

# Cristiano Ricci

## Curriculum Vitae



### Current Position

Sett 2024 **Ricercatore Tenure-Track (RTT)**,  
of Pisa.

### Past Positions

Nov 2020 – **PostDoc**, *Department of Economics and Management*, University of Pisa, project:  
Set 2024 “The Time-Space Evolution of Economic Activities: Mathematical Models and Empirical Applications”.

Nov 2019 – **PostDoc**, *Scuola Normale Superiore*, Pisa, project: “Stochastic Analysis Tools for Extreme  
Oct 2020 Event Probabilities in Climate Change”.

### Education

Nov 2016 – **Ph.D. in Mathematics**, *Department of Mathematics and Computer Science*, University of  
Oct 2019 Florence,  
Supervisor: Franco Flandoli  
Internal supervisor: Francesca Romana Nardi.

Feb 2014 – **Master Degree**, *Department of Mathematics*, University of Pisa,  
Oct 2016 Grade: *110/110 (with honors)*.  
Master thesis: “A mathematical model for the growth and therapy of the primary tumor mCRC and a model for the angiogenesis based on Poisson random measure”.  
Supervisor: Franco Flandoli

Sep 2009 – **Bachelor Degree**, *Department of Mathematics*, University of Pisa,  
Feb 2014 Grade: *102/110*.  
Bachelor thesis: “Weak convergence of probability measure on metric spaces and Donsker invariance principle”.  
Supervisor: Franco Flandoli

### Publications

#### Journals

- [1] Cristiano Ricci. A non-invariance result for the spatial ak model. *Decisions in Economics and Finance*, pages 1–20, 2023, (Classe A in 13/D4), WOS:001132581300001, SCOPUS: 2-s2.0-85181197936, doi: <https://doi.org/10.1007/s10203-023-00425-x>.
- [2] Daria Ghilli, Cristiano Ricci, and Giovanni Zanco. A mean field game model for covid-19 with human capital accumulation. *Economic Theory*, pages 1–28, 2023 (Classe A in 13/D4), WOS:001020432000001, SCOPUS: 2-s2.0-85163791536, doi: <https://doi.org/10.1007/s00199-023-01505-0>.
- [3] Andy Dobson, Cristiano Ricci, Raouf Boucekkine, Fausto Gozzi, Giorgio Fabbri, Ted Loch-Temzelides, and Mercedes Pascual. Balancing economic and epidemi-

ological interventions in the early stages of pathogen emergence. *Science Advances*, 9(21):eade6169, 2023, WOS:001009728200004, SCOPUS:2-s2.0-85160158903, doi: <https://doi.org/10.1126/sciadv.ade6169>.

- [4] Franco Flandoli, Dejun Luo, and Cristiano Ricci. Numerical computation of probabilities for nonlinear sdes in high dimension using kolmogorov equation. *Applied Mathematics and Computation*, 436:127520, 2023 (Classe A in 13/D4), WOS:000860361200003, SCOPUS:2-s2.0-85137625744, doi: <https://doi.org/10.1016/j.amc.2022.127520>.
- [5] Franco Flandoli, Marta Leocata, and Cristiano Ricci. The mathematical modeling of cancer growth and angiogenesis by an individual based interacting system. *Journal of Theoretical Biology*, 562:111432, 2023, (Scientifica in Area 13), WOS:000931874800001, SCOPUS:2-s2.0-85147821253, doi: <https://doi.org/10.1016/j.jtbi.2023.111432>.
- [6] Franco Flandoli, Dejun Luo, and Cristiano Ricci. A numerical approach to kolmogorov equation in high dimension based on gaussian analysis. *Journal of Mathematical Analysis and Applications*, 493(1):124505, 2021 (Classe A in 13/D4), WOS:000576820100028, SCOPUS:2-s2.0-85089825268, doi: <https://doi.org/10.1016/j.jmaa.2020.124505>.
- [7] Franco Flandoli, Dejun Luo, and Cristiano Ricci. On the relation between the girsanov transform and the kolmogorov equations for spdes. *Potential Analysis*, pages 1–28, 2021, (Scientifica in Area 13), WOS:000647338300001, SCOPUS:2-s2.0-85105515570, doi: <https://doi.org/10.1007/s11118-021-09924-1>.
- [8] Rémi Catellier, Yves D'angelo, and Cristiano Ricci. A mean-field approach to self-interacting networks, convergence and regularity. *Mathematical Models and Methods in Applied Sciences*, 31(13):2597–2641, 2021, (Scientifica in Area 13), WOS:000742398300001, SCOPUS:2-s2.0-85120784122, doi: <https://doi.org/10.1142/S0218202521500573>.
- [9] Franco Flandoli, Marta Leocata, and Cristiano Ricci. The navier-stokes-vlasov-fokker-planck system as a scaling limit of particles in a fluid. *Journal of Mathematical Fluid Mechanics*, 23:40, 2021, (Scientifica in Area 13), WOS:000630336100003, SCOPUS:2-s2.0-85102707461, doi: <https://doi.org/10.1007/s00021-021-00570-6>.
- [10] Franco Flandoli, Marta Leocata, and Cristiano Ricci. On the macroscopic limit of brownian particles with local interaction. *Stochastics and Dynamics*, 20(06):2040007, 2020, WOS:000580940600007, SCOPUS:2-s2.0-85089453902, doi: <https://doi.org/10.1142/S0219493720400079>.
- [11] Franco Flandoli, Marta Leocata, and Cristiano Ricci. The vlasov-navier-stokes equations as a mean field limit. *Discrete & Continuous Dynamical Systems - B*, 24:3741, 2019, (Scientifica in Area 13), WOS:000473268000016, SCOPUS:2-s2.0-85072559603, doi: <https://doi.org/10.3934/dcdsb.2018313>.
- [12] Houssam AlRachid, Mireille Bossy, Cristiano Ricci, and Lukasz Szpruch. New particle representations for ergodic mckean-vlasov sdes. *ESAIM: ProcS*, 65:68–83, 2019, doi: <https://doi.org/10.1051/proc/201965068>.

