

Gianna S. Monti

Curriculum Vitae

Personal Information

Position Tenured assistant professor (ricercatore confermato) of Statistics.

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Università degli Studi di Milano-Bicocca
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h-index 8 (scopus)



Research interests

Compositional Data, Robust Statistics, Statistical Methods for Ecological Data.

Research visits

- 2018 Institute of Statistics and Mathematical Methods in Economics, Vienna University of Technology, Vienna, Austria (May).
- 2016 Institute of Statistics and Mathematical Methods in Economics, Vienna University of Technology, Vienna, Austria, (May).
- 2014 Department of Statistics and Probability Theory, Vienna University of Technology, Vienna, Austria, (Mar-May).
- 2012 Department of Mathematical Analysis and Applications of Mathematics, Palacký University Olomouc, Faculty of Science, Olomouc, Czech Republic, (Oct-Dec).
- 2009 Department of Statistics, Stanford University, California (USA), (Jul-Oct).

Education

- 2007 **PhD in Statistics**, *Università degli Studi di Milano-Bicocca*, Italy
- 2003 **Degree in Statistics for the Demographic and Social Sciences**, *Università degli Studi di Milano-Bicocca*, Italy (bachelor and master degree, summa cum laude)

Publications

Under review

1. Monti, G.S., Filzmoser, P. (2021). Robust Logistic Zero-Sum Regression for Microbiome Compositional Data. *submitted to **Advances in Data Analysis and Classification***.
2. Monti, G.S., Mateu-Figueras, G. (2021) Full Normal Plot, *submitted to **Earth Sciences Series. Encyclopedia of Mathematical Geosciences***, edited by B. S. Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg, Springer.
3. Monti, G.S., Mateu-Figueras, G., K. Hron (2021) Additive Logistic Normal Distribution, *submitted to **Earth Sciences Series. Encyclopedia of Mathematical Geosciences***, edited by B. S. Daya Sagar, Qiuming Cheng, Jennifer McKinley and Frits Agterberg, Springer.

Journal articles

1. Monti, G.S., Filzmoser, P. (2021). Sparse least trimmed squares regression with compositional covariates for high dimensional data, **Bioinformatics**, doi: 10.1093/bioinformatics/btab572.
2. Rizzi, C., Villa, S., Chimera, C., Finizio, A., Monti, G.S. (2021). Spatial and temporal trends in the ecological risk posed by polycyclic aromatic hydrocarbons in Mediterranean Sea sediments using large-scale monitoring data. **Ecological Indicators**, 129(October 2021).
3. Migliorati, S., Monti, G.S., Vighi, M. (2021). Ecological hazard assessment via species sensitivity distributions: The non-exchangeability issue. **Biometrical Journal**, 63(4), 875-892.
4. Gentili, R., Solari, A., Diekmann, M., Duprè, C., Monti, G.S., Armiraglio, S., et al. (2018). Genetic differentiation, local adaptation and phenotypic plasticity in fragmented populations of a rare forest herb. **PeerJ**, 6.
5. Monti, G.S., Filzmoser, P., Deutsch, R. (2018). A Robust Approach to Risk Assessment Based on Species Sensitivity Distributions. **Risk Analysis**, 38(10), 2073-2086.
6. Migliorati, S., Ongaro, A., Monti, G.S. (2017). A structured Dirichlet mixture model for compositional data: inferential and applicative issues. **Statistics and Computing**, 27(4), 963-983.
7. Villa, S., Migliorati, S., Monti, G.S., Holoubek, I., Vighi, M. (2017). Risk of POP mixtures on the Arctic food chain. **Environmental Toxicology and Chemistry**, 36(5), 1181-1192.
8. Machalova, J., Hron, K., Monti, G.S. (2016). Preprocessing of centred logratio transformed density functions using smoothing splines. **Journal of Applied Statistics**, 43(8), 1419-1435.
9. Monti, G.S., Migliorati, S., Hron, K., Hrůzová, K., Fišerová, E. (2015). Log-ratio approach in curve fitting for concentration-response experiments. **Environmental and Ecological Statistics**, 22(2), 275-295.
10. Villa, S., Migliorati, S., Monti, G.S., Vighi, M. (2012). Toxicity on the luminescent bacterium *Vibrio fischeri* (Beijerinck). II: Response to complex mixtures of heterogeneous chemicals at low levels of individual components. **Ecotoxicology and Environmental Safety**, 86, 93-100.

