

Research interests

2021 - Present

Graphical Models with Applications in Ecology

Application of Gaussian Graphical Models to study the structure of soil arthropod communities and to analyze the impact of various factors on belowground biodiversity in agroecosystems. The goal is to provide tools that can support decision-making in the management and protection of biodiversity.

A first methodological contribution in this area focused on the simulation-based assessment of different distance measures used to compare unweighted and undirected graphical models.

2022 - Present

Models for Ordinal Data

Extension and application of models belonging to the CUB class (Combination of discrete Uniform and shifted Binomial random variables), which allow for the measurement of two latent components: *feeling* and *uncertainty*. CUB models have wide-ranging applications, including visitor and consumer experience measurement, sports analytics, and sensory analysis. The main methodological contributions in this area include:

- the extension of the CUM model (Combination of discrete Uniform and linearly transformed Multinomial random variables) for the analysis of ordinal variables derived from semantic differential scales with five response categories;
- the definition and study of the equivalence between the basic CUB model and the CUM model;
- the development of a clustering model within the CUB framework for the analysis of multivariate rating data;
- the current development of a multivariate CUB model that accounts for the dependence structure among variables through the use of copulas. In particular, the goal is to develop more computationally efficient estimation methods for copulas.

2024 - Present

Clustering and Mixture-models

An initial contribution concerned the development of a mixture model for the analysis of multivariate rating data within the CUB framework, named MLC-CUB. The multivariate CUB model currently under development, along with its estimation methods, will be used to design a clustering model that takes into account the dependence structure among variables and ensures computational efficiency.

I am also approaching model-based clustering for mixed data with covariates, aiming at both classification and prediction tasks.

Education

2021 - 2024

University of Brescia — PhD in Analytics for Economics and Management

Thesis title: *Advances in Mixture Models for Ordinal Data: Theoretical Insights and Model-based Clustering*

Supervisor: Prof. Paola Zuccolotto

Co-supervisor: Prof. Julien Jacques

Final grade: Excellent (equivalent to "Ottimo" in the Italian grading system)

2018 – 2020	University of Brescia — Master’s degree in Business Administration Thesis title: <i>Financial Markets and Social Networks: The Effects of Covid-19</i> Supervisor: Prof. Maurizio Carpita Final grade: 110/110 with honors
2015 – 2018	University of Brescia — Bachelor’s degree in Business Administration Thesis title: <i>The Merge of Non-profit Organizations</i> Supervisor: Prof. Isabella Maffezzoni Final Grade: 102/110

Visiting periods

Sep. 2025 – Oct. 2025	Victoria University of Wellington — School of Mathematics and Statistics Collaboration within the Marsden Project in developing a new model-based clustering model for mixed data with the aim of performing both classification and prediction. Position: Visiting Researcher Supervisors: Prof. Ivy Liu and Richard Arnold
Sep. 2023 – Jun. 2024	University Lumière of Lyon 2 — ERIC Laboratory Development of a mixture model for the analysis of rating data within the CUB framework, named MLC-CUB Position: Visiting PhD Student Supervisor: Prof. Julien Jacques, director of ERIC Lab

Experience

Nov. 2024 - Present	Postdoctoral Researcher – University of Brescia Activity carried out within the MICS project – Supervisor: Prof. Paola Zuccolotto Development and application of Mixture Models for the analysis of multivariate rating data and the perception, behaviors and preferences of consumers and businesses.
Mar. 2021 - Present	Data Analyst – Siderweb S.p.A. Activity carried out in collaboration with DMS StatLab – Director: Prof. Maurizio Carpita Collection of data related to the steel industry and their analysis using statistical indices for the steel market and industry analysis.
Feb. 2021 – Oct. 2021	Junior Research Fellow – University of Brescia Activity carried out in collaboration with the Agrofood Lab – Director: Prof. Gianni Gilioli Study and application of statistical models (Regression Models, Structural Equation Models, Graphical Models, Random Forests) to investigate the impact of several factors on the edaphic biodiversity of agroecosystems, to provide useful tools to support the decisions in the management and protection of biodiversity.