### Ph.D. Thesis

- Cristiano Ricci (2020): “*Interacting diffusion models: scaling limit and numerical analysis.*”, Department of mathematics and computer science, University of Florence

Paper under revision or submitted

- [13] Davide Fiaschi, Cristiano Ricci - *The spatial evolution of economic activities and the emergence of cities*, <https://arxiv.org/abs/2310.07883>. Status: Revise and Resubmit on *Journal of Economic Theory*.
- [14] Davide Fiaschi, Angela Parenti, Cristiano Ricci - *Unveiling spatial patterns of population in Italian municipalities*, <https://arxiv.org/abs/2311.10520>. Status: Submitted to *Regional Studies*.
- In preparation
- [15] Daria Ghilli, Cristiano Ricci, Giovanni Zanco - *A mean-field model for systems of economic agents with spatial interactions*
- [16] Davide Fiaschi, Angela Parenti, Cristiano Ricci - *Nightlights as a measure of local development: the case of Italy*
- [17] Davide Fiaschi, Angela Parenti, Cristiano Ricci - *Spatial Aggregation-Repulsion-Diffusion model: theory and estimation*
- [18] Raouf Boucekkine, Giorgio Fabbri, Fausto Gozzi, Ted Loch-Temzelides, Cristiano Ricci - *The optimal design of climate policy in a heterogenous world*

### Member of research projects

- 2024 Threshold models for social norm change in interacting particle society - Progetto Indam - GNAMPA
- 2022 Modelli MFGs in Economia per lo studio della dinamica del capitale umano con spillover spaziali - Progetto Indam - GNAMPA
- 2021 Equazioni di Kolmogorov in dimensione elevata o infinita: aspetti teorici e numerici - Progetto Indam - GNAMPA
- 2020 PRIN Project "The Time-Space Evolution of Economic Activities: Mathematical Models and Empirical Applications", Identifier: 2017FKHBA8 001

### Synthetic indexes of scientific production

Google Citations/h-index = 64/6  
 SCHOLAR:  
 SCOPUS: Documents/Citations/h-index = 11/24/3

### Presentations at conferences and workshops

- January 2024 Unveiling spatial patterns of population in Italian municipalities, - YETI meeting, University of Florence
- October 2023 A dynamical taxonomy of population density: moving around in the Moran scatterplot - 64 Riunione Scientifica Annuale (RSA) della SIE – Società Italiana di Economia, L'Aquila
- October 2023 A mean field game model for COVID-19 with human capital accumulation - Frontiers of Modeling in Economic Epidemiology, Paris
- September 2023 A non-invariance result for spatial AK model - The Mathematics of Subjective Probability, Topics in Economics and Probability, Università Milano Bicocca
- August 2023 A dynamical taxonomy of population density: moving around in the Moran scatterplot - 62st ERSA congress, European Regional Science Association 2023, Alicante
- August 2023 Nightlights as a measure of local development: the case of Italy - 62st ERSA congress, European Regional Science Association 2023, Alicante
- December 2022 An agent-based approach to the spatial dynamics of population and income: theory and estimation, - YETI meeting, IMT Lucca

