

Simon Thalabard

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🌐 <https://sites.google.com/site/simthalabard/home>

🌐 <https://inphyni.univ-cotedazur.fr/a-propos-dinphyni/annuaire/simon-thalabard>

Positions

Current

Since 2021 **Maître de Conférences**,
Associate professor position at Université Côte d'Azur,
Affiliations: *Institut de Physique de Nice* (Research), *Polytech Nice Sophia* (Teaching) .

Previous

- 2018 – 2021 **Post-Doc**, *Instituto de Matemática Pura e Aplicada*, Rio de Janeiro.
2017 **Post-Doc**, *Observatoire de la Côte d'Azur*, Laboratoire Lagrange, Nice.
2015 – 2016 **Post-Doc**, *University of Massachusetts*, Department of Mathematics and Statistics, Amherst, MA.
2014 **Post-Doc**, *Observatoire de la Côte d'Azur*, Laboratoire Lagrange, Nice.
2010 – 2013 **PhD student**, *SPHYNX/SPEC/DSM/CEA Saclay*, Gif-Sur-Yvette.

Education

- 2013 **PhD in Physics**, *Université Paris Sud 11*.
title: Contribution to the statistical mechanics of ideal two-and-a-half dimensional flows
advisor: Bérengère Dubrulle
2009 **Master's degree in physics**, *ENS Lyon*.
2007 **Bachelor's degree in physics**, *ENS Lyon*.
2006 **Admission at Ecole Normale Supérieure de Lyon (ENS Lyon)**.
2003-2006 **Undergrad studies in math and physics**, *Lycée Saint Louis*, Paris.

Publications

- 27 **Melting dynamics and mixing layer growth near the ice-ocean interface**,
with Allende, Couston and Favier, submitted to *Journal of Fluid Mechanics*, arXiv:2601.18674.
2026
- 26 **Interplay of blowups in a differential kinetic model of gravity wave turbulence**,
with Schubring and Rosenhaus, submitted to *Physica D*, arXiv:2509.23199.
2025
- 25 **Transport in multifractal Kraichnan flows: from turbulence to Liouville quantum gravity**,
with Considera, *Annales Henri Poincaré*, arXiv:2503.18851.
2026
- 24 **Scale invariance of intermittency in LES turbulence**,
with Magacho, Buzzicotti, Bonaccorso, Biferale and Mailybaev, *Journal of Fluid Mechanics*, arXiv:2504.15874.
2025
- 23 **Surface quasigeostrophic turbulence: the refined study of an active scalar**,
with Valade and Bec, *Journal of Fluid Mechanics*, arXiv:2503.16294.
2025
- 22 **Non-unique self-similar blowups in Sabra models: insights from dynamical systems and machine-learning**,
with Campolina and Simonnet, *Journal of Physics A: Mathematical and Theoretical*, arXiv:2501.07377.
2025
- 21 **From zero-mode intermittency to hidden symmetry in random scalar advection**,
with Mailybaev, *Journal of Statistical Physics*, arXiv:2402.04198.
2024
- 20 **Spontaneous stochasticity in the presence of intermittency**,
with Considera, *Physical Review Letters*, arXiv:2305.09839.
2023