11. Sala, S., Migliorati, S., Monti, G.S., Vighi M (2012). SSD-based rating system for the classification of pesticide risk on biodiversity. **Ecotoxicology**, 21(4), 1050-1062.
12. Monti, G.S., Walther, G. (2010). Correlation analysis for proportions via updating and resampling. **Journal of Statistics: Advances in Theory and Applications**, 3(1), 17-26.
13. Vighi, M., Migliorati, S., Monti, G.S. (2009). Toxicity on the luminescent bacterium *Vibrio Fischeri* (Beijerinck). I: QSAR equation for narcotics and polar narcotics. **Ecotoxicology and Environmental Safety**, 72(1), 154-161.

Book Chapters

1. Mateu-Figueras, G., Monti, G.S., Egozcue, J. (2021). Distributions on the Simplex Revisited. In **Advances in Compositional Data Analysis: Festschrift in Honour of Vera Pawlowsky-Glahn**, P. Filzmoser, K. Hron, J.A. Martín-Fernández, J. Palarea-Albaladejo (editors). Springer, pp. 61-82.
2. Benedan, L., Monti, G.S. (2021). Predicting the Risk of Gambling Activities in Adolescence: A Case Study. In **Data Science and Social Research II. Studies in Classification, Data Analysis, and Knowledge Organization**, M. Zenga and P. Mariani (editors). Springer, pp. 47-57.
3. Migliorati, S., Monti, G.S. (2021). A Bayesian Mixture Model for Ecotoxicological Risk Assessment. In **Data Science and Social Research II. Studies in Classification, Data Analysis, and Knowledge Organization**, M. Zenga and P. Mariani (editors). Springer, pp. 281-291.
4. Monti, G.,S. Filzmoser, P. (2020). High-dimensional regression with compositional covariates: a robust perspective. In **Book of short papers - SIS 2020**, N.S. Alessio Pollice (editors). Pearson, pp. 105-110.
5. Migliorati, S., Monti, G.S. (2020). An improved sensitivity-data based method for probabilistic ecological risk assessment. In **Book of short papers - SIS 2020**, N.S. Alessio Pollice (editors). Pearson, pp. 822-827.
6. Monti, G.S., Solari, A. (2016). Slot Machine II. In **Ludocrazia. Un lessico dell'azzardo di massa**, Marco Dotti e Marcello Esposito (editors). O barra O edizioni.
7. Monti, G.S., Solari, A. (2016). Probabilità. In **Ludocrazia. Un lessico dell'azzardo di massa**, Marco Dotti e Marcello Esposito (editors). O barra O edizioni.
8. Monti, G.S., Solari, A. (2016). Gioco equo. In **Ludocrazia. Un lessico dell'azzardo di massa**, Marco Dotti e Marcello Esposito (editors). O barra O edizioni.
9. Monti, G.S., Solari, A. (2016). Fallacia dello scommettitore. In **Ludocrazia. Un lessico dell'azzardo di massa**, Marco Dotti e Marcello Esposito (editors). O barra O edizioni.
10. Monti, G.S., Mateu Figueras, G., Pawlowsky, G., JJ Egozcue, V. (2016). A Regression Model for Compositional Data Based on the Shifted-Dirichlet Distribution. In **Compositional Data Analysis, Springer Proceedings in Mathematics & Statistics**, 187, J.A. Martín-Fernández, S. Thió-Henestrosa (editors). Springer New York LLC, pp. 127-143.
11. Monti, G.S., Mateu Figueras, G., Pawlowsky Glahn, V. (2011). *Notes on the*

Scaled Dirichlet distribution. In **Compositional Data Analysis: Theory and Applications**, V. Pawlowsky Glahn, A. Buccianti (editors). Toronto, John Wiley & Sons, pp. 128-138.

