Federico P. Cortese, PhD

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Date of birth: January 1, 1994
Personal Website - Google Scholar - GitHub - ORCID - ResearchGate

Research Interests

clustering, multivariate time-series analysis, network analysis, regime switching models

Professional Positions

Research fellow — Milan, Italy
Department of Economics, Management, and Quantitative Methods – University of Milan — *July 2025 – Present*
Supervisor: Prof. Rossini L.

Researcher — Milan, Italy
National Research Council, Institute for Applied Mathematics and Information Technologies — *October 2023 – June 2025*
Supervisor: Dr. Pievatolo A.

Visiting research fellow — Lund, Sweden
Centre for Mathematical Sciences, Lund University - Supervisor: Prof. Lindström E. — *May 2022 – October 2022*

Education

PhD in Statistics — Milan, Italy
University of Milano-Bicocca - Supervisors: Prof. Pennoni F. and Prof. Bartolucci F. — *2019 – 2023*
Thesis: "Statistical Modeling and Temporal Clustering of Multivariate Time-Series with Applications to Financial Data"

MSc in Finance and Insurance — Rende, Italy
University of Calabria - Supervisor: Prof. Leccadito A. — *2017 – 2019*
Thesis: "Tail Dependence in Financial Markets: A Dynamic Copula Approach"
Final grade: 110/110 cum laude

BSc in Mathematics — Rende, Italy
University of Calabria - Supervisor: Prof. Colao V. — *2013 – 2017*
Thesis: "Stochastic Differential Equations with Financial Applications" (in italian)
Final grade: 100/110

Articles

Cortese, Federico P.; Rossini, Luca — 2026
A comparison between initialization strategies for the infinite hidden Markov model
Computational Statistics & Data Analysis

Cortese, Federico P.; Rossini, Luca — 2026
Infinite hidden Markov models for cylindrical data
Statistics & Probability Letters

Cortese, Federico P.; Pievatolo, Antonio — 2026
Spatio-temporal jump model for urban thermal comfort monitoring
Stochastic Environmental Research and Risk Assessment

Cortese, Federico P.; Kolm, Petter N.; Lindström, Erik — 2026
Generalized information criteria for high-dimensional sparse statistical jump models
AStA: Advances in Statistical Analysis

Cortese, Federico P.; Pennoni, Fulvia; Bartolucci, Francesco — 2026
New risk indicators derived from the g- and h-index
Decisions in Economics and Finance (Accepted for publication)

Algieri, Bernardina; Cortese, Federico P.; Lawuobahsumo, Kokulo; Leccadito, Arturo — 2026
The dance of the markets: Unveiling Bitcoin's time-varying financial correlations using a GAS-based approach
China Finance Review International

Cortese, Federico P.; Di Ruzza, Sara; Alessi, Elisa Maria — 2025
A statistical sparse jump model for automatic identification of dynamical transitions in the co-orbital regime
Nonlinear Dynamics

Cortese, Federico P.; Pievatolo, Antonio — 2025
Statistical jump model for mixed-type data with missing data imputation
Advances in Data Analysis and Classification

Cortese, Federico P.; Pennoni, Fulvia; Bartolucci, Francesco 2024
Maximum likelihood estimation of regime switching Student-t copula model
International Statistical Review

Cortese, Federico P.; Kolm, Petter N.; Lindström, Erik 2023
What drives cryptocurrency returns? A sparse statistical jump model approach
Digital Finance

Cortese, Federico P. 2019
Tail dependence in financial markets: A dynamic copula approach
Risks

Short Papers

Cortese, Federico P.; Rossini, Luca 2026
Initialization Strategies for the Infinite Hidden Markov Model: A Monte Carlo Analysis
Statistical Science: From Theory to Applied Research III

Cortese, Federico P.; Pievatolo, Antonio 2025
Thermal Comfort Monitoring of Urban Areas: A Spatio-Temporal Jump Model Approach
Innovation & Society - Statistics and Data Science for Evaluation and Quality

Cortese, Federico P.; Pievatolo, Antonio; Alessi, Elisa Maria 2025
Fuzzy Jump Model for Asteroids Co-orbital Regimes Identification
Statistics for Innovation II - Springer Proceedings in Mathematics & Statistics

Cortese, Federico P.; Pievatolo, Antonio 2024
Modelling and forecasting correlated failure counts
ICES 2024 - 2nd Italian Conference on Economic Statistics - Book of Short Papers

