 13 février 2014, Dipartimento di Fisica, Università di Roma II "Tor Vergata" (Italie).
- *Séminaire*, 21 novembre 2013, Institut de Recherche sur les Phénomènes Hors Equilibre, Aix-Marseille Université, Marseille.
- *Séminaire* ITC, 20 juin 2013, Laboratoire de Mécanique, Modélisation et Procédés Propres, Ecole Centrale de Marseille & Institut Méditerranéen de Technologie, Marseille.
- *Séminaire* SMOCS, 18 décembre 2012, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.
- *Séminaire* GTCS, 20 mars 2012, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.
- *Séminaire* ER1-FCI, 2 février 2012, Laboratoire de Mécanique de Lille, Ecole Centrale de Lille.
- *Séminaire* ACSIOM, 13 décembre 2011, Institut de Mathématiques et de Modélisation de Montpellier, Université Montpellier 2.
- *Séminaire* LEPFM, 14 juillet 2011, Dipartimento di Energetica e Macchine, Università di Udine (Italie).
- *Séminaire* DAH, 4 novembre 2010, Laboratoire de Mécanique des Fluides, Ecole Centrale de Nantes.
- *Séminaire PhyStat*, 9 février 2010, Laboratoire de Physique Théorique, Université Paul Sabatier, Toulouse.
- *Séminaire* GEP, 9 octobre 2009, Institut Universitaire des Systèmes Thermiques Industriels, Polytech'Marseille.

- *Séminaire* FLUBIO, 14 septembre 2009, Dipartimento di Ingegneria delle Costruzioni, dell'Ambiente e del Territorio, Università di Genova (Italie).
- *Séminaire* EEC, 23 avril 2009, Institut de Mécanique des Fluides de Toulouse, Institut National Polytechnique de Toulouse.
- *Rencontres Niçoises de Mécanique des Fluides*, 26 janvier 2009, Observatoire de la Côte d'Azur, Nice.
- *Thermo-Fluids group*, 3 octobre 2008 & 30 novembre 2007, Department of Mechanical Engineering, Johns Hopkins University, Baltimore, MD (Etats-Unis).
- *Chapman Fellowships interview*, 20 février 2008, Department of Mathematics, Imperial College, London (Royaume-Uni).
- *Gruppo di Fisica dell'Atmosfera e dell'Oceano*, 11 septembre 2009 & 23 janvier 2009 & 7 janvier 2008 & 31 août 2007 & 22 décembre 2006 & 23 septembre 2005, Dipartimento di Fisica, Università di Genova (Italie).
- ITR *Turbulence group*, 27 septembre 2007, Department of Physics, Johns Hopkins University, Baltimore, MD (Etats-Unis).
- *Fluid Dynamics group*, 16 août 2007, Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot (Israël).
- *Fluid Mechanics group*, 16 mai 2007, Department of Aeronautics, Imperial College, London (Royaume-Uni).
- *Corso di Dottorato*, 18 mai 2006, Dipartimento di Fisica, Università di Genova (Italie).

Mots clés de ma recherche

Mécanique des fluides ; turbulence idéale et non-idéale (compressibilité, anisotropie et inhomogénéité : source ponctuelle) ; dynamique lagrangienne et eulérienne ; physique théorique, non-linéaire et statistique ; simulation des grandes échelles ; modèles de fermeture pour le gradient de vitesse ; méthodes multi-échelles et Boltzmann sur réseau ; interaction fluide–structure ; formalisme multifractal ; dispersion et mélange d'un traceur ou polluant ; champ électrostatique en écoulements diphasiques, magnéto–hydrodynamique (effet dynamo) ; couplage avec les systèmes biologiques ; écoulements complexes : solutions de polymères, suspensions de particules inertielles (aérosols, gouttes, bulles), jets granulaires tombants ; propriétés de transport : vitesse de sédimentation, diffusivité efficace ; approche mésoscopique, modèle à deux fluides ; globules rouges et membranes (capsules, vésicules) ; analyse de stabilité et contrôle du décollement sur profils aérodynamiques ; tourbillons ponctuels bidimensionnels, nanofluides ; décrochage et pompage de compresseurs, recuperation d'énergie des vagues marines

Logiciels

- ECDL : Microsoft Office et Windows
- Bonne connaissance de FORTRAN, LaTeX, Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab
- Notions de HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Animation de groupes de travail

Animateur de deux groupes de travail (*Lattice-Boltzmann Method* et *Fluid–Structure Interaction*) entre 2011 et 2013 chez I3M - UM2

Habilitations scientifiques

- *Qualification aux fonctions de Maître de Conférences*
- *Abilitazione Scientifica Nazionale per Professore Associato* (Italie)

Participation en jurys de thèse

Doutoramento de Teresa Daniela Batista de Jesus Grilo, DM-FCUP (21 décembre 2018)

Supervision de thèses

- Codirecteur des Doctorats de Gil Miguel Marques et de Tarikul Islam (CMUP, 2022–)

Curriculum Vitæ de Marco MARTINS AFONSO
Agosto 2026

Dados pessoais

Nome :	Marco
Sobrenome\Apelido :	Martins Afonso
Nascimento :	Génova\Gênova (Ligúria) [Itália] {Europa}, 21 de Setembro 1979
Nacionalidade :	Italiana

Instituição Académica

Endereço :	SIT Technologies; Università di Genova, DIME-MASET-TPG; via Montallegro 1, 16145 Genova, Italy (Villa Cambiaso - padiglioni F.019 F.037)
Membro :	CMUP - Centro de Matemática da Universidade do Porto; Departamento de Matemática da Faculdade de Ciências, FCUP; Rua do Campo Alegre, 687; 4169-007 Porto; Portugal
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Estudos e posições

