Curriculum Vitae

Personal informations

First name, family name:	Francesco Ragone
Nationality:	Italian
Place of birth:	Parma (Italy)
Date of birth:	23/05/1984
Current Position:	Assistant professor at Université Catholique de Louvain (UCLouvain) Researcher at Royal Meteorological Institute of Belgium (RMI)
Professional Address:	 1) Université Catholique de Louvain Place Louis Pasteur, 3, B-1348 Louvain-la-Neuve, Belgium 2) Royal Meteorological Institute of Belgium Avenue Circulaire 3, B-1180 Bruxelles, Belgium
Email address:	1) francesco.ragone@uclouvain.be 2) fragone@meteo.be
Personal website:	1) https://uclouvain.be/en/directories/francesco.ragone 2) https://climdyn.meteo.be/team/francesco-ragone
Researcher Identifier:	ORCID: 0000-0002-2493-7020

Employment

since September 2020	Assistant professor at Université Catholique de Louvain (UCLouvain) Researcher at Royal Meteorological Institute of Belgium (RMI)
June 2018 - August 2020	Postdoc, Laboratoire de Physique, ENS-Lyon, France Research on extreme events in numerical climate models with rare event simulation techniques.
May 2016 – May 2018	Postdoc, University of Milan-Bicocca, Italy Research on extreme events in the Mediterranean area.
May 2015 - May 2016	Postdoc, Laboratoire de Physique, ENS-Lyon, France Research on extreme heat waves in numerical climate models with rare event simulation techniques.
March 2014 - February 2015	Postdoc, University of Hamburg, Germany Research on semi-geostrophic approximation.
October 2013 - February 2014	Postdoc, University of Hamburg, Germany Research on application of linear response theory to climate models.
September 2009 - September 2013	PhD student, University of Hamburg, Germany Research on stochastic parameterizations and on thermodynamics of the climate system and of planetary atmospheres.

Education

December 2013	PhD in Meteorology, University of Hamburg, Germany Thesis: Stochastic parameterization of atmospheric convection - stochastic lattice models of cloud systems in Plasim Supervisor: Prof. Klaus Fraedrich
July 2009	M.Sc. in Physics, University of Bologna, Italy, mark: 110/110 cum laude Thesis: Energy balances and meridional energy transports in GCMs Supervisor: Prof. Valerio Lucarini
November 2006	B.Sc. in Physics, University of Parma, Italy, mark: 110/110 cum laude Thesis: Conduction in spin systems of non-integer dimensionality between 1 & 2 Supervisor: Prof. Mario Casartelli

Teaching

since 2020	Simulation numerique en physique (Numerical simulation in physics) B.Sc. in Physics, Université Catholique de Louvain Language: English and French Course webpage: https://uclouvain.be/cours-2022-lphys1303
since 2021	Le climat et ses changements (Climate and climate changes) B.Sc. in Geography, Université Catholique de Louvain Language: English and French Course webpage: https://uclouvain.be/cours-2022-lgeo1232
since 2022	Introduction to the physics of the climate system and its modelling M.Sc. in Physics, Université Catholique de Louvain Language: English and French Course webpage: https://uclouvain.be/en-cours-2022-lphys2162
2016-2018	Teaching assistance for Physical Oceanography International M.Sc. in Marine Sciences, University of Milan-Bicocca Language: English
2014-2015	Teaching assistance for Nonlinear Dynamical Systems M.Sc. in Oceanography, University of Hamburg Language: English

Supervision

Since February 2022 supervisor of one PhD student at UCLouvain working on statistics and predictability of Arctic sea ice reduction using rare event algorithms applied to coupled climate models. Member of the PhD committee of one PhD student at the University of Rennes (France) working on impacts of climate change on viral disease transmission in cereal aphids.

Supervisor of student projects on stochastic resonance for the course Personal Projects in Physics for the B.Sc. in Physics at UCLouvain. Reader for two Master thesis in Physics on sea ice variability at UCLouvain. Cosupervisor of two Master thesis and one Bachelor thesis at the University of Milan-Bicocca on air-sea interactions in the Mediterranean sea, and one Master thesis at the University of Hamburg on oceanic fluid dynamics.