- 19 **Anomalous dissipation and spontaneous stochasticity in deterministic surface quasi-geostrophic flow** ,
with Valade & Bec, Annales Henri Poincaré, arXiv:2210.12366.
2023
- 18 **Hidden scale invariance in Navier-Stokes intermittency**,
with Mailybaev, Proceedings of the Royal Society, arXiv:2105.09403.
2022
- 17 **Inverse cascade anomalies in fourth-order Leith Models**,
with Medvedev, Grebenev & Nazarenko, Journal of Physics A: Mathematical and Theoretical, arXiv:2107.09594.
2021
- 16 **From the butterfly effect to intrinsic randomness in singular shear flows**,
with Bec & Mailybaev, Communications Physics, arXiv:2004.08908.
2020
- 15 **Turbulence of generalised flows in two dimensions**,
with Bec, Journal of Fluid Mechanics, arXiv:1812.02167.
2019
- 14 **Phase transition in time-reversible Navier-Stokes equations**,
with Shukla, Dubrulle, Nazarenko & Krstulovic, Physical Review E, arXiv:1811.11503.
2019
- 13 **Nonlinear diffusion models for gravitational wave turbulence**,
with Galtier, Nazarenko & Buchlin, Physica D: Nonlinear Phenomena, arXiv:1809.07623.
2019
- 12 **Turbulent mass inhomogeneities induced by a point-source**,
, Journal of Statistical Mechanics: Theory and Experiment, arXiv:1707.06478.
2018
- 11 **Optimal response to non-equilibrium disturbances under truncated Burgers–Hopf dynamics**,
with Turkington, Journal of Physics A: Mathematical and Theoretical, arXiv:1610.05085.
2017
- 10 **Optimal thermalization in a shell model of homogeneous turbulence**,
with Turkington, Journal of Physics A: Mathematical and Theoretical, arXiv:1509.09156.
2016
- 9 **Coarse-graining two-dimensional turbulence via dynamical optimization**,
with Turkington & Chen, Nonlinearity, arXiv:1510.00341.
2016
- 8 **Anomalous spectral laws in differential models of turbulence**,
with Nazarenko, Galtier & Medvedev, Journal of Physics A: Mathematical and Theoretical, arXiv:1502.06750.
2015
- 7 **A statistical mechanics framework for the large-scale structure of turbulent Von Kármán flows**,
with Saint-Michel, Herbert, Daviaud & Dubrulle, New Journal of Physics, arXiv:1501.01182.
2015
- 6 **Cross-helicity in rotating homogeneous shear-stratified turbulence**,
with Pieri, Godeferd, Cambon & Dubrulle , Physical review letters.
2014
- 5 **Statistical mechanics of the 3D axisymmetric Euler equations in a Taylor–Couette geometry**,
with Dubrulle & Bouchet, Journal of Statistical Mechanics: Theory and Experiment, arXiv:1501.01182.
2014
- 4 **Turbulent pair dispersion as a continuous-time random walk**,
with Krstulovic & Bec, Journal of Fluid Mechanics, arXiv:1405.7315.
2014
- 3 **Rotating helical turbulence: three-dimensionalization or self-similarity in the small scales?**,
with Pouquet, Baerenzung, Mininni & Rosenberg, Journal of Physics: Conference Series.
2011
- 2 **Conformal invariance in three-dimensional rotating turbulence**,
with Rosenberg, Pouquet & Mininni, Physical review letters, arXiv:1104.1658.
2011

- 1 **Statistical mechanics of beltrami flows in axisymmetric geometry: equilibria and bifurcations.**, with Naso, Collette, Chavanis & Dubrulle, *Journal of Statistical Mechanics: Theory and Experiment*, arXiv:1002.2711.
2010