2024 –	Bolsa de investigação no DIME-MASET-TPG, Universidade de Genova (Itália).
2024	Consultoria ocasional no "SIT Technologies", Universidade de Genova (Itália).
2022 – 2023	Investigador Doutorado no "Centro de Matemática da Universidade do Porto" (Portugal).
2015 – 2020	Pós-Doutoramento no "Centro de Matemática da Universidade do Porto" (Portugal). Supervisor : S.M.A. Gama.
2013 – 2014	Pós-Doutoramento no grupo "Instabilité, Turbulence et Contrôle", "Laboratoire de Mécanique, Modélisation et Procédés Propres" (Marseille, França). Supervisor : E. Serre.
2011 – 2013	Pós-Doutoramento no grupo "Analyse, Calcul Scientifique Industriel et Optimisation de Montpellier", "Institut de Mathématiques et de Modélisation de Montpellier" (França). Supervisor : F. Nicoud.

2009 – 2011	Pós-Doutoramento no grupo "Particules, Spray et Combustion", "Institut de Mécanique des Fluides de Toulouse" (França). Supervisor: O. Simonin.
2007 – 2008	Pós-Doutoramento no "Department of Mechanical Engineering", "Johns Hopkins University", Baltimore, MD (EUA). Supervisor: C. Meneveau.
2006 – 2007	Pós-Doutoramento no "Department of Physics of Complex Systems", "Weizmann Institute of Science", Rehovot (Israel). Supervisor: G. Falkovich.
2003 – 2006	Tese de Doutoramento em Física na Universidade de Genova: *Analytical models of turbulence: from large scales to small scales, and beyond.* Orientadores: R. Festa, A. Mazzino, G. Boffetta. Defesa: 22 de Maio 2006.
1997 – 2002	Tese de "Laurea" em Física na Universidade de Genova: "Un modello risolubile analiticamente di Large-Eddy Simulation di campi scalari passivi" (*An analytically solvable model of large-eddy simulation of passive scalar fields*). Orientadores: R. Festa, A. Mazzino. Defesa: 10 de Julho 2002. Nota final: 110/110 cum laude.
1997	Diploma de "Maturità": Liceu Científico "G.D. Cassini" - Genova, nota final 60/60 cum laude.

Estágios e visitas

- *Centro de Matemática da Universidade do Porto.* Novembro–Dezembro 2019. Colaboração com S.M.A. Gama
- *Laboratoire Jean-Alexandre Dieudonné*, Nice (França). Janeiro 2019, Fevereiro 2020 e Novembro 2021. Colaboração com D. Vincenzi
- *University of Helsinki* (Finlândia). Agosto–Setembro 2011. Colaboração com P. Muratore-Ginanneschi
- *Weizmann Institute of Science*, Rehovot (Israel). Janeiro 2006. Colaboração com G. Falkovich
- *Observatoire de la Côte d'Azur*, Nice (França). Dezembro 2004–Abril 2005. Colaboração com U. Frisch
- *Institut Non-Linéaire de Nice*, Valbonne-Sophia-Antipolis (França). Fevereiro–Maio 2004. Colaboração com A. Celani

Palavras chave da minha atividade de investigação

- Mecânica dos fluidos, dinâmica Lagrangiana e Euleriana
- Física teórica, não-linear e estatística
- Turbulência de campos escalares passivos e traçadores no modelo de Kraichnan

- *Coarse-grained models*, *Large-Eddy Simulations*
- Escoamentos ideais e não-ideais: compressibilidade, anisotropia, inomogeneidade (fonte pontual)
- Polímeros, modelo FENE — equação de Heun e frações contínuas
- Propriedades de transporte de partículas inerciais: aerossóis, gotas, bolhas
- Expansão das escalas múltiplas, algoritmo de segunda quantização
- Formalismo multifractal, teoria de grandes desvios
- Método de *lattice*-Boltzmann, interação fluido–estrutura
- Estatística do campo de velocidade, modelos de fecho para o tensor gradiente
- Efeito da turbulência sobre os micro-organismos em biorreatores
- Jactos granulares em queda, abordagem mesoscópica, modelo a dois fluidos
- Glóbulos vermelhos, membranas biológicas (cápsulas, vesículas)
- Campo eletrostático em fluxos difásicos, efeito dínamo magnético turbulento
- Análise de estabilidade e controlo da separação sobre perfis aerodinâmicos
- Vórtices pontuais bidimensionais, nanofluidos
- *Stall* e *surge* de compressores, recuperação de energia das ondas marinas

Idiomas

Italiano, Inglês, Francês, Português, Genovês, Latim

Software

- ECDL: Microsoft Office e Windows
- LaTeX
- Bom conhecimento da linguagem FORTRAN e das ferramentas Matlab, Mathematica, Maple, Gnuplot, Paraview, Gambit, Freefem++, Simcenter Testlab
- Conhecimentos de HTML, Assembler, DOS, Basic, Pascal, Lotus, C, R, Maxima, Octave, Python, Ansys Fluent

Animação de grupos de trabalho

Animador de dois grupos de trabalho (*Lattice-Boltzmann Method* e *Fluid–Structure Interaction*) entre 2011 e 2013 no I3M - UM2

Habilitações científicas

- *Qualification aux fonctions de Maître de Conférences* (França)
- *Abilitazione Scientifica Nazionale per Professore Associato* (Itália)