Scholarly activities

Referee for Climate Dynamics, Earth System Dynamics, Geophysical Research Letters, Weather and Climate Extremes, Physical Reviews Research, Nature Communications.

Co-organizer in January 2023 of the training event on predictability of extreme events at RMI in Brussels (Belgium) for the EDIPI ITN project (https://edipi-itn.eu/). Co-convener of the session Extremes in Geophysical Sciences: Dynamics, Thermodynamics and Impacts, at the European Geophysical Union (EGU) general assembly 2020 in Vienna (Austria). Co-organizer of the 1st Hamburg-Kiel-Bremen PhD Conference 2010 at the University of Hamburg (Germany).

Grants

Beneficiary of a FSR Seedfund funding (80.000 Euro) in 2020, currently funding a PhD student at UCLouvain.

Main contributor to a DARI proposal in 2018 for a project on rare event simulation with state of the art climate models, that obtained 1,000,000 hours of computing time (equivalent to about 30.000 Euros) per year on the French supercomputing center GENCI. The allocation has then been renewed for three more years.

IT Skills

Extensive experience in working with numerical climate models on HPC infrastructures, in particular with the models Plasim and CESM. Advanced knowledge of Python, Matlab, Fortran, Climate Data Operator (CDO). Basic knowledge of Mathematica and C++.

Languages

Italian, mother tongue. English, fluent. French, intermediate.

Publications

Published

- Tradowsky, Jordis S., Philip, Sjoukje Y., Kreienkamp, Frank, Kew, Sarah F., Lorenz, Philip, Arrighi, Julie, Bettmann, Thomas, Caluwaerts, Steven, Chan, Steven C., De Cruz, Lesley, de Vries, Hylke, Demuth, Norbert, Ferrone, Andrew, Fischer, Erich M., Fowler, Hayley J., Goergen, Klaus, Heinrich, Dorothy, Henrichs, Yvonne, Kaspar, Frank, Lenderink, Geert, Nilson, Enno, Otto, Friederike E. L., **Ragone, F.**, Seneviratne, Sonia I., Singh, Roop K., Skålevåg, Amalie, Termonia, Piet, Thalheimer, Lisa, van Aalst, Maarten, Van den Bergh, Joris, Van de Vyver, Hans, Vannitsem, Stéphane, van Oldenborgh, Geert Jan, Van Schaeybroeck, Bert, Vautard, Robert, Vonk, Demi, & Wanders, Niko. Attribution of the heavy rainfall events leading to severe flooding in Western Europe during July 2021. *Climatic Change*, 176, 90 (2023);
- 2. Miloshevich G., Rouby-Poizat P., Ragone F., Bouchet F., Robust intra-model teleconnection patterns for extreme heatwaves, *Frontiers in Earth Science*, 11, (2023);
- 3. Docquier D., Vannitsem S., **Ragone F.**, Wyser K., Liang X.S, Causal links between Arctic sea ice and its potential drivers based on the rate of information transfer, *Geophysical Research Letters*, 49(9), e2021GL095892 (2022);
- Jacques-Dumas V., Ragone F., Borgnat P., Abry P., Bouchet F., Deep learning-based extreme heatwave forecast. *Front. Clim.*, 4:789641, 10.3389/fclim.2022.789641 (2022);