Conferences and Workshops

1. Monti, G.S., Filzmoser, P. (2021). A Robust Approach to Classification and Regression Tasks for Microbiome Data. **International Conference on Robust Statistics ICORS2021**. September 21-24, 2021, TU Wien, Austria.
2. Monti, G.S., Bonini, M., Ceriotti, V., Pelagatti, M., Ortolani, C. (2021). Compositional Data Techniques for the Analysis of the Ragweed Allergy. In **Book of Short Papers - SIS 2021 - 50th Scientific meeting of the Italian Statistical Society**. C. Perna, N. Salvati, F. Schirripa Spagnolo (editors), Pearson, pp. 1350-1355. June 21-25, 2021, Pisa, Italy.
3. Monti, G.S., Filzmoser, P. (2021). A Robust Approach to Microbiome-Based Classification Problems. In **Book of Short Papers - SIS 2021 - 50th Scientific meeting of the Italian Statistical Society**, C. Perna, N. Salvati, F. Schirripa Spagnolo (editors), Pearson, pp. 1326-1331. June 21-25, 2021, Pisa, Italy.
4. Bonini, M., Monti, G.S., Ceriotti, V., Re, E., Bramè, B., Bottero, P., et al. (2020). Features of ragweed allergy: symptoms and drug consumption related to airborne ragweed pollen concentrations in Northern Italy. In **Abstract Book of the 7th European Symposium on Aerobiology "Bioaerosols and Environmental Impacts"**, European Aerobiology Society. June 22-26, 2020, Cordoba, Spain.
5. Monti, G.S., Benedan, L., Mercandelli, M. (2019). A machine learning approach in the risk estimate of gambling in adolescents: a case study. In **Book of Abstracts of the Second international conference on data science and social research (DSSR2019)**. February 4-5, 2019, University of Milano - Bicocca and Università IULM, Milano, Italy.
6. Mateu-Figueras, G., Monti, G.S., Ortego, M. (2019). Alternative Kolmogorov-Smirnov Test of Goodness of Fit Based on Aitchison Distance. In **Book of Abstracts of the 8th International Workshop on Compositional Data Analysis (CoDaWork2019)**. June, 3-8, 2019, Universitat Politècnica de Catalunya, Terrassa (Barcelona), Spain.
7. Monti, G.S., Mateu-Figueras, G., Ortego, M., Pawlowsky-Glahn, V., Egozcue, J. (2018). Rethinking the Kolmogorov-Smirnov Test of Goodness of Fit in a Compositional Way. In **Book of Short Papers SIS2018 - 49th Meeting of the Italian Statistical Society**, A. Abbruzzo, E. Brentari, M. Chiodi, D. Piacentino (editors), Pearson, pp. 1379-1384. June 20-22, 2018, Palermo, Italy.
8. Monti, G.S., Mateu-Figueras, G., Ortego, M., Pawlowsky-Glahn, V., Egozcue, J. (2017). Modified Multivariate Kolmogorov-Smirnov Test of Goodness of Fit. In **Proceedings book of the 7th international Workshop on Compositional Data analysis (CoDaWork2017)**, K. Hron and R. Tolosana-Delgado (editors), pp.152-158. June 5-9, 2017, Abbadia San Salvatore (Siena), Italy.
9. Monti, G.S., Migliorati, S. (2017). Compositional approach to the analysis of species abundance data. In **Proceedings book of the 7th international Workshop on Compositional Data analysis (CoDaWork2017)**, K. Hron and R. Tolosana-Delgado (editors), pp. 141-151. June 5-9, 2017, Abbadia San Salvatore (Siena), Italy.

