Aliénor Rivière

Post-doctoral researcher at EPFL

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Academic career

01/2025– **Post-doctoral researcher at EPFL**, Lausanne, Suisse.
Bubble stability in model flows with F. Gallaire

10/2024– **Post-doctoral researcher at Institut ∂'Alembert**, Sorbonne Université, Paris.
12/2024 *Intermittency characterization in turbulent emulsions* with S. Chibbaro and M. Crialesi-Esposito

Education

Academic background

2020–2024 **PhD Fluid Mechanics**, PMMH, ESPCI, Paris.
Title: *Bubble deformation and fragmentation in turbulence*
Supervisors: S. Perrard, L. Duchemin and C. Josserand

2018–2020 **MSc Physics**.

↪ **Master 2 Sorbonne Université**, Paris, *Master of Fluid Mechanics*, rank 2
Internship: Institut ∂'Alembert, Sorbonne Université, Paris (6 months)
Subject: *Capillary waves at the interface between two viscous fluids*
Supervisors: M. Rossi and D. Fuster

↪ **Master 1 Ecole Normale Supérieure (ENS) Paris**,
Master of Fundamental Physics and Applications, with high honors
Internship: Princeton University (6 months)
Subject: *Bubble breakup in turbulence*
Supervisor: L. Deike

2017–2018 **BSc Physics ENS Paris**, *Fundamental Physics (FIP)*, with high honors.

2015–2017 **Classe préparatoire aux grandes écoles**, Lycée Louis le Grand, Paris, *PCSI/PC**.

Summer/Winter schools

02/2025 **Physics school of Les Houches**, *New challenges in turbulence research*, France.

07/2023 **Physics school of Les Houches**, *200 Years of Navier-Stokes and Turbulences*, France.

07/2022 **Boulder School for Condensed Matter and Materials Physics**, *Hydrodynamics across scales*, Boulder, USA.

Prizes and distinctions

2024 **L'Oréal-UNESCO Prize for Women in Science**, Young Talents France.
Supports early-career scientific female researchers, in PhD or Post-doc. In 2024, 35 women were awarded in France among the 800 applicants.

2023 **APS François Frenkiel Award**, for the paper A. Rivière & al. PRF (2022).
Awards young investigators for a significant contributions to Fluid Mechanics published during the previous year in Physical Review Fluids.

Publications

[8] **A. Rivière**, S. Perrard, "Bubble breakup probability in turbulent flows", *Under review at Phys. Rev. Fluids Lett.*.

[7] **A. Rivière**, K. Abahri, S. Perrard, "Bubble shape oscillations in a turbulent environment", *J. Fluid Mech.* 1001, A26 (2024)

[6] S. Gomé, **A. Rivière**, L. Tuckerman, D. Barkley, "Phase transition to turbulence via moving fronts", *Phys. Rev. Lett.* 132.26, 264002 (2024)

Selected as **Editor's suggestion**.

[5] **A. Rivière**, L. Duchemin, C. Josserand, and S. Perrard, "Bubble break-up reduced to a 1D non linear oscillator", *Phys. Rev. Fluids* 8.9, p. 094004 (2023)

[4] D. J. Ruth, A. Ayier, **A. Rivière**, S. Perrard, and L. Deike, "Experimental observations and modelling of sub-Hinze bubble production by turbulent bubble break-up", *J. Fluid Mech.* 951, A32 (2022).

[3] **A. Rivière**, D. J. Ruth, W. Mostert, L. Deike and S. Perrard, "Capillary driven fragmentation of large gas bubbles in turbulence", *Phys. Rev. Fluids* 7.8, p. 083602 (2022).

APS François Frenkiel Award 2023.

[2] S. Perrard, **A. Rivière**, W. Mostert, and L. Deike, "Bubble deformation by a turbulent flow", *J. Fluid Mech.* 920, A15 (2021).

[1] **A. Rivière**, S. Perrard, W. Mostert, and L. Deike, "Sub-hinze scale bubble production in turbulent bubble break-up", *J. Fluid Mech.* 917, A40 (2021).