- 5. **Ragone F.**, Bouchet F., Rare event algorithm study of extreme warm summers and heatwaves over Europe, *Geophysical Research Letters*, 48, e2020GL091197 (2021);
- Gálfi V.M., Lucarini V., Ragone F., Wouters J, Applications of large deviation theory in geophysical fluid dynamics and climate science, *Rivista del Nuovo Cimento*, 44(6), 291–363 (2021);
- 7. Lembo V., Lucarini V., **Ragone F.**, Beyond forcing scenarios: predicting climate change through response operators in a coupled general circulation model, *Scientific Reports*, 10, 8668 (2020);
- Ragone F., Bouchet F., Computation of extremes values of time averaged observables in climate models with large deviation techniques, J. Stat. Phys., 179, 1637-1665 (2020);
- Meroni A.N., Giurato M., Ragone F., Pasquero C., Observational evidence of the preferential occurrence of wind convergence over sea surface temperature fronts in the Mediterranean, Q. J. R. Meteorol. Soc., 146(728), 1443-1458 (2020);
- Napoli A., Crespi A., Ragone F., Maugeri M., Pasquero C., Variability of orographic enhancement of precipitation in the Alpine region, *Scientific Reports*, 9, 13352 (2019);
- Ragone F., Meli A., Napoli A., Pasquero C., Ocean signature of intense wind events in the Western Mediterranean Sea, J. Mar. Sci. Eng., 182(7), 1-14 (2019);
- Lestang T., Ragone F., Brehier C.E., Herbert C., Bouchet F., Computing return times or return periods with rare event algorithms, J. Stat. Mech., 2018(4), 043213 (2018);
- Ragone F., Wouters J., Bouchet F., Computation of extreme heat waves in climate models using a large deviation algorithm, *Proc. Natl. Acad. Sci. U.S.A.*, 115(1), 24-29 (2018);
- Ragone F., Mariotti M., Parodi A., von Hardenberg J., Pasquero C., A climatological study of Western Mediterranean Medicanes in numerical simulations with explicit and parameterized convection, *Atmo-sphere*, 9, 397 (2018);
- 15. Lucarini V., **Ragone F.**, Lunkeit F., Predicting climate change using response theory: global averages and spatial patterns, J. Stat. Phys., 166(3-4), 1036-1064 (2017);
- Ragone F., Badin G., A study of surface semi-geostrophic turbulence: freely decaying dynamics, J. Fluid Mech., 792, 740-774 (2016);
- 17. Ragone F., Lucarini V., Lunkeit F., A new framework for climate sensitivity and prediction: a modelling perspective, *Clim. Dyn.*, 46(5-6), 1459-1471 (2016);
- 18. Ragone F., Fraedrich K., Borth H., Lunkeit F., Coupling a minimal stochastic lattice gas model of a cloud system to an atmospheric general circulation model, Q. J. R. Meteorol. Soc., 141(686), 37-51 (2015);
- Lucarini V., Blender R., Herbert. C., Ragone F., Pascale S., Wouters J., Mathematical and physical ideas for climate science, *Rev. Geophys.*, 52, 809-859 (2014);