Atividade de referências como par avaliador

68 revistas internacionais

- *Journal of Turbulence*
- *Journal of Mathematical Physics*
- *Physical Review* E
- IMA *Journal of Applied Mathematics*
- *Europhysics Letters*
- *Physical Review Letters*
- *Physica* D
- *Physics of Fluids*
- *Meccanica*
- *Symmetry*
- *Fluids*
- *Energies*
- *International Journal of Multiphase Flow*
- *Journal of Fluid Mechanics*
- *Physical Review Research*
- *Monthly Notices of the Royal Astronomical Society*
- *Journal of Nonlinear Science*
- *Physical Review Applied*
- *Sensors*
- *Mathematics*
- *Journal of Dermatology and Skin Science*
- *Minerals*
- *Processes*

- *Electronics*
- *Inventions*
- *Physchem*
- *Microfluidics and Nanofluidics*
- *Lubricants*
- *Fractal and Fractional*
- *Axioms*
- *Sustainability*
- *Algorithms*
- *Applied Sciences*
- *Journal of Marine Science and Engineering*
- *Photonics*
- *Water*
- *Computation*
- *AppliedMath*
- *Micromachines*
- *Information*
- *Magnetochemistry*
- *Contemporary Mathematics*
- *Machines*
- *Entropy*
- *Actuators*
- *Applied System Innovation*
- *Molecular & Cellular Biomechanics*
- *Annals of Mathematics and Physics*
- *Big Data and Cognitive Computing*
- *Modern Mathematical Physics*
- *Meteorology*

- *Atmosphere*
- *IgMin Research*
- *Aerospace*
- *Modelling*
- *Journal of Nuclear Engineering*
- *Mathematical and Computational Applications*
- *Astronautics*
- *Dynamics*
- *ChemEngineering*
- *Journal of Electronics and Electrical Engineering*
- *Computer Sciences & Mathematics Forum*
- *International Journal of Energy Research*
- *Annals of Psychiatry and Treatment*
- *Energy Engineering*
- *Journal of Vibration Engineering & Technologies*
- *Nanomaterials*
- *Fluid Dynamics & Materials Processings*

2 conferências internacionais

- 2020 European Control Conference
- 2024 63rd IEEE Conference on Decision and Control

Atividade editorial

Guest Editor (com Sílvio Gama) do número especial "Multiscale Turbulent Transport" da revista *Fluids* publicada por MDPI (2018–2019) e do livro homónimo (2020).

Projetos financiados: redação e participação

- Projeto MAGIC ("Multi-Agent Control and Estimation for Multi-Horizon Goals Conciliation") financiado pela *Fundação para a Ciência e a Tecnologia* em 2017 no âmbito *Projetos de Investigação Científica e Desenvolvimento Tecnológico* COMPETE 2020
- "Contributi per l'addestramento di ricercatori presso centri di ricerca di alta qualificazione all'estero" atribuídos pela *Università degli Studi di Genova* em 2004

Participação em júris de tese

Doutoramento de Teresa Daniela Batista de Jesus Grilo, DM-FCUP (21 dezembro 2018)

Supervisão de teses

- Codiretor dos planos de Doutoramento de Gil Miguel Marques e de Tarikul Islam (CMUP, 2022–)

Lista de publicações

H-index: 11; G-index: 17

Revistas internacionais

[31] *Random forest and XGBoost network learning on Darcy–Forchheimer magneto-bioconvection and entropy generation in a ferrofluid-filled porous wavy enclosure*
T. Islam, S. Gama e **M. Martins Afonso**
Journal of Thermal Analysis and Calorimetry, pp. 1-34 (8\)(2026).

[30] *Stretching and breaking of particles in compressible random flows*
D. Roy, **M. Martins Afonso**, J.R. Picardo e D. Vincenzi
Journal of Fluid Mechanics **1040**, no. A2, pp. 1-27 (2026).

[29] *Thermal Optimization of Magneto-Nanofluid Convection in Wavy Circular Enclosure Using Response Surface Method*
T. Islam, **M. Martins Afonso** e S. Gama
AppliedMath **6** (6), no. 96, pp. 1-28 (2026).
1 citação

[28] *Experimental Investigation on the Dynamic Response of a Vaned Diffuser Compressor in Innovative Heat-Pump Systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont du Haut Champ, F. Reggio, A. Traverso e C. Halbe
Journal of Engineering for Gas Turbines and Power **148** (2), n. 021017, pp. 1–13 (2026).

[27] *Advanced machine learning analysis of bioconvection in nanofluid with oxytactic microorganisms in a porous wavy enclosure under inclined periodic magnetic effects*
T. Islam, S. Gama e **M. Martins Afonso**
Physics of Fluids **37** (8), n. 082070, pp. 1–34 (2025).
6 citações

[26] *Artificial Neural Network and Response Surface Methodology-Driven Optimization of Cu-Al_2O_3/Water Hybrid Nanofluid Flow in a Wavy Enclosure with Inclined Periodic MHD Effects*
T. Islam, S. Gama e **M. Martins Afonso**

Mathematics **13** (1), no. 78, pp. 1–44 (2024).
16 citações

[25] *Tracking Point Vortices and Circulations via Advected Passive Particles: An Estimation Approach*
G. Marques, **M. Martins Afonso** e S. Gama
IEEE *Control Systems Letters* **7**, 1760–1765 (2023).

[24] *Kazantsev dynamo in turbulent compressible flows*
M. Martins Afonso, D. Mitra e D. Vincenzi
Proceedings of the Royal Society A **475** (2223), no. 20180591, pp. 1–17 (2019).
16 citações

[23] *Optimal transient growth in an incompressible flow past a backward-slanted step*
M. Martins Afonso, P. Meliga e E. Serre
Fluids **4** (1), no. 33, pp. 1–16 (2019).
1 citação

[22] *Point-source dispersion of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso e S.M.A. Gama
European Physical Journal E **42** (1), no. 10, pp. 1–8 (2019).

