

Roulley Emeric

Post-doc researcher

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Birth 13/06/1994

Academic background

- 2025-Now **Postdoc ERC**, *Università degli studi di Milano*
Scientific referent : Riccardo Montalto
- 2022-2025 **Postdoc PRIN**, *SISSA, Trieste*
Scientific referent : Massimiliano Berti
- 2019-2022 **PhD**, *IRMAR, Rennes*
Advisor : Taoufik Hmidi
- 2018 **Agrégation de mathématiques**
- 2015-2019 **ENS Rennes and University Rennes 1**
Bachelor and Master degrees
- 2012–2015 **Prépa MPSI, MP* (5/2)**, *Lycée Malherbe, Caen*

Publications and Preprints

ORCID **0000-0002-1593-3781**

- [1] **Time quasi-periodic vortex patches for quasi-geostrophic shallow-water equations**
with Taoufik Hmidi, to appear in *Mémoires de la Société Mathématique de France* in 2026
- [2] **Vortex rigid motion in quasi-geostrophic shallow-water equations**
Asymptotic Analysis 133 (2022), no. 3, 397–446.
- [3] **Boundary effects on the emergence of quasi-periodic solutions for Euler equations**
with Zineb Hassainia, *Nonlinearity* 38 (2025) 015016, no. 1, 1-81.
- [4] **Periodic and quasi-periodic Euler- α flows close to Rankine vortices**
Dynamics of Partial Differential Equations 20 (2023), no. 4, 311-366.
- [5] **Invariant KAM tori around annular vortex patches for 2D Euler equations**
with Zineb Hassainia and Taoufik Hmidi, *Communications in Mathematical Physics* 405 (2024), no. 270, 1-127.
- [6] **Dynamics of vortex cap solutions on the rotating unit sphere**
with Claudia García and Zineb Hassainia, *Journal of Differential Equations* 417 (Feb. 2025), 1–63.
- [7] **Local and global bifurcation of electron-states**
Discrete and Continuous Dynamical Systems 45 (2025), no. 8, 2381–2419.
- [8] **Uniformly rotating vortices for the lake equation**
with Taoufik Hmidi, Haroune Houamed and Mohamed Zerguine, *Mathematische Annalen* 392 (2025), 3065–3160.
- [9] **Desingularization of time-periodic vortex motion in bounded domains via KAM tools**
with Zineb Hassainia and Taoufik Hmidi, to appear in *Journal of the European Mathematical Society*
- [10] **Steady vortex sheets in presence of surface tension**
with Federico Murgante and Stefano Scrobogna
- [11] **Long-time dynamics for the Kelvin-Helmholtz equations close to circular vortex sheets**
with Federico Murgante and Stefano Scrobogna, *Archive for Rational Mechanics and Analysis* 250 (2026), no. 32.
- [12] **Filamentation near monotone zonal vortex caps**
with Gian Marco Marin

- [13] **Ions-electrons-states for the two-component Vlasov-Poisson equation**
- [14] **Confinement results on the rotating sphere**
with Martin Donati
- [15] **Quasi-periodic traveling electron layers**
with Luca Franzoi
- [16] **On stationary Quasi-Geostrophic Shallow-Water flows**
with Vittorio Baroncini and Claudia García