Talks

- 23 **An introduction to Spontaneous stochasticity.**
 - Les Treilles, 2026
- 22 **Turbulent transport in multifractal random flows.**
 - ENS Lyon general colloquium, 2025
- 21 **Questioning turbulence with surface quasi-geostrophy.**
 - Fluid seminar at Kampé de Fériet Lab, Lille, 2025
- 20 **Smoothing by intermittency in multifractal Kraichnan Flows.**
 - Workshop: "Blurring the lines between pure and applied through mixing", Isle of Skye, 2025
- 19 **Self-similar blowups in cascading fluid models.**
 - Group seminar: LJAD (Nice), 2024
- 18 **Turbulent routes to intermittency: from zero-modes to hidden symmetry.**
 - Worskhop GDR Navier-Stokes 2.00, Nantes, 2024
 - Simons turbulence seminar, online, 2024
- 17 **Inverse cascade anomalies in local 4-wave turbulence.**
 - Turbin workshop, Institut Camille Jordan, Villeurbanne, 2022
 - Worskhop GDR Navier-Stokes 2.00, Saclay, 2021
- 16 **Hidden scale invariance in Navier-Stokes intermittency.**
 - Worskhop GDR Navier-Stokes 2.00, Lille, 2022
 - V workshop on fluids and PDE – online, Unicamp Brésil , 2021
 - Online seminar Johns Hopkins University / ENS Lyon , 2021
- 15 **From random trajectories to random fields: Is fluid dynamics intrinsically random?.**
 - eTNT seminar: ENS Lyon, 2021
- 14 **From anomalous scaling to reversible turbulence.**
 - Group seminar: Impa (Rio), CPT (Marseille), 2021
- 13 **Spontaneous growth of shear layer instabilities.**
 - Group seminar: Inphyni (Nice) , 2019
 - Workshop “Waves, coherent structures, and turbulence 2019” (Norwich), 2019
 - Workshop “Universal features of hydrodynamical, optical and wave turbulence” (Nice), 2019
- 12 **Generalised flows and turbulent transport.**
 - Conference: ETC 17 (Torino), 2019
- 11 **Turbulence of 2D generalised flows.**
 - Workshop “Mathematical and Computational Problems of Incompressible Fluid Dynamics” (Rio), 2018
- 10 **Turbulent dispersion from a point-source.**
 - Group seminar: ICTS (Bangalore), 2018
- 9 **Turbulent dispersion from a point-source.**
 - Group seminar: LJAD (Nice), LEGI (Grenoble) , 2017
 - Workshop “Interdisciplinary Geo-Astro Fluid Dynamics” (Paris), 2017
- 8 **Small-Scale modelling through dynamical optimization.**
 - Group seminar: Lagrange (Nice), 2017
 - Workshop “Irreversibilité et Turbulence” (Les Treilles), 2017
 - Conference: JETC 14 (Budapest), 2017
- 7 **Bypassing fluctuation-dissipation theorems to compute non-equilibrium responses.**
 - Group seminar: ENS Lyon, McMaster University (Hamilton, ON)
 - Conference: StatPhys 26 (Lyon), 2016

6 Optimal coarse-graining of hydrodynamics.

- Group seminar: Brown university (Providence, RI), Umass (Amherst, MA) ,2015
- Conferences: 114th Stat Mech Conference at Rutgers (New Brunswick, NJ), 68th Annual meeting of the APS division of Fluid dynamics (Boston), 2015

5 A non-markovian route to turbulent pair dispersion.

- Group seminar: Umass (Amherst, MA), ENS Lyon ,2014

4 Statistical mechanics and ideal two-and-a-half dimensional flows.

- Workshop “Rencontres niçoises de mécanique des fluides” (Nice), 2014

3 Large scale structures in axisymmetric turbulence.

- Workshop “European Postgraduate Fluid Dynamics Conference” (London), 2012

2 Schramm-Loewner analysis of quasi two-dimensional turbulent flows.

- APS March meeting (Boston), 2012

1 Rotating helical turbulence: three-dimensionalization or self-similarity in the small scales?.

- Conference: ETC 13 (Varsovie), 2011

Teaching

Minicourses

4 Hidden symmetries in fluid mechanics, with Alexei Mailybaev, Impa, 2024.

https://www.youtube.com/playlist?list=PLo4jXE-LdDTQvCiCQ_KeJWeiHHzfxesSH

3 Topics in Mathematics of Turbulence, with Alexei Mailybaev, Impa , 2022.

<https://www.youtube.com/playlist?list=PLo4jXE-LdDTTmHMuXfQvy134J20D-WP3x>

2 Thermal and statistical aspects of fluid mechanics, with Alexei Mailybaev, Impa, 2020.

<http://alexei.impa.br/Teaching>

1 An introduction to stochastic differential equations with applications to fluid dynamics, with Theo Drivas, Impa, 2019.

<http://fluid.impa.br/SDE2019>

Regular courses

Since 2021 **between 130 and 192 hours per Academic year**, Université Côte d’Azur.

- *Master*: Introduction to turbulence (with C. Brouzet)
- *Bachelor*: Fluid Mechanics 1 & 2, Pipe Flows
- *Undergrad*: Fluid mechanics, mathematical methods for physicists, Practicum sessions in physics

2010–2013 **~ 192 hours**, Institut Universitaire de Technologie, Orsay.