- August 2022 The evolution of economic activities over space and time, the use of nightlights - 61st ERSA congress, European Regional Science Association, Pécs
- July 2022 Numerical methods for a Mean Field Game model for human capital - 15th Viennese Conference on Optimal Control and Dynamic Games, Vienna
- July 2022 The micro-foundation of cities: a mean-field approach - Workshop on "The Time-Space Evolution of Economic Activities: Mathematical Models and Empirical Applications", Pisa
- June 2022 Numerical applications of Kolmogorov equations and Girsanov transformation for SPDEs - Third Italian probability meeting, Bologna
- November 2020 Scaling limit for interacting diffusion models - Dipartimento di economia e management, Università di Pisa
- July 2020 Numerical experiments with Kolmogorov equation associated to SPDEs - Mathematics of Planet Earth Webinars: Analysis and Modelling
- November 2019 The Kolmogorov equation associated to SPDEs: theoretical and numerical problems - IUSS Scuola Universitaria Superiore Pavia, Pavia
- July 2019 The Navier-Stokes-Vlasov-Fokker-Planck system as a scaling limit of particles in a fluid - Recent Trends in Stochastic Analysis and SPDEs, Pisa
- August 2017 Long time simulations of interacting stochastic particle system - CEMRACS 2017
- November 2017 A mathematical model for the dynamics of the hypah network of P. Anserina - Nice, Workshop DENA
- Posters presented
- September 2017 Dynamical Expanding Networks: modelling multi-scale spatial exploration in filamentous fungi - Mathematical Modelling in Life Sciences - Pisa

## Referee activity

Article reviewer for *Automatica*, *Physica A*, *Journal of Computational Biology*, *Journal of Optimization Theory and Applications*, *Mathematical Models and Methods in Applied Sciences*, *Journal of Mathematical Economics*, *Nonlinear Analysis*, *Journal of Mathematical analysis and applications*, *Siam REVIEW*, *education*, *Stochastics and Partial Differential Equations: Analysis and Computations*

## Teaching activity:

### 2023/2024

- Teacher - 3 hours - Econometrics for financial markets - Master in Risk Management a.a. 2023/2024, University of Pisa. Taught in English
- Teacher - 21 hours/3 CFU - Principles of Mathematics - Bachelor of Science in Management for Business and Economics, University of Pisa. (B.A.) taught in English
- Teaching assistant - 40 hours - Mathematical methods for economics - Corso di laurea magistrale in Economics, University of Pisa and Scuola Superiore Sant'Anna (M.S.E.) taught in English
- Teacher - 2 hours - Ph.D. Topic "Spatial growth: models and estimation", joint Phd program University of Siena, Florence, Pisa. (Ph.D.) taught in English

### 2022/2023

- Teacher - 60 hours/8 CFU - Mathematics I - Economics and business, LUISS. (B.A.) taught in English
- Teaching assistant - Mathematics II - Economics and business, LUISS. (B.A.) taught in English

### 2021/2022

- Teaching assistant - Mathematics II - Economics and business, LUISS. (B.A.) taught in English
- Teaching assistant - Mathematics - Management and computer science, LUISS. (B.A.) taught in English
- Teacher - 20 hours/3 CFU - Mathematical methods for economics - Corso di laurea magistrale in Economics, University of Pisa. (M.S.E.) taught in English

### 2020/2021

- Teacher - 10 hours/1.5 CFU - Economia politica I - Corso di laurea triennale in Economia, University of Pisa. (B.A.)

### 2019/2020

- Teaching assistant - Calcolo delle probabilità e statistica - Corso di laurea triennale in informatica, University of Pisa. (B.S.)

### 2018/2019

- Teaching assistant - Calcolo delle probabilità - Corso di laurea triennale in matematica, University of Florence. (B.S.)

### 2017/2018

- Teaching assistant - Calcolo delle probabilità - Corso di laurea triennale in matematica, University of Florence. (B.S.)

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## Research Activity

### Visiting / Extensive periods abroad:

- 14 March 2024 - 24 Marc 2024 Princeton University, collaboration with Ted Loch-Temzelides and Andrew Dobson
- 24 April 2023 - 1 May 2023 Rennes school of Business, collaboration with Raouf Boucekkine
- July 2017 - August 2017 Numerical methods for stochastic models: control, uncertainty quantification, Mean-Field (CEMRACS 2017) - One week summerschool, intensive HPC training on openMP + MPI API for parallel computing. Five weeks of research project on topics related to the summerschool.
- 5 April 2017 - 18 April 2017 University of Nice, collaboration with Rémi Catellier, Yves D'angelo
- 01 March 2017 - 14 March 2017 University of Nice, collaboration with Rémi Catellier, Yves D'angelo

### Organizer of events/congress

- 2023 **Organizer**, Workshop on “The Time-Space Evolution of Economic Activities: Mathematical Models and Empirical Applications”, LUISS, Rome, 18 December 2023.
- 2023 **Organizer**, Lunch-seminar of the Department of Economics and Management, University of Pisa, Pisa, March 2023 - Ongoing.
- 2022 **Organizer**, Workshop on “The Time-Space Evolution of Economic Activities: Mathematical Models and Empirical Applications”, University of Pisa, Pisa, 1 July 2022.

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## Additional Experiences - Miscellaneous

2011 – 2016 **Linux System Administrator**, PHC: Pisa, Department of Mathematics.

I have been a Linux system administrator for the computer network assigned to students. This involved the management of the students account database, web pages, mail server, backups, as well as the management of the physical infrastructure.

2012 – 2014 **Student representative**, *Department of Mathematics, Department council*, University of Pisa.

GitHub <https://github.com/crricci>