Conferences

- June 2026 **Bifurcations in Differential Equations**, *Milano (Politecnico)*
- May 2026 **Mathematical Developments in Geophysical Fluid Dynamics II**, *Paris (IHP)*
- April 2026 **Mathematical Developments in Geophysical Fluid Dynamics I**, *Paris (IHP)*
- April 2026 **Pre-school of "Mathematical Developments in Geophysical Fluid Dynamics"**, *CIRM*
- Jan. 2026 **Journées des Jeunes EDPistes**, *Paris Dauphine*
- May 2025 **WaDIB conference Waves dynamics, integrability and beyond**, *Cagliari*
- May 2025 **Cabo de Gata PDE days**, *San José*
- March 2025 **Conclusive PRIN workshop**, *Venezia*
- March 2025 **Workshop Vortices, Boundary layers and Instabilities**, *Grenoble (Institut Fourier)*
- Jan. 2025 **Workshop Vortex dynamics in incompressible flow**, *Seoul (Yonsei University)*
- Dec. 2024 **14th AIMS conference**, *Abu Dhabi*
- Dec. 2024 **Long time behaviour and singularity formation in PDE-Part VII**, *NYUAD*
- Nov. 2024 **Mathematics of fluids in motion: Recent results and trends**, *CIRM*
- Sept. 2024 **Hamiltonian and dispersive PDEs, third school and workshop**, *Milano*
- July 2024 **Alhambra PDE days**, *Granada (IMAG)*
- June 2024 **Stability and rigidity in dynamical systems beyond classical KAM theory**, *Paris*
- May 2024 **Summer school: (in)-stability phenomena in fluid mechanics**, *Neuville-sur-Oise*
- Jan. 2024 **Long time behaviour and singularity formation in PDE-Part VI**, *Online*
- Aug. 2023 **School/Workshop on Wave Dynamics: Turbulent vs Integrable Effects**, *Trieste (ICTP)*
- June 2023 **New trends in mathematical fluid dynamics**, *Grenoble (Institut Fourier)*
- May 2023 **Hamiltonian and dispersive PDEs, second school and workshop**, *Roma*
- Oct. 2022 **Young Researcher's Workshop on Nonlocal PDEs and Applications**, *Granada*
- Sept. 2022 **Hamiltonian and dispersive PDEs, first school and workshop**, *Pisa*
- June 2022 **Summer school on fluids and turbulence**, *Lyon (Institut Camille Jordan)*
- May 2022 **Long time behaviour and singularity formation in PDE-Part V**, *Online*
- April 2022 **Research school Mathematical advances in geophysical flows**, *CIRM*
- Jan. 2022 **Long time behaviour and singularity formation in PDE-Part IV**, *Online*
- May 2021 **Long time behaviour and singularity formation in PDE-Part III**, *Online*
- Jan. 2021 **Long time behaviour and singularity formation in PDE-Part II**, *Online*
- May 2020 **Long time behaviour and singularity formation in PDE-Part I**, *Online*

Given seminars

- March 2026 **Seminario de Ecuaciones Diferenciales**, *Universidad de Granada*
Nonlinear oscillations of electron layers
- Feb. 2026 **Analysis seminar**, *Università degli Studi di Trieste*
Quasi-periodic traveling electron layers
- Jan. 2026 **Séminaire EDP**, *Laboratoire de Mathématiques de Besançon*
Nonlinear oscillations of electron layers

- Nov. 2024 **Analysis seminar, SISSA**
Periodic vortex patch motion in bounded domains
- Oct. 2025 **Analysis seminar, Beijing Normal University**
Filamentation near monotone zonal vortex caps
- Oct. 2024 **Tassili Sunday Maths Seminar (TSMS)**
Vortex patch motion in bounded domains
- Set. 2024 **Analysis seminar, Beijing Normal University**
Vortex patch motion in bounded domains
- Dec. 2023 **PDE seminar, Laboratoire Jean Leray Nantes**
Poches périodiques et quasi-périodiques en temps
- Nov. 2023 **PDE seminar, New York University Abu Dhabi**
Dynamics of vortex cap solutions on the rotating unit sphere
- June 2023 **Analysis Junior Seminar, SISSA**
Dynamics of vortex cap solutions on the rotating unit sphere
- Feb. 2023 **Analysis Junior Seminar, SISSA**
Invariant KAM tori around annular vortex patches for 2D Euler equations
- May 2022 **PDE seminar, Universitat Autònoma de Barcelona**
Boundary effects on the emergence of quasi-periodic solutions for Euler equations
- May 2022 **Analysis seminar, SISSA**
Time quasi-periodic vortex patch solutions for geophysical fluid models
- Dec. 2021 **PDE seminar, New York University Abu Dhabi**
Boundary effects on the emergence of quasi-periodic solutions for Euler equations
- June 2021 **PDE seminar, University Rennes 1**
Time quasi-periodic vortex patches for quasi-geostrophic shallow-water equations
- Jan. 2021 **PDE PhD seminar, University Rennes 1**
Doubly-connected V-states for quasi-geostrophic shallow-water equations
- Jan. 2020 **PDE PhD seminar, University Rennes 1**
Time (quasi-)periodic solutions for quasi-geostrophic shallow-water equations