[21] *Eddy diffusivity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso, P. Muratore-Ginanneschi, S.M.A. Gama e A. Mazzino
Physical Review Fluids **3** (4), no. 044501, pp. 1–21 (2018).
3 citações

[20] *Settling velocity of quasi-neutrally-buoyant inertial particles*
M. Martins Afonso e S.M.A. Gama
Comptes Rendus Mécanique **346** (2), 121–131 (2017).
2 citações

[19] *Combined role of molecular diffusion, mean streaming and helicity in the eddy diffusivity of short-correlated random flows*
M. Martins Afonso, A. Mazzino e S. Gama
Journal of Statistical Mechanics, 103205, pp. 1–17 (10\)(2016).
4 citações

[18] *Anomalous diffusion of inertial particles in random parallel flows: theory and numerics face to face*
S. Boi, **M. Martins Afonso** e A. Mazzino
Journal of Statistical Mechanics, P10023, pp. 1–21 (10\)(2015).
11 citações

[17] *Anomalous diffusion for inertial particles under gravity in parallel flows*
M. Martins Afonso
Physical Review E **89** (6), no. 063021, pp. 1–8 (2014).
8 citações

[16] *On the damped oscillations of an elastic quasi-circular membrane in a two-dimensional incompressible fluid*
M. Martins Afonso, S. Mendez e F. Nicoud
Journal of Fluid Mechanics **746**, 300–331 (2014).
6 citações

[15] *Stokes drift for inertial particles transported by water waves*
F. Santamaria, G. Boffetta, **M. Martins Afonso**, A. Mazzino, M. Onorato e D. Pugliese
Europhysics Letters **102** (1), no. 14003, pp. 1–5 (2013).
60 citações

[14] *Numerical study of substrate assimilation by a microorganism exposed to fluctuating concentration*
M. Linkès, **M. Martins Afonso**, P. Fede, J. Morchain e P. Schmitz
Chemical Engineering Science **81**, 8–19 (2012).
17 citações

[13] *Eddy diffusivities of inertial particles under gravity*
M. Martins Afonso, A. Mazzino e P. Muratore-Ginanneschi
Journal of Fluid Mechanics **694**, 426–463 (2012).
19 citações

[12] *Point-source inertial particle dispersion*
M. Martins Afonso e A. Mazzino
Geophysical and Astrophysical Fluid Dynamics **105** (6), 553–565 (2011).
9 citações

[11] *Recent Fluid Deformation closure for velocity gradient tensor dynamics in turbulence: time-scale effects and expansions*
M. Martins Afonso e C. Meneveau
Physica D **239**, 1241–1250 (2010).
24 citações

[10] *Renormalized transport of inertial particles in surface flows*
M. Martins Afonso, A. Mazzino e P. Olla
Journal of Physics A **42** (27), no. 275502, pp. 1–18 (2009).
5 citações

[9] *The terminal velocity of sedimenting particles in a flowing fluid*
M. Martins Afonso
Journal of Physics A **41** (38), no. 385501, pp. 1–15 (2008).
21 citações

[8] *Fluid-particle separation in a random flow described by the telegraph model*
G. Falkovich e **M. Martins Afonso**
Physical Review E **76** (2), no. 026312, pp. 1–5 (2007).
4 citações

[7] *Point-source scalar turbulence*
A. Celani, **M. Martins Afonso** e A. Mazzino
Journal of Fluid Mechanics **583**, 189–198 (2007).
11 citações

[6] *Coarse-grained description of a passive scalar*
A. Celani, **M. Martins Afonso** e A. Mazzino
Journal of Turbulence **7**, no. 52, pp. 1–18 (2006).
4 citações

[5] *Does multifractal theory of turbulence have logarithms in the scaling relations?*
U. Frisch, **M. Martins Afonso**, A. Mazzino e V. Yakhot
Journal of Fluid Mechanics **542**, 97–103 (2005).
13 citações

[4] *Structure of temperature fluctuations in turbulent convective boundary layers*
M. Antonelli, **M. Martins Afonso**, A. Mazzino e U. Rizza
Journal of Turbulence **6**, no. 35, pp. 1–34 (2005).
5 citações

[3] *Nonlinear elastic polymers in random flows*
M. Martins Afonso e D. Vincenzi
Journal of Fluid Mechanics **540**, 99–108 (2005).
38 citações

[2] *Inhomogeneous anisotropic passive scalars*
M. Martins Afonso e M. Sbragaglia
Journal of Turbulence **6**, no. 10, pp. 1–13 (2005).
7 citações

[1] *Large-eddy-simulation closures of passive scalar turbulence: a systematic approach*
M. Martins Afonso, A. Celani, R. Festa e A. Mazzino
Journal of Fluid Mechanics **496**, 355–364 (2003).
9 citações

Atos de conferências

[XIII] *Non-Intrusive Load Monitoring of a Two-Stage Dynamic Compressor in a Heat Pump*
P. Silvestri, **M. Martins Afonso**, L. Mantelli, F. Reggio, A. Traverso e V. Sishtla
Aceite em: *Proceedings of the 2026* ASME *International Mechanical Engineering Congress and Exposition*, Vancouver, BC (Canadá), 8–12 Novembro 2026; GT2025-151820, pp. 1-15.