10. Monti, G.S., Filzmoser, P., Deutsch, R. (2016). Robust estimation approach for hazardous concentration levels using species sensitivity distribution. In **Proceedings of the 11th International Conference in Computer Data Analysis and Modeling: Theoretical and Applied Stochastics**, S. Aivazian, P. Filzmoser, Y. Kharin (editors), Publishing center of BSU. September 6-10, 2016, Minsk, Belarus.
11. Crosato, L., Monti, G.S. (2015). A simplicial approach to inequality measurement. In **Proceedings of the SIS2015 conference: Statistics and Demography: the Legacy of Corrado Gini**. September 9–11, 2015, Treviso, Italy.
12. Monti, G.S., Mateu-Figueras, G., Pawlowsky-Glahn, V., Egozcue, J.J. (2015). Shifted-Dirichlet Regression vs Simplicial Regression: a comparison. In **Proceedings of the 6th International Workshop on Compositional Data Analysis (CoDawork 2015.)**, Thió-Henestrosa, S; Martín Fernández, JA (editors). June 1-5, 2015, L'Escala (Girona), Spain.
13. Monti, G.S., Mateu Figueras, G., Pawlowsky Glahn, V., Egozcue, J.J. (2014). Scaled-Dirichlet Covariate Models for Compositional Data. In **Proceedings of the 47th SIS Scientific Meeting of the Italian Statistical Society**, Cooperativa Universitaria Editrice Cagliariitana CUEC. June 10-14, 2014, Cagliari, Italy.
14. Monti, G.S., Hron, K., Filzmoser, P., Templ, M. (2013). Covariance-Based Outlier Detection for Compositional Data with Structural Zeros: Application to Italian Survey of Household Income and Wealth Data. In **Advances in Latent Variables**, E. Brentari, M. Carpita (editors). Vita e Pensiero, Milano.
15. Migliorati, S., Monti, G.S., Ongaro, A. (2012). Point and interval estimation for the Flexible Dirichlet model. In **Proceedings of the 2nd Stochastic Modeling Techniques and Data Analysis International Conference (SMTDA2012)**, C. Skiadas (editors), pp.177-190. June 5 - 8, 2012, Chania, Crete, Greece.
16. Ongaro, A., Migliorati, S., Monti, G.S. (2011). A new multivariate distribution as a basis for compositional data. In **Proceedings of 14th Applied Stochastic Models and Data Analysis Conference (AMSDA2011)**. June 7-10, 2011. University of Rome "La Sapienza", Italy.
17. Monti, G.S., Vighi, M. (2011). A Bayesian approach to model EC_p in concentration–response experiments. In **Proceedings of 14th Applied Stochastic Models and Data Analysis Conference (AMSDA2011)**. June 7-10, 2011. University of Rome "La Sapienza", Italy.
18. Monti, G.S., Mateu-Figueras, G., Pawlowsky-Glahn, V., Egozcue, J.J. (2011). The shifted-scaled Dirichlet distribution in the simplex. In **Proceedings of the 4th International Workshop on Compositional Data Analysis (CoDa-Work2011)**, Egozcue, J.J., Tolosana Delgado, R. and Ortego Martinez, M.I. (editors). May 9-13, 2011, Sant Feliu de Guíxols, Spain.
19. Migliorati, S., Monti, G.S., Ongaro, A. (2010). The Flexible Dirichlet family: some inferential issues. In **Proceedings of Stochastic Modeling Techniques and Data Analysis International Conference (SMTDA2010)**, C. Skiadas (editors). June 8-11, 2010, Chania, Crete, Greece.
20. Papa, E., Kovarich, S., Monti, G.S., Gramatica, P., Vighi, M. (2009). Pesticides and Narcotics toxicity to *Vibrio* fishery studied by QSAR. In **SETAC Europe**

(Society of Environmental Toxicology and Chemistry) 19th Annual Meeting, "Protecting ecosystem health: facing the challenge of a globally changing environment". 31 May - 4 June, 2009, Göteborg, Sweden.