Cortese, Federico P.; Kolm, Petter N.; Lindström, Erik 2023
Generalized information criteria for sparse statistical jump models
Symposium i anvendt statistik - Copenhagen Business School

Cortese, Federico P.; Bartolucci, Francesco; Pennoni, Fulvia 2022
A regime switching Student-t copula model for the analysis of cryptocurrencies data
Book of Abstracts, Mathematical and Statistical Methods for Actuarial Sciences and Finance

Bartolucci, Francesco; Pennoni, Fulvia; Cortese, Federico P. 2021
Hidden Markov and regime switching copula models for state allocation in multiple time-series
Book of abstracts and short papers, CLADAG, Firenze University Press

Preprints

Cortese, Federico P. 2026
Fuzzy network jump models for soft dynamic clustering of graph-structured data

Cortese, Federico P.; Farcomeni, Alessio 2026
Robust State-Conditional Feature-Weighted Jump Models for Temporal Clustering

Cortese, Federico P.; Pievatolo, Antonio; Alessi, Elisa Maria 2025
Fuzzy Jump Models for Soft and Hard Clustering of Multivariate Time Series Data

Ongoing Projects

- Leisen, Fabrizio; Cortese, Federico P.; Rossini, Luca
  Copula Gaussian Graphical Model Based on Compund Random Measures for Sparse Networks with Overlapping Community Structure
- Cortese, Federico P.; Farcomeni, Alessio
  Generalized Bayesian Community Detection in Networks
- Cortese, Federico P.; Bignemi, Giuseppe
  Covariate-Dependent Infinite Hidden Markov Models for Item Responses and Response Times
- Cortese, Federico P.; Rossini, Luca
  Multivariate Quantile Regression through Infinite Hidden Markov Models
- Cortese, Federico P.; Alessi, Elisa Maria
  rJM: An R Package for the Estimation of Statistical Jump Models of Various Types

Teaching Experience

- Academic year **2025-2026**
  Lecturer – Statistics for Big Data for Economics and Business
  BSc Economics and Management, University of Milan - **20 hours**

  Teaching assistant – Unsupervised Learning
  MSc Data Science for Public Decision Making, University of Rome-Tor Vergata - **18 hours**

- Academic year **2024-2025**
  Teaching assistant – Unsupervised Learning
  MSc Data Science for Public Decision Making, University of Rome-Tor Vergata - **12 hours**

- Academic year **2022-2023**
  Teaching assistant – Probability and Statistics
  BSc Automation Engineering, Politecnico di Milano - **36 hours**

  Teaching assistant – Fundamentals of Statistics and Biomedical Signals
  BSc Biomedical Engineering, Politecnico di Milano- **20 hours**

  Teaching assistant – Bayesian Inference
  MSc Biostatistics, University of Milano-Bicocca- **12 hours**

  Tutor – Probability and Statistics for Computer Science
  BSc Computer Science, University of Milano-Bicocca - **28 hours**

- Academic year **2021-2022**
  Teaching assistant – Fundamentals of Statistics and Biomedical Signals
  BSc Biomedical Engineering, Politecnico di Milano- **20 hours**

  Teaching assistant – Bayesian Inference
  MSc Biostatistics, University of Milano-Bicocca- **12 hours**

- Academic year **2018-2019**
  Tutor – Financial Econometrics
  MSc Finance and Insurance, University of Calabria- **10 hours**

Thesis supervision

- Simone Bosio - *University of Brescia - MSc in Economics* (co-supervised with prof. Enrico Ripamonti)

Software

- `RSstcopula`
  R/C++ implementation for estimation, simulation, and state decoding of regime-switching Student-t copula models.

- `GIC-for-SJM`
  R/C++/Python implementation of high-dimensional Sparse Jump Models and model selection via Generalized Information Criteria.

- `FNJM`
  R/C++ implementation of Fuzzy Network Jump Models for soft clustering of mixed-type, graph-structured data.

- `iHMM`
  R implementation for Bayesian inference in infinite Hidden Markov Models using beam sampling.

Research Projects

NEA-BES. Development of machine-learning and statistical methodologies to study and predict asteroid orbital evolution, dynamical transitions, and physical characteristics of small near-earth objects.

LUMIO. Development of data analysis and machine-learning models to study asteroid dynamics and predict orbital evolution of celestial objects impacting the lunar surface.

RAISE. Implementation of statistical models and data analysis strategies for urban thermal comfort within the Robotics and AI for Socio-economic Empowerment project, supported by the European Commission under NextGenerationEU.