[XII] *Compressor Surge Identification in a Refrigerant Closed-Loop System by Means of Approximate-Entropy Estimation*
M. Zahid, **M. Martins Afonso**, G. Liskiewicz, P. Korbel, P. Silvestri, A. Traverso e V. Sishtla

Em: *Proceedings of the 2026* ASME *Turbo Expo Conference*, Milão (Itália), 15–19 Junho 2026; GT2026-177945, pp. 1-14.

[XI] *Instability Detection of a Two-Stage E-Driven Dynamic Compressor in an Industrial-Size Heat-Pump Loop*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso e V. Sishtla
Em: *Proceedings of the 2026* ASME *Turbo Expo Conference*, Milão (Itália), 15–19 Junho 2026; GT2026-176515, pp. 1-14.

[X] *Experimental investigation on the dynamic response of a vaned diffuser compressor in innovative heat-pump systems*
P. Silvestri, **M. Martins Afonso**, C.A. Niccolini Marmont Du Haut Champ, F. Reggio, A. Traverso e C. Halbe
Em: *Proceedings of the 2025* ASME *Turbo Expo Conference*, Memphis, TN (Estados Unidos da América), 16–20 Junho 2025; GT2025-151820, V004T06A003, pp. 1-14.

[IX] *Application of multidimensional Hermite polynomials to fluid mechanics*
M. Martins Afonso e S.M.A. Gama
Em: *Proceedings of SymComp2019* (ECCOMAS), Porto, 11–12 Abril 2019 (eds.: Maria Amélia Loja, Joaquim Infante Barbosa, José Alberto Rodrigues e Paulo B. Vasconcelos), pp. 337–342, APMTAC.

[VIII] *Eddy diffusivity of short-correlated random flows: helicity, molecular-diffusion & mean-streaming effects*
M. Martins Afonso, S.M.A. Gama e A. Mazzino
Em: *Proceedings of the 9th Turbulence, Heat and Mass Transfer Conference* (ICHMT), Rio de Janeiro (Brasil), 10–13 Julho 2018 (eds.: A.P. Silva Freire, K. Hamjalić, K. Suga, D. Borello e M. Hadžiabdić), pp. 175–178 (imprimido) & 141–152 (digital), Begell House.

[VII] *Inertial-particle dispersion and diffusion*
M. Martins Afonso, A. Mazzino e P. Muratore-Ginanneschi
Em: *Advances in Turbulence XIII*, Proceedings of the 13th EUROMECH European Turbulence Conference, Varsóvia (Polónia), 12–15 Setembro 2011, *Journal of Physics: Conference Series*, vol. 318, no. 052014, pp. 1–4.
1 citação

[VI] *Renormalized transport of inertial particles*
M. Martins Afonso, A. Celani, A. Mazzino e P. Olla
Em: *Advances in Turbulence XII*, Proceedings of the 12th EUROMECH European Turbulence Conference, Marburgo (Alemanha), 7–10 Setembro 2009 (ed.: B. Eckhardt), Springer Proceedings in Physics, vol. 132, pp. 505–508, Springer.
1 citação

[V] *Settling velocity of inertial particles*
A. Celani, **M. Martins Afonso** e A. Mazzino
Em: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), 25–28 Junho 2007 (eds.: J.M.L.

M. Palma e A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 61–63, Springer.
1 citação

[IV] *Mixing of a passive scalar emitted from a random-in-time point source*
A. Celani, **M. Martins Afonso** e A. Mazzino
Em: *Advances in Turbulence XI*, Proceedings of the 11th EUROMECH European Turbulence Conference, Porto (Portugal), 25–28 Junho 2007 (eds.: J.M.L. M. Palma e A. Silva Lopes), Springer Proceedings in Physics, vol. 117, pp. 206–208, Springer.
1 citação

[III] *Punctual emission of a passive scalar in turbulent flows*
A. Celani, **M. Martins Afonso** e A. Mazzino
Em impressão numa edição especial de *Physics of Particles and Nuclei, Letters*, proceedings of the conference Mathematical Modeling and Computational Physics 2006, Tatranská Štrba (Eslováquia), 28 Agosto–1 Setembro 2006.

[II] *Coarse-grained scalar transport: closures and large-eddy simulations*
A. Celani, **M. Martins Afonso** e A. Mazzino
Em: *Progress in Turbulence II*, Proceedings of the iTi Conference on Turbulence, Bad Zwischenahn (Alemanha), 25–28 Setembro 2005 (eds.: M. Oberlack, S. Guenther, T. Weller, G. Khujadze, A. Osman, M. Frewer e J. Peinke), Springer Proceedings in Physics, vol. 109, pp. 229–233, Springer.

[I] *Closures for large-eddy simulations of passive scalars*
M. Martins Afonso, A. Celani e A. Mazzino
Em: *Advances in Turbulence X*, Proceedings of the 10th European Turbulence Conference, Trondheim (Noruega), 29 Junho–2 Julho 2004 (eds.: H.I. Andersson e P.A. Krogstad), pp. 319–322, CIMNE.

Capítulos de livros

[00bis] *YALES2BIO : un solveur dédié aux écoulements sanguins*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic e F. Nicoud
AUTOR CONVIDADO em: *Écoulements biologiques dans les grands vaisseaux : dialogue entre modélisations numériques et études expérimentales in vitro/in vivo* (eds.: V. Deplano, J.-M. Fullana e C. Verdier), Sciences—Mécanique—Mécanique du vivant, cap. 7, pp. 185–208, ISTE, London (2023).