Teaching Activity

Summer schools

Academic Year	Institution	Course	Duration
2024 – 2025 (7-11 July 2025)	Polytechnic University of Catalunya – Barcelona - FEM	Ordinal Data Analysis in R: Measuring Human Perceptions from Surveys	15 hours

Teaching Assistant

Academic Year	Institution	Course	Professor in Charge	Duration
2024 - 2025	University of Brescia - DEM	Statistics	Prof. Marica Manisera	30 hours
	University of Brescia - DEM	Statistics	Prof. Ambra Macis	40 hours
2023 - 2024	University of Brescia – DEM	Statistics	Prof. Ambra Macis	40 hours
2022 - 2023	University of Brescia - DEM	Statistics	Prof. Marica Manisera	10 hours
	University of Bergamo - DISA	Statistics	Prof. Alessandro Fassò	18 hours
	University of Bergamo - DIGIP	Statistics	Prof. Alessandro Fassò	12 hours

Thesis Supervision

Co-supervisor

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| 2024 | 1. Master's degree Thesis - <i>Statistic Analysis of Customers' Perception: Swarovski's Stores and Advertising Messages</i>
2. Master's degree Thesis - <i>Statistical analysis of slow tourism: focus on the Italian trails</i> |
| 2023 | 3. Master's degree Thesis - <i>Spectral Clustering: analysis of the literature and application for the analysis of the visitor experience in an Art Gallery</i> |

Publications

Indexed Journals (WoS, Scopus)

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| 2025 | 1. Simonetto, A., & Ventura, M. (2025). Distance measures for unweighted undirected networks: A comparison study. <i>Australian and New Zealand Journal of Statistics</i> . Accepted for publication. |
| 2024 | 2. Ventura, M., Macis, A., Manisera, M., & Zuccolotto, P. (2024). On the equivalence of two mixture models for rating data. <i>Advances in Statistical Analysis</i> , 1–25. https://doi.org/10.1007/s10182-024-00513-2
3. Manisera, M., Migliorati, M., Ventura, M., & Zuccolotto, P. (2024). A mixture model for the analysis of categorical variables measured on five-point semantic differential scales. <i>Austrian Journal of Statistics</i> , 53(3), 70–86. https://doi.org/10.17713/ajs.v53i3.1744 |
| 2022 | 4. Ventura, M., & Ricciardi, R. (2022). Exploring financial microblogs: Analysis of users' trading profiles with multivariate statistical methods. <i>Statistica e Applicazioni</i> , 20(1), 61–78. DOI: 1026350/999999_000051 |

2021

5. Ghiglieno, I., Simonetto, A., Sperandio, G., Ventura, M., Gatti, F., Donna, P., Tonni, M., Valenti, L., & Gilioli, G. (2021). Impact of environmental conditions and management on soil arthropods communities in vineyard ecosystems. *Sustainability*, 13(21), 11999. <https://doi.org/10.3390/su132111999>

Conference Proceedings

2025

1. Ventura, M., Jacques, J., & Zuccolotto, P. (2025). *Clustering multivariate rating data within the CUB framework* [Short paper]. In G. Boccuzzo, E. Bovo, M. Manisera, & L. Salmaso (Eds.), *IES 2025 - Statistical Methods for Evaluation and Quality* (pp. 983-989). Cleup sc. ISBN: 9788854958494
2. Ventura, M., Jacques, J., & Zuccolotto, P. (2025). *Clustering multivariate rating data within the CUB framework* [Short paper]. In A. Pollice & P. Mariani (Eds.), *Methodological and Applied Statistics and Demography II. SIS 2024, Short Papers, Solicited Sessions* (pp. 637–642). Italian Statistical Society Series on Advances in Statistics (ISSAS). Springer. ISBN: 9783031644467

2022

3. Simonetto, A., Ventura, M., & Gilioli, G. (2022). *An explorative analysis of different distance metrics to compare unweighted undirected networks* [Short paper]. In A. Balzanella, M. Bini, C. Cavicchia, & R. Verde (Eds.), *51st Scientific Meeting of the Italian Statistical Society – Caserta, 22–24 June 2022* (pp. 1522–1527). Pearson. ISBN: 9788891932310

2021

4. Simonetto, A., Ventura, M., Ghiglieno, I., Gatti, F., & Gilioli, G. (2021). *Le risposte della biodiversità edafica alla gestione degli agroecosistemi: Un approccio basato sull'Ecological Network Analysis* [Abstract]. In A. Elia & G. Conversa (Eds.), *Agriculture, Environment and Health. XIII National Congress on Biodiversity – Foggia, 7–9 September 2021* (p. 236). DAFNE, University of Foggia. ISBN: 9788874271016
5. Ghiglieno, I., Simonetto, A., Sperandio, G., Ventura, M., Gatti, F., Donna, P., Tonni, M., Valenti, L., & Gilioli, G. (2021). *Impatto delle condizioni ambientali e della gestione del suolo sugli artropodi edafici dell'ecosistema vigneto* [Abstract]. In A. Elia & G. Conversa (Eds.), *Agriculture, Environment and Health. XIII National Congress on Biodiversity – Foggia, 7–9 September 2021* (p. 123). DAFNE, University of Foggia. ISBN: 9788874271016