- Pascale S., Ragone F., Lucarini V., Wang Y., Boschi R., Nonequilibrium thermodynamics of circulation regimes in optically thin, dry atmospheres, *Planet. Space Sci.*, 84, 48-65 (2013);
- Lucarini V., Fraedrich K., Ragone F., New results on the thermodynamic properties of the climate system. J. Atmos. Sci., 68(10), 2438-2458 (2011);
- 22. Lucarini V., **Ragone. F.**, Energetics of climate models: Net energy balance and meridional enthalpy transport, *Rev. Geophys.*, 49, RG1001 (2011).

Submitted and in preparation

- 1. Cini M., Corti S., Zappa G., **Ragone F.**, Simulating AMOC tipping driven by internal climate variability with a rare event algorithm, under review for *npj Climate and Atmospheric Science*, https://doi.org/10.21203/rs.3.rs-3215995/v1;
- 2. Sauer J., Demaeyer J., Massonnet F., Zappa G., **Ragone F.**, Rare event simulations of extreme Arctic sea ice reduction in a coupled climate model, submitted to *Climate Dynamics*;
- 3. **Ragone F.**, Vannitsem S., Demaeyer J., Analysis of circulation analogues of July 2021 heavy precipitation events, in preparation;

Other publications

Kreienkamp F., Philip S.Y., Tradowsky J.S., Kew S.F., Lorenz P., Arrighi J., Belleflamme A., Bettmann T., Caluwaerts S., Chan S.C., Ciavarella A., De Cruz L., de Vries H., Demuth N., Ferrone A., Fischer E.M., Fowler H.J., Goergen K., Heinrich D., Henrichs Y., t Lenderink G., Kaspar F., Nilson E., Otto F.E.L., **Ragone.** F., Seneviratne S.I., Singh R.K., Skålevåg A., Termonia P., Thalheimer L., van Aalst M., Van den Bergh J., Van de Vyver H., Vannitsem S., Jan van Oldenborgh G., Van Schaeybroeck B., Vautard R., Vonk D., Wanders N., Rapid attribution of heavy rainfall events leading to the severe flooding in Western Europe during July 2021; World Weather Attribution (WWA) report; https://www.worldweatherattribution.org/wp-content/ uploads/Scientific-report-Western-Europe-floods-2021-attribution.pdf (2021)

Presentations

- 1. Quantifying the risk of extreme events with rare event algorithms in climate models, WCRP Workshop on Extremes in Climate Prediction Ensembles (ExCPEns), Busan, Republic of Korea, 2021
- 2. Analysis of teleconnection patterns during extreme warm summers and heatwaves over Europe with a rare event algorithm, EGU General Assembly 2021
- 3. Sampling extreme heat waves in numerical climate models with a rare event algorithm, International Workshop on Complex systems and Networks, Humboldt-Universität zu Berlin, Germany, 2019
- 4. Rare event simulation techniques for numerical climate modelling, Global Systems Institute, University of Exeter, UK, 2019;
- 5. Studying extremes with rare event algorithms applied to numerical climate models, Department of Meteorology, University of Reading, UK, 2019;
- 6. Studying extremes with rare event algorithms applied to numerical climate models, CICERO Center for International Climate Research, Oslo, Norway, 2019;
- 7. Studying extreme climatic events with rare event algorithms applied to numerical climate models, Laboratoire de Meteorologie Dynamique, ENS-Paris, France, 2019;
- 8. Studying extreme climatic events with rare event algorithms applied to numerical climate models, School of Mathematics, University of Edinburgh, UK, 2018;
- Computation of extreme heat waves in climate models using a large deviation algorithm, 2018 Annual SISC Conference on Recent trends in climate sciences, adaptation and mitigation, Venice, Italy, 2018;
- 10. Simulation of extreme European heat waves with rare event algorithms, Workshop on Dynamical systems in atmospheric sciences, Laboratoire des Sciences du Climat et de l'Environnement, Paris, France, 2018;
- 11. Simulation of extreme European heat waves in a climate model with a rare event algorithm, Sixth Annual CliMathNet Conference, University of Reading, Reading, UK, 2018;

- 12. Simulation of heat waves in climate models using large deviation algorithms, Workshop on Numerics for Stochastic Partial Differential Equations and their Applications, Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria, 2016;
- 13. Simulation of heat waves in climate models using large deviation algorithms, Workshop on Extreme events in the Earth and planetary sciences, University of Warwick, Coventry, UK, 2016;
- 14. Simulation of heat waves in climate models using large deviation algorithms, Laboratoire des Sciences du Climat et de l'Environnement, PAris, France, 2016;
- 15. Simulation of heat waves in climate models using large deviation algorithms, 31st IUGG Conference on Mathematical Geophysics, Université Pierre et Marie Curie, Paris, France, 2016;
- 16. Simulation of heat waves in climate models using large deviation algorithms, Department of Environmental and Earth Sciences (DISAT), University of Milan-Bicocca, Milan, Italy, 2016;
- 17. Simulation of heat waves in climate models using large deviation algorithms, Joint Seminar of the Centrum für Erdsystemforschung und Nachhaltigkeit of the University of Hamburg and the Max Planck Institute for Meteorology, University of Hamburg, Hamburg, Germany, 2016;
- Large deviation theory and simulation of heat waves in climate models, Workshop on Instantons and Extreme Events in Turbulence and Dynamical Systems, Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brasil, 2015;
- A study of surface semi-geostrophic turbulence, Joint Seminar of the Centrum f
 ür Erdsystemforschung und Nachhaltigkeit of the University of Hamburg and the Max Planck Institute for Meteorology, University of Hamburg, Hamburg, Germany, 2015;
- 20. Applications of linear response theory to climate change experiments with a general circulation model of the atmosphere, ENS de Lyon, Lyon, France, 2014;
- 21. A new framework for climate sensitivity and prediction, Workshop on Fundamentals of Climate, Atmosphere and Ocean Dynamics, University of Hamburg, Hamburg, Germany, 2014;
- 22. Energetics of climate models: energy balance and meridional enthalpy transport, International Radiation Symposium, Berlin, Germany, 2012;
- 23. Energetics and entropy production of IPCC4AR climate models, Gemeinsames Seminar of the Meteorological Institute, Hamburg, Germany, 2010.