Talks at conferences

- May 2026 **Mathematical Developments in Geophysical Fluid Dynamics II, Paris (IHP)**
Confinement results near point vortices on the rotating sphere (Poster)
- April 2026 **Mathematical Developments in Geophysical Fluid Dynamics I, Paris (IHP)**
Filamentation near monotone zonal vortex caps
- Jan. 2026 **Journées des Jeunes EDPistes, Paris Dauphine**
Filamentation near monotone zonal vortex caps
- May 2025 **WaDIB conference Waves dynamics, integrability and beyond, Cagliari**
Periodic vortex patch motion in bounded domains
- May 2025 **Cabo de Gata PDE days, San José**
Periodic vortex patch motion in bounded domains
- March 2025 **Conclusive PRIN workshop, Venezia**
Periodic vortex patch motion in bounded domains
- March 2025 **Workshop Vortices, Boundary layers and Instabilities, Grenoble (Institut Fourier)**
Periodic vortex patch motion in bounded domains
- Jan. 2025 **Workshop Vortex dynamics in incompressible flow, Seoul (Yonsei University)**
Periodic vortex patch motion in bounded domains (2h)
- Dec. 2024 **14th AIMS Conference, Special Session Fluid dynamics and KAM theory, Abu Dhabi**
Periodic vortex patch motion in bounded domains

- Nov. 2024 **Mathematics of fluids in motion: Recent results and trends**, *CIRM*
Dynamics of vortex cap solutions on the rotating unit sphere (short presentation)
- Dec. 2022 **Junior Math Days**, *SISSA*
Periodic and quasi-periodic vortex patch motion
- April 2022 **Brittany PhD meeting**, *University Rennes 1*
Hurricanes and implicit function theorem
- Aug. 2019 **Workshop harmonic analysis**, *Saint-Nazaire*
Quasi-periodic solutions in PDE

Administrative duties

- Reviewer
- **Discrete and continuous dynamical systems**
 - **Communications in Mathematical Physics**
 - **Journal of Differential Equations**
 - **Advances in Nonlinear Analysis**
 - **SIAM Journal on Mathematical Analysis**
 - **Nonlinearity**
 - **Journal of Functional Analysis**
 - **Annales de l'Institut Henri Poincaré Analyse Non-Linéaire**
 - **Annales Polonici Mathematici**
 - **Transactions of the American Mathematical Society**
 - **Journal of Mathematical Analysis and Applications**
- 2026 **Member of the project INdAM-GNAMPA (In)-stability in fluid mechanics**
Principal Investigator : Roberta Bianchini
- 2025-2027 **Member of the project ERC STARTING GRANT 2021 "Hamiltonian Dynamics, Normal Forms and Water Waves" (HamDyWWa), project Number: 101039762**
- 2022-2025 **Member of the project PRIN "Hamiltonian and Dispersive PDEs", project number: 2020XB3EFL**
- 2020-2022 **Co-organizer of PDE PhD seminar University Rennes 1**
- Oct. 2020 **Participation to "fête de la science", Rennes**
Presentation of mathematical objects/concepts to the general public

Teaching and Supervision

- August-Nov. 2025 **Lecturer and examiner for the course *Analisi Matematica***
Università telematica eCampus (lectures and examinations delivered in Italian)
- June–August 2025 **Examination duties for the course *Analisi Matematica***
Università telematica eCampus (examination delivered in Italian)
- Jan.-March 2025 **Lectures on the periodic motion of vortex patches in bounded domain**, *SISSA*
PhD course (22h)
- 2024 **Master thesis of Gian Marco Marin**, *SISSA*
Filamentation of vortex patches on planes and spheres
- Sept.-Oct. 2022 **Lectures on periodic and quasi-periodic vortex patches**, *SISSA*
Analysis working group (15h)
- 2020-2022 **Integral calculus for Agrégation de mathématiques**, *University Rennes 1*
- 2019-2022 **Tutorials for undergraduate classes**, *University Rennes 1*
- 2018-2019 **Colles in prépa MP**, *Lycée Chateaubriand Rennes*
Weakly oral examinations for undergraduate students
- 2012-2022 **Private lessons in Mathematics**
Every level until Bachelor degree

———— Languages

French **Mother tongue**

English **Fluent**

Italian **Fluent**

Spanish **Basics**