Work in progress

1. Ventura M., Jacques J., Zuccolotto P., Model-based Clustering of Multivariate Rating Data accounting for Feeling and Uncertainty, *Submitted to the Journal of Classification*
2. Ventura M., Macis A, Manisera M. Zuccolotto P., Measuring synesthetic experience of museum visitors using multi-point semantic differential scales, *Submitted to the International Journal of Tourism Research*
3. Carloni E., Codini A. P., Ventura M., Does country of origin extend to sustainable products? The case of sustainable Made in Italy

Conference Contributions

Invited Talks

Speaker

1. Ventura M., Jacques J., Zuccolotto P., *Model-Based Clustering of Multivariate Rating Data to Evaluate Consumer Perceptions on Sustainability*, 12th Scientific Meeting of the Statistics for the Evaluation and Quality of Services Group of the Italian Statistical Society (IES25 - Statistical Methods for Evaluation and Quality), Brixen (Italy), 25-27 June 2025.
2. Ventura M., Jacques J., Zuccolotto P., *Sustainability and Consumer Choice: Clustering Attitudes in the Italian Furniture Market*, StaTalk2025, Milan (Italy), 13-14 June 2025

3. Ventura M., Macis A., Manisera M., Zuccolotto P., *Synesthetic Experience in Museums: a Statistical Analysis based on Semantic Differential Scales*, 29th Nordic Conference in Mathematical Statistics (NORDSTAT), Gothenburg (Sweden), 19-22 June 2023.

Co-author

1. Macis A., Ventura M., Manisera M., Zuccolotto P., *Modeling Rating Data: Exploring the Relationship between CUB and CUM Models*, 29th Nordic Conference in Mathematical Statistics (NORDSTAT), Gothenburg (Sweden), 19-22 June 2023.

Contributed Talks

Speaker

1. Ventura M., Jacques J., Zuccolotto P., *Clustering Multivariate Rating Data within the CUB Framework*, 52nd Scientific Meeting of the Italian Statistical Society, Bari (Italy), 17-20 June 2024.
2. Ventura M., Macis A., Manisera M., Zuccolotto P., *A Mixture Modelling Approach to Enhance the Multisensory Experience of Museum Visitors*, Joint Conferences Data Science, Statistics and Visualisation (DSSV) and European Conference on Data Analysis (ECDA), Antwerp (Belgium), 5-7 July 2023.

Co-author

1. Macis A., Ventura M., Manisera M., Zuccolotto P., *Exploring the Equivalence of two Mixture Models for Rating Data in the CUB class*, Joint Conferences Data Science, Statistics and Visualisation (DSSV) and European Conference on Data Analysis (ECDA), Antwerp (Belgium), 5-7 July 2023.
2. Simonetto A., Ventura M., Gilioli G., *An Explorative analysis of Different Distance Metrics to Compare Unweighted Undirected Networks*. 51st Scientific Meeting of the Italian Statistical Society, Caserta (Italy), 22-24 June 2022.
3. Simonetto A., Ventura M., Ghiglieno I., Gatti F., Gilioli G., *Soil Biodiversity Responses to Agroecosystem Management: An Ecological Network Analysis Approach*, Agriculture, Environment and Health XIII National Congress on Biodiversity, Foggia (Italy), 7-9 September 2021.
4. Ghiglieno, I., Simonetto, A., Sperandio G., Ventura M., Gatti F., Donna P., Tonni M., Valenti L., Gilioli., *Impact of Environmental Conditions and Soil Management on Soil Arthropods in Vineyard Ecosystem*, Agriculture, Environment and Health XIII National Congress on Biodiversity, Foggia (Italy), 7-9 September 2021.

Posters

1. Ventura M., Jaccques J., Zuccolotto P., *A Mixture of Multivariate CUB Models for Clustering Rating Data*, 30th Summer Working Group on Model-Based Clustering (WGMBC), Bertinoro (Italy), 22-27 July 2024.