[00] *YALES2BIO: A General Purpose Solver Dedicated to Blood Flows*
S. Mendez, A. Bérod, C. Chnafa, M. Garreau, E. Gibaud, A. Larroque, S. Lindsey, **M. Martins Afonso**, P. Mattéoli, R. Mendez Rojano, D. Midou, T. Puiseux, J. Sigüenza, P. Taraconat, V. Zmijanovic e F. Nicoud
AUTOR CONVIDADO em: *Biological Flow in Large Vessels: Dialog Between Numerical Modeling and In Vitro/In Vivo Experiments* (eds.: V. Deplano, J.-M. Fullana e C. Verdier), Sciences—Mechanics—Biomechanics, cap. 7, pp. 183–206,

John Wiley & Sons, Hoboken, NJ (2022).
3 citações

[0] *Flow-driven renormalization of transport e sedimentation for inertial particles*
M. Martins Afonso
AUTOR CONVIDADO em: *Mathematical Analysis and Applications in Engineering, Aerospace and Sciences* (ed.: S. Sivasundaram), Mathematical Problems in Engineering Aerospace and Sciences, vol. 5, no. 13, pp. 187–201, Cambridge Scientific Publishers, Cambridge (2012).

Ensaios

[∅] *Applications of mathematics in fluid dynamics*
M. Martins Afonso
AUTOR CONVIDADO em: CIM *Bulletin* **36**, 26–31 (Março 2016).

Artigos em arquivos informáticos

[ii] "Analyse théorique de stabilité linéaire d'un jet granulaire tombant" (*Theoretical analysis of linear stability for a falling granular jet*)
M. Martins Afonso
`HAL`: hal-00769571 (2013).

[i] *Fluid-particle separation in the Batchelor regime with telegraph model of noise*
M. Martins Afonso
`arXiv`: nlin.CD/0703056 (2007).

Editoriais

- *Editorial for Special Issue "Multiscale Turbulent Transport"*
  M. Martins Afonso e S.M.A. Gama
  Fluids **4** (4), no. 185, pp. 1–2 (2019).

Livros: edição e contribuição

- *Multiscale Turbulent Transport*
  M. Martins Afonso e S. Gama
  10 capítulos, 200 páginas, MDPI (2020).
  Contribuição pessoal: editorial pp. 1–2, artigo pp. 11–26.

Manuscritos submetidos

- *Centrifugal compressor surge in closed loop systems: modelling and comparison with experiments*
  S. Purushothaman, A. Traverso, F. Reggio, **M. Martins Afonso**, C. Halbe e V. Sishtla
  Submetido em: *International Journal of Refrigeration* (2026).

Em preparação

- *Velocity scaling exponents in the refined Advected Delta-Vee model*
  M. Martins Afonso.

- *On the electric-field modifications induced by flowing red blood cells in Coulter-like particle-counting devices*
  M. Martins Afonso, S. Mendez e F. Nicoud.

Comunicações em livros de resumos

- *Transport properties of quasi-neutrally-buoyant inertial particles*
  M. Martins Afonso, S.M.A. Gama, A. Mazzino e P. Muratore-Ginanneschi
  EUROMECH ETC17, no. 331, s2-r10 (2019).

- *An application of multivariate Hermite polynomials in fluid mechanics*
  M. Martins Afonso
  WNA2019, pp. 16–17 (2019).

- *Applications of multivariate Hermite polynomials in fluid dynamics*
  M. Martins Afonso
  WOPA2017, p. 16 (2017).

- *Effective diffusivity of short-correlated random flows*
  M. Martins Afonso, A. Mazzino e S. Gama
  EUROMECH ETC16, no. 28722, C7-5 (2017).

- *Eddy diffusivity of short-correlated random flows: effects of helicity, molecular diffusion and mean streaming*
  M. Martins Afonso
  Flowing Matter 2017, p. 39 (2017).

- *Renormalized transport and diffusion of tracer and inertial particles*
  M. Martins Afonso, A. Mazzino e S. Gama
  ENSPM2016, p. 214 (2016).

- *Effective and anomalous diffusion of inertial particles in flowing fluids*
  M. Martins Afonso e A. Mazzino
  EUROMECH ETC15, no. 331, M-TM1-5 (2015).

- *Optimal transient growth in flow past a slanted surface*
  M. Martins Afonso, P. Meliga e E. Serre
  APS Bulletin, vol. 59, no. 20, p. 413, R21.0005 (2014).

- *Stokes drift for inertial particles transported by water waves*
  F. Santamaria, G. Boffetta, **M. Martins Afonso**, M. Onorato e A. Mazzino
  EUROMECH ETC14, no. 147, MD1-PT6-1 (2013).

- *Effective diffusion and dispersion of inertial particles in flowing fluids*
  M. Martins Afonso, A. Mazzino e P. Muratore-Ginanneschi
  EUROMECH ETC14, no. 133, TD1-PT8-3 (2013).

- *Renormalized transport of inertial particles*
  M. Martins Afonso, A. Celani, A. Mazzino e P. Olla
  APS Bulletin, vol. 55, no. 16, p. 196, GV.00001 (2010).

- *Direct numerical simulations and particle tracking to investigate the effect of mixing on the assimilation by microorganisms*
  M. Martins Afonso, J. Morchain e P. Fede
  II FERMaT–IMPACT meeting, p. 10 (2009).

- *Terminal velocity of inertial particles*
  A. Celani, **M. Martins Afonso** e A. Mazzino
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 48, 51/III[6] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso e C. Meneveau
  VII International Conference on Nonlinear Problems in Aviation and Aerospace, p. 36, 37/IV[7] (2008).

- *Exploring the dynamics of the velocity gradient tensor*
  M. Martins Afonso e C. Meneveau
  APS Bulletin, vol. 53, no. 2, p. 151, D9.00002 (2008).

