

Dr Grégoire Le Lay

Post-doctoral researcher at LFMI, EPFL

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Research Experiences

Academic Positions

- 2026 – **Post-doctoral researcher**, with Pr. François Gallaire
Laboratory of Fluid Mechanics and Instabilities (LFMI), EPFL, Lausanne (Switzerland)
- 2025 – 2026 **Post-doctoral researcher**, with Pr. Adrian Daerr
Spontaneous Meandering of Liquid Filaments
Laboratoire Matière et Systèmes Complexes (MSC), U. Paris Cité | CNRS, Paris (France)

Academic Training

- 2022 – 2025 **PhD in Physics**, under the supervision of Pr. Adrian Daerr
Nonlinear Dynamics of a Liquid Rivulet in a Hele-Shaw Cell
Matière et Systèmes Complexes (MSC), Université Paris Cité | CNRS
- 2021 – 2022 **Admission to Agrégation de Physique**
High-level competitive exam for future physics teachers (rank : 2/459)
École Normale Supérieure and Sorbonne Université
- 2020 – 2021 **Master 2 Nonlinear and Out of Equilibrium Phenomena** in Physics & Mathematics
Applied and Theoretical Mathematics (MATH) Master's degree
École Normale Supérieure and Université Paris Dauphine
- 2019 – 2020 **Master 2 Lophiss** in History and Philosophy of Science
Université Paris Diderot
- 2017 – 2022 **Scolarity at École Normale Supérieure**
Elite academic institution accessed by competitive exam in Paris, France
2017 – 2019 : Bachelor in Physics (L3 FIP) and Master 1 in Fundamental Physics (ICFP)

Research Internships

- 2021
(5 months) **Experimental study of the meandering of a liquid rivulet**, with Adrian Daerr —
Laboratoire Matière et Systèmes Complexes, Université Paris Cité, Paris, France
- 2020
(6 months) **Computational analysis of leukocytes migration dynamics in complex environments**, with
Pablo Vargas and Matthieu Piel — MOTILE group, Institut Curie, Paris, France
- 2019
(6 months) **Transition to disordered front propagation in a Hele-Shaw channel**, with Anne Juel —
Manchester Center for Nonlinear Dynamics, University of Manchester, Manchester, UK
- 2018
(1 month) **Assembly of a TIRFM to study the dynamics of polymers at nanometric scales**, with
Joshua McGraw — Laboratoire Gulliver, ESPCI, Paris, France

Summer Schools

- 08 / 2025 **Les Gustins Summer School**, Chambéry, France
- 07 / 2025 **ILL Soft Matter Summer School**, Grenoble, France
- 06 / 2025 **Complex Motion in Fluids**, Oléron, France

Publications

- 2026 **Grégoire Le Lay** & Adrian Daerr
Dancing rivulets in an air-filled Hele-Shaw cell
Journal of Fluid Mechanics — 10.1017/jfm.2025.11104
- 2025 **Grégoire Le Lay** & Adrian Daerr
Controlling deposition and characterizing dynamics of thin liquid films with high temporal and spatial resolution
Physics of Fluids — **Featured Article** — 10.1063/5.0268672
- 2025 **Grégoire Le Lay** & Adrian Daerr
Phase-locking parametric instability coupling longitudinal and transverse waves on rivulets in a Hele-Shaw cell
Physical Review Letters — 10.1103/PhysRevLett.134.014001
- 2024 **Grégoire Le Lay**, Sarah Layani, Adrian Daerr, et al.
Magnetic levitation in the field of a rotating dipole
Physical Review E — **Editor's suggestion** — 10.1103/PhysRevE.110.045003
- 2023 Tania Gajardo, Mathilde Bernard, Marie Lô, **et al.**
*Actin dynamics regulation by *TTC7A/PI4KIII α* limits DNA damage and cell death under confinement*
Journal of Allergy and Clinical Immunology — 10.1016/j.jaci.2023.06.016
- 2021 Antoine Gaillard, Jack S. Keeler, **Grégoire Le Lay**, et al.
The life and fate of a bubble in a geometrically perturbed Hele-Shaw channel
Journal of Fluid Mechanics — 10.1017/jfm.2020.844
- 2021 Sunday Sormendi, Mathieu Deygas, Anupam Sinha, **et al.**
HIF2 α is a direct regulator of neutrophil motility
Blood — 10.1182/blood.2020007505

Presentations

- 10/2025 **LFMI Seminar**, Lausanne (ch), Invited seminar.
- 03/2025 **Rencontres du Non-Linéaire**, Paris (fr), Selected talk — [Conference advert].
- 01/2025 **Journées de la Physique Statistique**, Paris (fr), Contributed talk.
- 12/2024 **MSC Internal Seminar**, Paris (fr), Invited seminar.
- 10/2024 **Journées de la Matière Condensée**, Marseille (fr), Contributed talk.
- 09/2024 **European Fluid Dynamics Conference**, Aachen (de), Contributed talk.
- 06/2024 **International meeting in the memory of Yves Couder**, Paris (fr), Poster presentation.
- 03/2024 **Rencontres du Non-Linéaire**, Paris (fr), Poster presentation.
- 03/2024 **Séminaire Café**, Paris (fr), Invited seminar.
- 09/2023 **European Coating Symposium**, Paris (fr), Contributed talk — [Cover].
- 07/2023 **Congrès Général des 150 ans de la SFP**, Paris (fr), Contributed talk.
- 06/2023 **Non-linear physics seminar**, Paris (fr), Invited seminar.
- 03/2023 **Rencontres du Non-Linéaire**, Paris (fr), Poster presentation.