Workshops and Seminars

Organizer/Chair

1. Seminar “*An overview of regression methods with functional data*”, Prof. Julien Jacques, University Lumière Lyon. 2, May 14th, 2025. University of Brescia, Brescia (Italy)
2. Seminar “*Topological Data Analysis in Natural Language Processing*”, Irina Proskurina, University Lumière Lyon. 2, April 9th, 2025. University of Brescia, Brescia (Italy)
3. Workshop “*Statistical Methods and Models for Ordinal Data*”, Università degli Studi di Brescia – Dipartimento di Economia e Management, Brescia (Italia), 25 maggio 2023.

Speaker

1. Seminar “*Title to be defined*”, Victoria University of Wellington – Department of Mathematics and Statistics, Wellington (New Zealand), February 2025.

2. Seminar “*Title to be defined*”, Victoria University of Auckland – Department of Statistics, Auckland (New Zealand), February 2025.
3. Seminar “*Advances in the Analysis of Human Perceptions within the CUB Framework*”, Polytechnic University of Catalonia – Department of Statistics and Operation Research, Barcelona (Spain), February 4th, 2025.
4. Workshop “*Statistical Methods and Models for Ordinal Data*”, Contribution: “*Comparing CUB and CUM models*”, University of Brescia – Department of Economics and Management, Brescia (Italy), May 25th, 2023.

Research Projects

Participant

2024

1. **Characterizing and Measuring Visual Information Literacy**

Founded by MUR (Ministero dell’Università e della Ricerca) and PRIN program

Scientific coordinator: Prof. Angela Locoro

Role: Research collaboration

Description: Development of a model for characterizing and measuring the level of Visual Information Literacy by establishing an evaluation scale to analyze individual competencies in this field.

2. **MICS – Made in Italy Circolare e Sostenibile**

Founded by MUR (Ministero dell’Università e della Ricerca) and PNRR program

Scientific coordinator for UniBs: Prof. Emilio Sardini

Role: Post-doc (Assegnista di Ricerca)

Description: Development and application of Mixture Models to measure the perception of Made in Italy and Sustainability and the behaviors and preferences of consumers and businesses.

2022

3. **DS4BS – Data Science for Brescia - Arts and Cultural Places**

Founded by Fondazione Cariplo within the grant “Data Science for Science and Society”.

Scientific coordinator: Prof. Marica Manisera

Role: Research collaboration

Description: Development and application of Mixture Models to analyze data on visitor behaviour at cultural sites in Brescia to improve their experience and attract more visitors, ultimately contributing to increased tourism and cultural activities in the region.

2021

4. **F.A.Re.Su.Bio. – Fertilità, Ambiente e Reddito attraverso Suolo e Biodiversità**

Project under the PSR (Piano di Sviluppo Rurale) funded by Regione Lombardia

Scientific coordinator for UniBs: Prof. G. Gilioli

Role: Research collaboration

Description: Application of machine learning models (random forests, CART, GLM), Structural Equation Models (SEM) and Graphical Models to investigate the relationships between soil biodiversity indicators (e.g., soil biological quality) and meteorological variables, vineyard management practices, and soil chemical-physical characteristics, providing decision support tools for biodiversity management in the wine sector.

5. **Development of a sampling protocol for *Anopheles spp.* and assessment of their potential role as vectors of emerging pathogens**

Project funded by Ministry of Health

Scientific coordinator for UniBs: Prof. G. Gilioli

Role: Research collaboration

Description: Application of machine learning models to assess the impact of meteorological and land use factors on predicting *Anopheles* mosquito population abundance and to evaluate the risk of their

presence using landscape and meteorological data, with the goal of developing optimal sampling protocols.

Scientific Cooperation

- Member of the Italian Statistical Society (SIS)
- Member of the Young group of the Italian Statistical Society (y-SIS)

Reviewer

Reviewer for the following journals:

- Electronic Journal of Applied Statistical Analysis (EJASA)
- Advances in Statistical Analysis (AStA)

Digital Skills

Microsoft | MS Office | R | Python | Latex | Lime Survey

Languages

Italian	Native				
	Comprehension		Speaking		Writing
	Listening	Reading	Spoken production	Spoken interaction	B2
	B2	B2	B2	B2	
English	A2	A2	A2	A2	A2
French					

I hereby declare that the information reported in this CV is true and complete to the best of my knowledge.

Travagliato, July 6th, 2025

