

**Name:** **Freddy Bouchet**  
**Born on:** June the 17th 1972 in Saint Julien en Genevois (France)  
**Nationality and Civil status:** French. Three children (1998,2000,2005)  
**Professional address:** Laboratoire de Météorologie Dynamique, Ecole Normale Supérieure  
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**E-mail:** Freddy.Bouchet @ cnrs. fr  
**Current position:** **Directeur de recherche at CNRS and Professeur attaché at ENS/PSL**

### Professional experience and education

22->	<b>Directeur de recherche DR1 at CNRS - LMD ENS/PSL - Paris</b>	ENS/PSL Paris
22->	<b>Professeur attaché at ENS/PSL</b>	ENS/PSL Paris
13->22	<b>Directeur de recherche DR2 (Prof.) at CNRS - ENS de Lyon</b>	ENS de Lyon, France
10->13	<b>Chargé de recherche CRI (Ass. Prof.) at CNRS - ENS de Lyon</b>	
09->10	<b>Center for Non Linear Studies (Los Alamos, USA) - Sabbatical</b>	Los Alamos, USA
04->09	<b>Researcher position at CNRS - INLN</b>	INLN-Nice, France
03->04	<b>Agrégé préparateur (post doc) at ENS-Lyon</b>	ENS de Lyon France
03	<b>Post-Doc directed by Angelo Vulpiani</b>	Roma La Sapienza Italy
01-02	<b>Post-Doc directed by Stefano Ruffo</b>	Florence, Italy
98-01	<b>PHD in physics, supervised by R. Robert and J. Sommeria</b> Statistical mechanics for geophysical flows	Institut Fourier, Grenoble Université Joseph Fourier
96-98	High school math teacher (during the <b>French national service</b> )	French school in Milan
94-95	<b>Agrégation in Mathematics.</b>	
92-96	<b>Student in the Ecole Normale Supérieure de Lyon (normalien)</b>	ENS de Lyon, France

**Main scientific interests:** Climate dynamics, climate extreme events, rare event simulations, rare events and resilience of the electric system, climate tipping points, large deviation theory and rare event simulation, statistical physics, kinetic theory, turbulence and statistical mechanics.

**Current research:** Currently my main focus is the study of rare events which are of interest for climate change impacts or the energy transition. I develop the theory and the methodology for rare event algorithms, which allow to multiply, at a fixed numerical cost, the number of rare trajectories that lead to event with high impacts. The three main domains of application are climate extreme events (heat waves, droughts), rare transitions that lead to climate tipping points, or extreme imbalance of production and demand for the future electric system. For this we also develop machine learning approaches.

**Summary of research record:** 83 original publications in peer-reviewed journals. 3 review articles. 1 edited book. 5 book chapters.

**Invited talks in international conferences and schools: 103 (54 since 2016) (in the fields of climate, statistical physics, and applied mathematics).** 19 research lectures in schools (11 since 2016) + 98 seminars with competitive selections or in labs abroad (USA, Japan, Europe, and so on).

*Plenary speaker at the SIAM annual meeting in 2016 at Boston, USA (the world reference conference in applied mathematics).* Invited talks at APS, ICTAM, and APS-DFD in 2021.

### Grants:

1. One of the 10 PIs of the PSL grant TERRAE dedicated to transdisciplinary research to accelerate ecology transitions (2024-2029).
2. One of multiple PIs of the European **Horizon grant Climtip** (Climate tipping points) (2024-2029).
3. One of the two leaders of the project Climaths within the **PEPR Mathvives** (2024-2029).
4. I lead the IPSL/RTE collaboration framework dedicated to the resilience of the electric system (with L. Dubus, led until 2023 by R. Vautard).
5. **PI** of a IMPT grant “New computational and mathematical tools to study extremes of electricity demand and renewable production” (2022-2025).
6. **PI** of **one Simons foundation** grant “Turbulence and Statistical Mechanics” (2019-2024) and member of **another one** “Wave turbulence” (2019-2029).
7. I am one of the two PIs of the ANR grant SAMPLing RAre Climate Events (SAMPRACE). (2020-2025).
8. **PI** of two ITN European research grants (2020-2024).
9. Member of one University de Lyon Breakthrough IDEX grant ACADEMICS (2018-2021).
10. **PI** of the **ERC consolidator grant TRANSITION** (2014-19): Large deviation theory applied to complex dynamical systems, in turbulence, climate dynamics and the solar system dynamics (1 200 k€).
11. **PI** of the **ANR project STATOCEAN**, 2010-2013, (ENSL, LEGI, LPO) (320 k€).
12. **PI** of the **ANR-JC project STATFLOW**, 2006-2009, (120 k€) and member of 3 more ANR projects.

**Publications in referred international journals:** Google scholar : **F. Bouchet scholar**

**Student and post-doc supervision:** 14 PhDs and 16 Pqst-docs