- *Fluid-particle separation in the Batchelor regime with the telegraph-noise model*
  G. Falkovich e **M. Martins Afonso**
  XXIII IUPAP International Conference on Statistical Physics, p. 346, 5C-164 (2007).

Pósters

- *Study of the dynamics of the velocity gradient tensor*
  Simpósio "Fluid Science and Turbulence", 30–31 Maio 2008, Johns Hopkins University, Baltimore, MD (EUA).

- *First-principle closures for passive-scalar turbulence*
  "INFM National Course" *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi*, 13–17 Setembro 2004, ISI - Villa Gualino, Turim (Itália).

Apresentações orais

38 seminários convidados e 36 apresentações em conferências, três como ORADOR PLENÁRIO/CONVIDADO

- Seminário "Applied Mathematics: Analysis, Numerics and Computing" (Faculdade de Engenharia da Universidade do Porto), 14 Julho 2023, Porto.

- Seminário "Dynamical Systems" (Centro de Matemática da Universidade do Porto), 6 Março 2020, Porto.

- Seminário "Applied Mathematics and Numerical Analysis" (Instituto Superior Técnico), 16 Outubro 2019, Lisboa.
- "17th EUROMECH European Turbulence Conference", 3–6 Setembro 2019, Turim (Itália).
- (ORADOR CONVIDADO) WNA2019 "Workshop on Numerical Analysis", 15 Julho 2019, Porto.
- "4th International Conference on Numerical and Symbolic Computation: Developments and Applications", 11–12 Abril 2019, Porto.
- Seminário "Interfaces" (Laboratoire Jean-Alexandre Dieudonné, Université de Nice-Sophia-Antipolis), 25 Janeiro 2019, Nice (França).
- Seminário "Systems and Control" (Centro de Investigação e Desenvolvimento em Matemática e Aplicações), 21 Novembro 2018, Aveiro.
- Seminário "Fluid Dynamics" (Instituto de Matemática Pura e Aplicada), 11 Julho 2018, Rio de Janeiro (Brasil).
- "9th Turbulence, Heat and Mass Transfer Conference", 10–13 Julho 2018, Rio de Janeiro (Brasil).
- Seminário (Centro de Matemática e Aplicaçoẽs, Universidade da Beira Interior), 9 Maio 2018, Covilhã.
- Seminário "Post-Doc Meeting" (Centro de Matemática da Universidade do Porto), 27 Abril 2018, Porto.
- Conferência "Flowing Matter" (COST Action MP1305), 5–9 Fevereiro 2018, Lisboa.
- (ORADOR CONVIDADO) WOPA2017 "Workshop on Orthogonal Polynomials and Applications", 5 Setembro 2017, Porto.
- "16th EUROMECH European Turbulence Conference", 21–24 Agosto 2017, Estocolmo (Suécia).
- Seminário "Numerical Analysis and Optimization" (Centro de Matemática da Universidade de Coimbra), 22 Março 2017, Coimbra.
- Conferência "Flowing Matter" (COST Action MP1305), 23–27 Janeiro 2017, Porto.
- Seminário "Dynamical Systems" (Centro de Matemática da Universidade do Porto), 30 Setembro 2016, Porto.
- Encontro Nacional da Sociedade Portuguesa de Matemática, 11–13 Julho 2016, Barreiro.
- Seminário "Post-Doc Meeting" (Centro de Matemática da Universidade do Porto), 18 Dezembro 2015, Porto.

- "15th EUROMECH European Turbulence Conference", 25–28 Agosto 2015, Delft (Holanda).
- "67th APS–DFD Meeting", 23–25 Novembro 2014, San Francisco, CA (EUA).
- Seminário (Departamento de Física, Universidade de Roma II "Tor Vergata"), 13 Fevereiro 2014, Roma (Itália).
- Seminário (Institut de Recherche sur les Phénomènes Hors Équilibre, Aix-Marseille Université), 21 Novembro 2013, Marselha (França).
- "14th EUROMECH European Turbulence Conference", 1–4 Setembro 2013, Lião (França).
- Conferência "Particles in Turbulence" (COST Action MP0806), 1–5 Julho 2013, Eindhoven (Holanda).
- Seminário (Laboratoire de Mécanique, Modélisation et Procédés Propres, École Centrale de Marseille & Institut Méditerranéen de Technologie), 20 Junho 2013, Marselha (França).
- Seminário (I3M, UM2), 18 Dezembro 2012, Mompilher (França).
- Encontro "Particles in Turbulence" (COST Action MP0806), 14–16 Maio 2012, Leiden (Holanda).
- Seminário (I3M, UM2), 20 Março 2012, Mompilher (França).
- Seminário (Laboratoire de Mécanique de Lille, École Centrale de Lille), 2 Fevereiro 2012, Lila (França).
- Seminário (I3M, UM2), 13 Dezembro 2011, Mompilher (França).
- "13th EUROMECH European Turbulence Conference", 12–15 Setembro 2011, Varsóvia (Polónia).
- Seminário (Departamento de Energética e Máquinas, Universidade de Údine), 14 Julho 2011, Údine (Itália).
- "63rd APS–DFD Meeting", 21–23 Novembro 2010, Long Beach, CA (EUA).
- Seminário (Laboratoire de Mécanique des Fluides, École Centrale de Nantes), 4 Novembro 2010, Nantes (França).
- "International School on Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds", 2–10 Setembro 2010, Porquerolles (França).
- "GDR Turbulence CNRS", 31 Maio–2 Junho 2010, Ruão (França).
- Seminário (Laboratoire de Physique Théorique, Université Paul Sabatier), 9 Fevereiro 2010, Tolosa (França).
- "Workshop on Modeling — Particles in Turbulence" (COST Action MP0806), 2–4 Dezembro 2009, Nice (França).