- *Undergrad*: Linear algebra, analysis, graph theory

Students (Supervision or Co-Supervision)

Bachelor and Master

- Jorge Carreno-Donoso (2025) cosupervision with S. Nazarenko
- Arnaud Guardia (2024) cosupervision with C. Brouzet
- Nathan Badshaw (2024) cosupervision with C. Brouzet

PhD students

- Nicolas Valade, UniCa/Inria, co-supervision with J. Bec. Defended in September 2025
- André Peixoto Considera, IMPA/Paris Sud, co-supervision with A. Mailybaev and B. Dubrulle. Defended in June 2025

Postdoc mentoring

- Long Li (Since October 2025)
- André Peixoto Considera (Since October 2025)

Refereeing activities

Chaos, Physica A, Physica D, Journal of Fluid Mechanics, Journal of Physics A, New Journal of Physics, Physics of Fluids, Physical Review E, Physical Review Fluids, Physical Review Letters, Physical Review X, Journal of Statistical Physics

Participation in Thesis committees

Master Thesis

- Bernhard Eisvogel, Numerical approximation of Volterra processes with intermittency properties (INRIA 2025)
- Paul Maurer, Dynamique stochastique de particules en turbulence (INRIA 2022)
- Ciro Sobrinho Campolina Martin, Fluid Dynamics on Logarithmic Lattices and Singularities of Euler Flow (IMPA 2019)

PhD Thesis

- Benoit Gay, Gravitational wave turbulence: multiscale methods and numerical simulations (Paris-Saclay, 2025)
- Wesley Agoua, Transitions and helicity in two-dimensional three-component turbulence (Centrale Lyon 2023)
- Ciro Campolina, Fluid Flows and Boundaries on Logarithmic Lattices (Impa 2022)
- José Manuel Escorcía Tafur, Post-Blowup Dynamics for the Nonlinear Schrödinger Equation (Impa 2021)

Organization of scientific events (Chair or Co-Chair)

- 2025 **Fall school "Bridges over turbulent matters"**, *Institut d'études scientifiques de Cargèse*, <https://turbazur.github.io/cargese2025>.
- 2024 **Workshop "Physics of Wave Turbulence and beyond"**, *Les Houches School of Physics*, <https://60waves.github.io/Houches2024>.
- Since 2023 **Biweekly general audience seminars**, *Institut de physics de Nice*, <https://inphyni.univ-cotedazur.eu/events-1>.
- 2023 **Summer school "100 years of cascades"**, *Nice & Porquerolles*, <https://univ-cotedazur.eu/events/turbulence-semester/summer-school>.
- 2023 **Thematic semester in Turbulence**, *Nice*, <https://univ-cotedazur.eu/events/turbulence-semester>.

Grants and Fellowships (PI or Co-PI)

- 2025 **Grant from MATH-AMSUD**, *CHA²MAN*, stoCHAsticity & CHAos in MultiscAle pheNomena. <https://project.inria.fr/cha2man/>
- 2025 **Grant from Institut National de Physique**, *Emergence@INP*, Scalar transport in multifractal random flows, 60kE. <https://www.inp.cnrs.fr/fr/cnrsinfo/decouvrez-les-laureats-des-appels-projets-tremplinphysique-et-emergen>
- 2023 **Grant from the Complex System Academy**, *IDEX UCA^{JEDI}*, *Doctoral visit program*, 7.5kE.
- 2023 **Grant from the Complex System Academy**, *IDEX UCA^{JEDI}*, *Thematic semester in Turbulence*, 70kE, <https://univ-cotedazur.eu/events/turbulence-semester>.
- 2022 **Grant from Institut National de Physique**, *Tremplin@INP*, Stochastic experiments on dipolar vortices (Estourdi), 15kE. <https://www.inp.cnrs.fr/fr/cnrsinfo/resultats-de-lappel-projets-specifique-tremplininp-2022>
- 2018-2020 **Postdoctoral of Excellence IMPA Fellowship.**