21. Monti, G.S. (2009). Analysis of correlation among components of a Flexible Dirichlet Distribution. In **Proceedings of the 6th Conference on Complex Models and Computational Intensive Methods for Estimation and Prediction (S.Co. 2009)**, Maggioli Editore, Santarcangelo di Romagna (RN), pp. 217-222. September 14-16, 2009, Milano, Italy.
22. Ongaro, A., Migliorati, S., Monti, G.S. (2008). A new distribution on the simplex containing the Dirichlet family. In **Proceedings of the 3rd Compositional Data Analysis Workshop (CODAWORK08)**. May 27-30, 2008, University of Girona, Spain.
23. Migliorati, S., Monti, G.S., Ongaro, A. (2008). E-M algorithm: an application to a mixture model for compositional data. In **Proceedings of the XLIV Meeting of the Italian Statistical Society (SIS2008)**, Cleup. June 25-27, 2008, Arcavacata di Rende, (Cosenza), Italy.

Invited Talks and Lectures

1. seminar *A robust approach to classification and regression tasks for microbiome data*. March 24, 2021, Department of Economics, University of Crete, Greece.
2. lecture *CoDa in ecotoxicology*, at Week-CoDaCourse with CoDaPack and R. July 6, 2018, University of Girona, Spain.
3. seminar *L'azzardo che ti rovina ... probabilmente*, joint work with Aldo Solari, CuriosaMente - Aperitivi culturali a Villa Forno. January 29, 2015, Cinisello Balsamo, Milan, Italy.
4. lecture *Scaled-Dirichlet Regression for Compositional Data*, at Olomoucian Days of Applied Mathematics (ODAM) 2015. May 20, 2015, Olomouc, Czech Republic.
5. lecture *Concentration-Response Curves in Bioassays*, within the Project: A-Math-Net Applied Mathematics Knowledge Transfer Network CZ.1.07/2.4.00/17.0100, Statistical processing of experimental data. November 16, 2012, Velké Losiny, Czech Republic.
6. *Compositional data: distributions on the simplex and correlation analysis*, Statistics seminar. August 25, 2009, Department of Statistics, Stanford University, (CA).

Research Dissemination Papers

1. Benedan, L., Monti, G.S., Cerasi, V., Mari, S., & Orsenigo, J. (2020). Fattori di rischio e protezione nel gioco d'azzardo in adolescenza: uno studio interdisciplinare. **Statistica & Società**.
2. Monti, G.S. (2020). Un approccio compositazionale allo studio del microbioma. **Statistica & Società**.

Research Supports

1. Local coordinator of the research project Fondi di Ateneo per la Ricerca (F.A.R) of the Department of Economics, Management and Statistics, University of Milano-Bicocca, on *Inferential methods for sparse compositional data* (2019-2021).
2. Local coordinator of the research project Fondi di Ateneo per la Ricerca (F.A.R)

- of the Department of Economics, Management and Statistics, University of Milano-Bicocca, on *Statistical methods for complex problems* (2013-2018).
3. Member of the project *INTEGRATE Integrated Solutions for Agile Manufacturing in High-mix Semiconductor Fabs* (2013-2015).