Para-academic activities

- 2023-2025 **Laboratory board member**, MSC
Elected representative of the non-permanents (PhD students and post-docs) at the laboratory board of MSC.
- 2024 **EDPIF Scientific Day organizer**, Paris
Planning and supervision of a one-day event reuniting ~150 2nd year PhD students of the doctoral school EDPIF.
- 2023 **Young Physicists Meeting organizer**, Paris
Organisation of the RJP 2023, a one-day wide-range conference reuniting ~200 PhD students and Post-Docs with a budget of 15 k€.
- 2022-2025 **French IPHO scientific comitee member**, French Ministry of Education
Member of the scientific comitee of the selection and training of the french team for the International Physics Olympiads (IPHO).

Outreach

- 05/2025 **Pint of Science**, Paris
30-minutes intervention for the Pint of Science global science festival.
- 10/2023 **Science Fair**, Université Paris Cité
Presentation of scientific experiments to primary school classes.
- 07/2023 **Before du grand congrès de la SFP**, Cité des sciences et de l'industrie
Vulgarization of a scientific concept to the general public.
- 2018-2019 **Cours aux ernests**, ENS
Short courses explaining the basics of physics for non-physics students.
- 10/2018 **Science Fair**, ENS
Presentation of scientific experiments for the general public.

Grants obtained

- 03/2025 **Chaos, Météo & Roue à Eau** (1 k€), Scientific Mediation Call (Université Paris Cité)
Designing and building a visual experiment to introduce chaos theory to the general public.
- 01/2024 **Multi-camera observation** (2 k€), MSC internal call
Buying loudspeakers, cameras and lenses in order to improve an existing experiment.

Expertise

- Experimental
Optical alignment protocols
Chemistry lab techniques
Fabrications techniques (3D printing, Laser cutting)
- Softwares
Experiment control (LabView, Arduino, Limrendir)
Technical drawing (Inkscape) | Computer Assisted Design (FreeCAD, SolidWorks)
Image analysis (openCV, ImageJ)
- Programming
Python - Image analysis, Data treatment
C, C++ - Software development, GTK & Qt frameworks
Git - Distributed version control

Teaching

Master of Science

- 2023-2025 **Theoretical courses**, Préparation à l'agrégation interne, Université Paris Cité
MS (2nd year) — Intense courses in wave phenomena and electromagnetism
22.5 hETD (30 trainee / session)
- 2022-2025 **Préparation au montage**, Préparation à l'agrégation interne, Université Paris Cité
MS (2nd year) — Preparation of the experimental evaluation for candidates to the agrégation
36 hETD (15 trainee / session)
- 2022-2025 **Oral training**, Préparation à l'agrégation interne, Université Paris Cité
MS (2nd year) — Preparation of the oral evaluation for candidates to the agrégation
9 hETD (15 trainee / session)
- 2022-2025 **LASER**, École d'Ingénieurs Denis Diderot (EIDD)
MS (1st year) — Write and dispense 9 tutorial sessions on the physics of lasers
54 hETD (20 students / session)
- 2022-2023 **Experimental physics**, Master MEEF, Université Paris Cité
MS (1st year) — Supervision of practical work for candidates to the CAPES competitive exam
27 hETD, 15 students / session

Bachelor's degree

- 2022-2025 **Training for the International Physicists' Tournament (IPT)**, Université Paris Cité
Bachelor (3rd year) — Supervising and training the university's team for the IPT
43.5 hETD, 10 students / session
- 2020-2022 **Oral evaluations**, Prépa Hadamart
Bachelor (1st and 2nd year) — Preparation for the oral part of the physics competitive exam
Two times one hour per week, 3 students / session

Volunteering

- 2019-2020 **Tutoring**, Jean Zay State boarding school
Bachelor (1st and 2nd year) — Personalized tutoring for state scholarship holders
Four times one hour a week, individual
- 2017-2019 **Tutoring**, Maison des Jeunes Talents
Bachelor (1st and 2nd year) — Tutoring for state scholarship holders
One time two hours per week, 3 to 9 students / session

Interns supervision

- 2025 (2 mo) Zacharie Leridon (L3) : Surface tension measurements by the Pendant Drop method
- 2024 (2 mo) Youtta-Maria Saad (L3) : Surface tension measurements by the Pendant Drop method
- 2024 (2 mo) Appoline Malliach (L3) : Out of equilibrium statical physics of 2D dices