- "2nd FERMaT–IMPACT Meeting", 13–16 Outubro 2009, Twente University, Enschede (Holanda).
- Seminário (Institut Universitaire des Systèmes Thermiques Industriels, Polytech' Marseille), 9 Outubro 2009, Marselha (França).
- Seminário (Departamento de Engenharia Civil, Ambiental e Arquitetónica, Universidade de Génova), 14 Setembro 2009, Génova (Itália).
- Seminário (Departamento de Física, Universidade de Génova), 11 Setembro 2009, Génova (Itália).
- "12th EUROMECH European Turbulence Conference", 7–10 Setembro 2009, Marburgo (Alemanha).
- Seminário (Institut de Mécanique des Fluides de Toulouse, Institut National Polytechnique de Toulouse), 23 Abril 2009, Tolosa (França).
- Seminário "Rencontres Niçoises de Mécanique des Fluides" (Observatoire de la Côte d'Azur), 26 Janeiro 2009, Nice (França).
- Seminário (Departamento de Física, Universidade de Génova), 23 Janeiro 2009, Génova (Itália).
- Seminário "Thermo-Fluids" (Department of Mechanical Engineering, Johns Hopkins University), 3 Outubro 2008, Baltimore, MD (EUA).
- (2 apresentações) "ICNPAA International Conference" *Mathematical Problems in Engineering, Aerospace and Sciences*, 25–27 Junho 2008, Génova (Itália).
- "APS March Meeting", 10–14 Março 2008, Nova Orleães, LA (EUA).
- Seminário "Chapman Fellowships interview" (Department of Mathematics, Imperial College), 20 Fevereiro 2008, Londres (RU).
- Seminário (Departamento de Física, Universidade de Génova), 7 Janeiro 2008, Génova (Itália).
- Seminário "Thermo-Fluids" (Department of Mechanical Engineering, Johns Hopkins University), 30 Novembro 2007, Baltimore, MD (EUA).
- Seminário (Department of Physics, Johns Hopkins University), 27 Setembro 2007, Baltimore, MD (EUA).
- Seminário (Departamento de Física, Universidade de Génova), 31 Agosto 2007, Génova (Itália).
- Seminário (Department of Physics of Complex Systems, Weizmann Institute of Science), 16 Agosto 2007, Rehovot (Israel).
- Conferência "StatPhys 23", 9–13 Julho 2007, Génova (Itália).

- (2 apresentações) "11th EUROMECH European Turbulence Conference", 25–28 Junho 2007, Porto.
- Seminário (Department of Aeronautics, Imperial College), 16 Maio 2007, Londres (RU).
- Seminário (Departamento de Física, Universidade de Génova), 22 Dezembro 2006, Génova (Itália).
- (ORADOR PLENÁRIO) Conferência "Mathematical Modeling and Computational Physics", 28 Agosto–1 Setembro 2006, Tatranská Štrba (Eslováquia).
- Encontro "Non-equilibrium statistical mechanics and turbulence", 15–21 Julho 2006, Warwick University, Covêntria (RU).
- Seminário "Ph.D. Course" (Departamento de Física, Universidade de Génova), 18 Maio 2006, Génova (Itália).
- "Meeting of EU Networks" *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach & Physics of Nonequilibrium and Complex Systems*, 12–17 Fevereiro 2006, Weizmann Institute of Science, Rehovot (Israel).
- "ITI Conference on Turbulence", 25–28 Setembro 2005, Bad Zwischenahn (Alemanha).
- Seminário (Departamento de Física, Universidade de Génova), 23 Setembro 2005, Génova (Itália).
- "Meeting of EU Network" *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach*, 10–11 Junho 2005, Turim (Itália).
- "Convegno annuale nazionale informale di Fisica Teorica INFN", 25–28 Maio 2005, Cortona, Arezzo (Itália).
- "Incontro annuale per il progetto PICS" (Universidades de Génova, Nice e Turim), 17–18 Fevereiro 2005, Acceglio, Cuneo (Itália).
- "INLN Meeting" *Fluid Mechanical Stirring and Mixing: the Lagrangian Approach & Nonideal Turbulence*, 11–15 Outubro 2004, Nice (França).
- "INFM Workshop" *Lagrangian problems in turbulence*, 27–28 Junho 2003, Roma (Itália).

Escolas frequentadas

- "SoftFlow 2012": *Biological Complex Fluids*, 26 Junho–6 Julho 2012, Cargèse (França).
- "International School": *Fluctuations and Turbulence in the Microphysics and Dynamics of Clouds*, 2–10 Setembro 2010, Porquerolles (França).

- "LMS-EPSRC Short Course": *Non-equilibrium statistical mechanics and turbulence*, 10–14 Julho 2006, Warwick University, Covêntria (RU).
- Escola de inverno: *Minerva*, 12–17 Fevereiro 2006, Weizmann Institute of Science, Rehovot (Israel).
- "INFM National Course": *Sistemi di non equilibrio: il problema delle turbolenze nei fluidi e nei plasmi*, 13–17 Setembro 2004, ISI - Villa Gualino, Turim (Itália).
- "CIMA Summer School": *Transport in Geophysical Flows: Ten Years After*, 14–23 Junho 2004, Saint Oyen, Aosta (Itália).
- Escola de verão: *Transport, reaction and propagation in fluids*, e conferência: *Kolmogorov's legacy in physics: one century of chaos, turbulence and complexity*, 8–17 Setembro 2003, Abdus Salam International Center for Theoretical Physics, Trieste (Itália).