URBANSENSE. Supervised and monitoring of the activities related the project – "Citizens as sensors: promoting inclusion through the development and application of a multifunctional wearable system for a citizen-oriented city".

Conferences

- CFE-CMStatistics 2026 - HTW Berlin, University of Applied Sciences - **Invited speaker**, December 12-14, 2026
- ENBIS-26, 26th annual conference of the European Network for Business and Industrial Statistics - University of Florence - **Invited speaker**, September 7-9, 2026
- MBC^2 2026, 8th Workshop on Models and Learning in Clustering and Classification, University of Catanaia - **Contributed Speaker**, August 25-28, 2026
- SIS-FENStatS 2026, 53rd SIS and 1st FENStatS Scientific Meetings, La Sapienza - University of Rome, - **Contributed Speaker**, June 22-25, 2026
- 5th ISI Regional Statistics Conference - Valletta, University of Malta - **Contributed Speaker**, June 3-5 2026
- CFE-CMStatistics2025 - Birkbeck, University of London - **Invited Speaker**, December 13-15 2025
- ISBIS 2025, International Society for Business and Industrial Statistics - University of Amsterdam - **Invited Speaker**, October 2-3 2025
- EPSC-DPS 2025, Europlanet Science Congress, Division for Planetary Sciences - Finlandia Hall, Helsinki - **Contributed Speaker**, September 7-12, 2025
- IES 2025, Innovation & Society: Statistics and Data Science for Evaluation and Quality - University of Padua, Brixen - **Invited Speaker** and **discussant**, June 25-27, 2025
- SIS 2025, Statistics for Innovation - University of Genoa - **Contributed Speaker**, June 16-18, 2025
- BISP14, Bayesian Inference in Stochastic Processes - National Research Council of Italy, Institute for Applied Mathematics and Information Technologies, Milan - **Chair**, May 26-28, 2025
- SDS, Statistics and Data Science - University of Milan and Politecnico di Milano, Italy - **Invited Speaker**, April 02-03, 2025
- Emerging Risks in Economics and Finance - University of Florence, Italy - **Invited Speaker**, September 12-13, 2024
- EcoSta 2023 - Waseda University, Tokyo, Japan - **Contributed Speaker**, August 1-3, 2023
- Statistics@Naples - University of Naples Federico II, Naples, Italy - **Contributed Speaker**, June 28-30, 2023
- CFE-CMStatistics2022, Computational and Methodological Statistics - King's College London, London, UK - **Invited Speaker**, December 17-19, 2022
- International FinTech Research Conference - Politecnico di Milano, Milan, Italy - **Contributed Speaker**, October 27-28, 2022
- MAF2022, Mathematical and Statistical Methods for Actuarial Sciences and Finance - University of Salerno, Fisciano (SA), Italy - **Contributed Speaker**, April 20-22, 2022
- CLADAG, 13th Scientific Meeting of the Classification and Data Analysis Group - University of Florence, Florence, Italy - **Participant**, September 9-11, 2021

Workshops

- "Advanced Time Series Methods" - University of Perugia, Perugia, Italy - Participant, June 19-20, 2023
- "Bayesian Nonparametrics for Complex Data" - University of Padua, Padua, Italy - Participant, January 24, 2020

Outreach activity

Escape Moon. Educational activity developed within the Co-Science initiative to explain, through a game-based approach, the dynamics of celestial bodies and the Earth–Moon system to primary school children.

Space debris: what future for a sustainable use of near-Earth space? Public outreach event within the Co-Science initiative focused on the environmental challenges of space debris and the importance of sustainable practices in space exploration and satellite operations.

Editorial activity

Referee for *Annals of Operations Research* (Springer), *Statistics and Probability Letters* (Elsevier), *Nonlinear Dynamics* (Springer), *Statistical Modelling* (Sage Journals), *Metron* (Springer), *Discover Analytics* (Springer), *Advances in Computational Science and Engineering* (American Institute of Mathematical Sciences) and *Scientific Reports* (Nature).

Awarded the "Graduation Prize - University of Calabria", *Value: 1,600 EUR*

Technical Skills

Proficient in R

Competent in Python

Familiar with MATLAB, C++, SAS

Softwares: LaTeX, R-Markdown, Git

Languages: Italian (native), English (fluent), French (basic)

Place: Milan **Date:** October 19, 2026 **Signature:** _____