Teaching

- *Computational Statistics*, graduate level, master's degree in Statistical and Economic Sciences, University of Milano Bicocca, A.A.: 2021/22, 2020/21, 2019/20, 2018/19, 2017/18, 2016/17.
- *High Dimensional Data Analysis*, graduate level, master's degree in Data Science, University of Milano Bicocca, A.A.: 2021/22, 2020/21, 2019/20, 2018/19.
- *Introduction to R*, undergraduate level, MOOC course, Federica WebLearning, A.A.: 2018/19.
- *Statistics*, undergraduate level, bachelor's degree in Business economics and management, Bocconi University, A.A.: 2021/22, 2020/21, 2019/20, 2018/19, 2017/18, 2016/17, 2015/16, 2014/15.
- *Multivariate Statistical Analysis*, undergraduate level, bachelor's degree in Statistical and Economic Sciences, University of Milano Bicocca, A.A.: 2017/2018, 2016/2017, 2014/15, 2013/14, 2012/13, 2011/12, 2010/11, 2009/10.
- *Statistics with R*, PhD course. Doctorate in Chemical, Geological and Environmental Sciences, University of Milano Bicocca, A.A.: 2014/15.
- *Element of statistical inference*, graduate level, master's degree in Statistical and Economic Sciences, University of Milano Bicocca, A.A.: 2012/13, 2011/12, 2010/11, 2009/10.
- *Programming with R*, graduate level, master's degree in Biostatistics, University of Milano Bicocca, A.A.: 2012/13, 2011/12, 2010/11, 2009/10.
- *Programming with R*, PhD course. Doctorate in Statistics of the University of Milano Bicocca, A.A.: 2012/13.
- Teaching assistant for *Bayesian Inference*, graduate level, master's degree in Biostatistics, University of Milano Bicocca, A.A.: 2009/10, 2008/09.
- Teaching assistant for *Statistics*, undergraduate level, bachelor's degree in Political Sciences, University of Milano, A.A.: 2005/06.
- *Statistics and Probability Calculus*, Master in Health Statistic course, University of Milano Bicocca, A.A.: 2004/05.

Software

In-depth knowledge of the programming environments for statistical computing and graphics R/S-Plus. Discrete knowledge of software packages Matlab, SPSS, SAS, Python, STATA, OpenBUGS. Digital and Mathematical typesetting (LaTeX).

I contributed to the R Open-Source project as developer and maintainer of the package: RobZS, <https://github.com/giannamonti/RobZS>.

Scientific societies and other information

- Member of the Italian Statistical Society (SIS).
- Member of the International Association for Statistical Computing (IASC-ISI).

- Elected Council member of the CoDa-Association for the period 2021-2025, an organization which brings together scientists interested in developing methods for compositional data modelling and their application in different fields.
- Member of the Center for Neurosciences – Milan (NeuroMi), scientific committee.
- Member of the Bicocca Applied Statistic Center (B-ASC), scientific committee.
- Member of the Academic board of the PhD in "Statistics", University of Milano Bicocca, 2011-2015.
- Member of the Academic board of the PhD in "Statistics and Mathematics for Finance", University of Milano Bicocca, 2013-2016.
- External review for the PhD thesis of M. Comas Cufí, Doctoral School, University of Girona, Spain (2018).
- External review for the PhD thesis of V. Simonacci, PhD in International Studies of the University of Naples "L'Orientale", (2019).
- Editorial board member of the journal *Induzioni. Demografia, probabilità, statistica a scuola*, regarding the activity of Italian university statisticians to promote statistics in schools.
- Organizer and Chair of the solicited session *Composition in the Data Science Era* at SIS 2021 - 50th Scientific meeting of the Italian Statistical Society.
- Local Organizer of the 7th international Workshop on Compositional Data analysis (CoDaWork2017).
- Member of the Library Commission, University of Milano-Bicocca, to provide input and recommendations regarding the development, implementation and maintenance of the Bicocca's library.
- Scientific responsible for the project "Selfie 2.0. Survey on youth lifestyles", approved by the Bicocca ethics committee in 2019. The project is linked to a personal and scientific interest in the study of risk factors related to dysfunctional youthful behaviors and their prevention. The project is of particular importance also for its multidisciplinary nature, the Bicocca Applied Statistics Center, the Department of Psychology and the Department of Human Sciences for Education "Riccardo Massa" are also involved.
- Occasional referee activities for the following journals: *Chemometrics and Intelligent Laboratory Systems, Journal of Applied Statistics, Computational Statistics, Electronic Journal of Applied Statistical Analysis, Integrated Environmental Assessment and Management, Quality & Quantity, Statistics and Probability Letters, Stats, Science of the Total Environment, AJSE-Mathematics*.

Languages

Italian Mother tongue
English Fluent

I give my permission to use my private data as for the Italian D.LGS. 196/2003.

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