Posters

- Statistics of Medicanes in 30-years high resolution runs with the Weather Research and Forecasting regional model with different representations of convection, 2018 Annual SISC Conference on Recent trends in climate sciences, adaptation and mitigation, Mestre-Venice, Italy, 2018;
- 2. Sampling extreme heat waves using a large deviation algorithm, 26th IUPAP International Conference on Statistical Physics, Lyon, France, 2016;
- 3. Bouchet F., Sampling extreme heat waves using a large deviation algorithm, EGU General Assembly, Vienna, Austria, 2016;
- 4. A study of surface semi-geostrophic turbulence: freely decaying dynamics, Energy transfers in atmosphere and ocean, University of Hamburg, Germany, 2015;
- 5. Surface quasi- and semi-geostrophic dynamics, Ocean Scale Interactions Symposium, Ifremer, Brest, France, 2014;
- 6. Response theory in geophysical fluid dynamics, Workshop on Fundamentals of Climate, Atmosphere and Ocean Dynamics, University of Hamburg, Germany, 2014;
- 7. Energetics of climate models: energy balance and meridional enthalpy transport, 3rd International Conference on Earth System Modelling, Hamburg, Germany, 2012;
- 8. Stochastic parameterization of atmospheric convection in a GCM (Planet Simulator), EGU General Assembly, Vienna, Austria, 2011;
- 9. Thermodynamical properties of planetary fluid envelopes, EGU General Assembly, Vienna, Austria, 2011;

- 10. Energetics of climate models: Net energy balance and meridional enthalpy transport, EGU General Assembly, Vienna, Austria, 2011;
- 11. Energetics of IPCC4AR climate models: energy balance and meridional enthalpy transports, EGU General Assembly, Vienna, Austria, 2010.

Workshops and summer schools

- 1. Workshop "Physical modeling supporting a storyline approach", CICERO Center for International Climate Research, Oslo, Norway, 2019;
- 2. Workshop "Dynamical Systems in Atmospheric Sciences", LSCE, Gif-sur-Yvette, France, 2018;
- 3. Summer School "Fundamental Aspects of Turbuent Flows in Climate Dynamics", Les Houches Physics School, Les Houches, France, 2017;
- 4. Workshop "Numerics for Stochastic Partial Differential Equations and their Applications", RICAM, Linz, Austria, 2016;
- 5. Workshop "Extreme Events in the Earth and Planetary Sciences", University of Warwick, Coventry, 2016;
- 6. Workshop "Instantons and Extreme Events in Turbulence and Dynamical Systems", IMPA, Rio de Janeiro, Brazil, 2015;
- 7. Workshop "Energy Transfers in Atmosphere and Ocean", University of Hamburg, Hamburg, Germany, 2015;
- 8. Summer School "Dynamics, Stochastics and Predictability of the Climate System", ISAC-CNR/CNRS, Valsavarenche, Italy, 2014;
- 9. Workshop "Fundamentals of Climate, Atmosphere and Ocean Dynamics", University of Hamburg, Hamburg, Germany, 2014;
- 10. Workshop "Concepts for Convective Parameterizations in Large-Scale Models: Spectrum or Bulk?", COST Activity ES0905, CIMA Foundation, Savona, Italy, 2012;
- 11. Workshop "Stochastic Methods in Climate Modelling", Newton Institute for Mathematical Sciences, Cambridge, UK, 2010.