Talks

Invited talks in conferences and seminars

11/2024 **Engineering department Seminar**, UNIMORE, Modena, Italy.
"Bubble deformations and breakup in a turbulent flow"

05/2024 **Meche Seminar**, EPFL, Lausanne, Switzerland.
"Bubble deformations and breakup in a turbulent flow"

03/2024 **LMFA Seminar**, Lyon, France.
"Bubble deformations and breakup in a turbulent flow"

11/2023 **APS Division of Fluid Dynamics (APS DFD)**, *Washington DC*, Invited speaker.
François Frenkiel Award talk
"Oceanic bubble size distributions: Capillarity produces the tiny bubbles"

10/2023 **Seminar of the Non-linear Physics' group**, LPENS, Paris, France.
"Stochastic oscillations of bubbles in turbulence"

03/2023 **Rencontre du Non-linéaire (RNL)**, *Paris, France*, Selected speaker.
12 talks selected among a hundred of applications.
"Bubble break-up is always sub-critical"

Contributed talks

07/2025 **ERCOFTAC SIG 33 Progress in Flow Instability, Transition and Control**, *Cagliari, Italy*.
"Competition between deformation and drift in uniaxial straining flows"

05/2025 **International Conference on Multiphase Flows (ICMF)**, *Toulouse, France*.
"Predicting bubble lifetime from a stochastic toy model"

03/2025 **Rencontre du Non Linéaire (RNL)**, *Paris, France*.
"From turbulent to laminar bubble breakup: Capillary splitting of gas filaments" (Poster)

09/2024 **European Fluid Mechanics Conference (EFMC)**, *Aachen, Germany*.
"A linear stochastic model to predict bubble lifetime in turbulence"

06/2024 **International Conference on Numerical Methods in Multiphase Flows (ICNMMF)**, *Reykjavik, Iceland*.
"Bubble fate in turbulence: predicting lifetimes from a stochastic toy model"

11/2023 **APS Division of Fluid Dynamics (APS DFD)**, *Washington DC, USA*.
"Oceanic bubble size distributions: Capillarity produces the tiny bubbles"

11/2023 **APS Division of Fluid Dynamics (APS DFD)**, *Washington, USA.*
"Stochastic bubble shape oscillations"

10/2023 **GDR Navier-Stokes S 2.0**, *Rouen, France.*
"Stochastic oscillations of bubbles in turbulence"

09/2023 **European Turbulence Conference (ETC)**, *Valencia, Spain.*
"Stochastic deformations of bubbles in turbulence"

07/2023 **Basilisk (Gerris) Users' Meeting 2023**, *Paris, France.*
"Subcritical bubble break-up"

05/2023 **Euromech Colloquium 628, Complex Particles in Turbulent Flow**, *Nice, France.*
"Bubble shape fluctuations in turbulence" (Poster)

03/2023 **Rencontre du Non-linéaire (RNL)**, *Paris, France.*
"Bubble break-up is always sub-critical"

11/2022 **APS Division of Fluid Dynamics (APS DFD)**, *Indianapolis, USA.*
"Bubble oscillations in a uni-axial extensional flow"

09/2022 **European Fluid Mechanics Conference (EFMC)**, *Athens, Greece.*
"Investigation of the coupling between bubble interface deformations and flow velocity"

03/2022 **Rencontre du Non-linéaire (RNL)**, *Paris, France.*
"Capillary fragmentation of large bubbles in turbulence" (Poster)

11/2021 **APS Division of Fluid Dynamics (APS DFD)**, *Phoenix, USA.*
"Capillary fragmentation of large bubbles in turbulent flows"

10/2021 **GDR Micro et Nano Fluidique : Ondes, Fluides, Interface**, *Lille, France.*
"Capillary fragmentation of large bubbles in turbulence"

03/2021 **Rencontre du Non-linéaire (RNL)**, *Paris, France.*
"Bubble deformations by a turbulent flow" (Poster)

08/2020+1 **International Congress of Theoretical and Applied Mechanics (ICTAM)**, *Online.*
"Bubble deformation by a turbulent background"

11/2020 **APS Division of Fluid Dynamics (APS DFD)**, *Online.*
"Sub-Hinze scale bubble production in turbulent bubble break-up"

06/2019 **Basilisk Meeting**, *Sorbonne Université, Paris, France.*
"Bubble break-ups in turbulence"

Teaching and advising

2021–2024 **Undergraduate supervision**, with S. Perrard.
Daily supervision of Kamel Abahri (2nd year at ENSTA, 4 months), Baptiste Vernet (Licence 3, 2 months), Philippe Ngahbi (1st year at ENSTA, 3 months).

2021–2024 **Teaching Assistant**, Numerical and Experimental practical sessions in Engineering schools (ESPCI and ENSTA) 64h/year during 3 years.
Fluid mechanics (2nd year students), Python (1st year), Mechanics of Incompressible fluids (1st year).

Participation in academic life and outreach

Seminar organization, Inter-labs visits in Paris between PMMH (ESPCI), Institut ∂'Alembert (Sorbonne Université) and MSC (Université Paris Diderot); weekly MEchanics GAthering (MEGA) Seminar at EPFL.

Peer Review, European Journal of Mechanics - B Fluids.

Outreach activities, Communication of my PhD research through radio, television and print media.