

Biographical sketch

Andrea Cerioli received his Ph.D. in Statistics from the Department of Statistical Sciences of the University of Padua in 1992. He has been Professor of Statistics at the University of Parma, Italy, since 2002. He is currently affiliated with the Department of Economics and Management. He was President of the Board of Studies of the Faculty of Economics of the University of Parma in the period 2009-2012 and member of many other boards since then.

He is author or coauthor of more than 100 scientific peer-reviewed scientific works, most of them published in international journals or books. He is also a coauthor of the book "[Exploring Multivariate Data with the Forward Search](#)" and a co-editor of the book "[Data Analysis, Classification and the Forward Search](#)", both published by Springer-Verlag.

In the years 2011-2015 he was Editor-in-Chief of the journal "Statistical Methods and Applications" (Springer), for which he had served as a Co-editor in the years 2008-2011. He is currently an Editor of the journal "Advances in Data Analysis and Classification" (Springer).

He was President of the Classification and Data Analysis Group (CLADAG), a Section of the Italian Statistical Society, in the years 2009-2011. In the years 2011-2017 he was a member of the Council of the International Federation of Classification Societies.

He chaired the Local Organizing Committee of the CLADAG 2005 Conference, hosted by the University of Parma. He has served and is still serving on the Scientific Program Committee of many international conferences. He has been invited to give plenary talks and to organize specialized sessions at many international scientific conferences.

Research

A large part of his research activity has focused on the development of robust methodologies for data analysis, both under the approach called "Forward Search" and other high-breakdown techniques, with special emphasis on:

- multivariate outlier detection and testing, when masking and swamping are present
- consistency, robustness and efficiency of estimators
- robust classification and clustering

- the relationships among alternative approaches
- the properties of methods under elliptical and non-elliptical distribution models.

He also studied the effect of spatial autocorrelation on association tests between categorical variables and the properties of clustering methods.

His more recent research activity includes:

- The properties of Benford's Law for the distribution of digits arising in international trade and the development of efficient statistical procedures for testing this law;
- Tempered (Positive) Stable distributions and the development of computationally efficient methods for estimating their parameters.

From the point of view of applications, he is mainly interested in applying methodologies to solve problems of major economic impact for businesses and the whole Society. The main application area in the last few years has been the detection of data manipulations in international trade and customs data, which has also been the main motivation for the development of the new methodologies described above.

Selected publications

1. Brito, P.; CERIOLO, A.; García-Escudero, L. A.; Saporta, G. (2024). Special issue on "New methodologies in clustering and classification for complex and/or big data". *ADVANCES IN DATA ANALYSIS AND CLASSIFICATION*, 18, 539-543.
2. Barabesi, L.; CERIOLO, A.; García-Escudero, L. A.; Mayo-Isacar, A. (2023). Consistency factor for the MCD estimator at the Student-t distribution. *STATISTICS AND COMPUTING*, 33: 132.
3. Barabesi, L.; CERIOLO, A.; Di Marzio M. (2023): Statistical models and the Benford hypothesis: a unified framework. *TEST*, DOI: 10.1007/s11749-023-00881-y.
4. Barabesi, L.; Cerasa, A.; CERIOLO, A.; Perrotta, D. (2022). On Characterizations and Tests of Benford's Law. *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*, 117, 1887-1903.
5. Torricelli, L.; Barabesi, L.; CERIOLO A. (2022). Tempered positive Linnik processes and their representations. *ELECTRONIC JOURNAL OF STATISTICS*, 16, 6313-6347.
6. Barabesi, L.; CERIOLO, A.; Perrotta, D. (2021). Forum on Benford's law and statistical methods for the detection of frauds. *STATISTICAL METHODS & APPLICATIONS*, 30, 767-778.
7. Salini, S.; Laurini, F.; Morelli, G.; Riani, M.; CERIOLO, A. (2021). Covariance matrices of S robust regression estimators, *JOURNAL OF STATISTICAL COMPUTATION AND SIMULATION*, DOI: 10.1080/00949655.2021.1972300.
8. Torti, F.; Perrotta, D.; Riani, M.; CERIOLO, A. (2019). Assessing trimming methodologies for clustering linear regression data. *ADVANCES IN DATA ANALYSIS AND CLASSIFICATION*, 13, 227-257.
9. Riani, M.; Atkinson, A. C.; CERIOLO, A.; Corbellini, A. (2019). Discussion on the paper: Data Science, Big Data and Statistics, by Pedro Galeano and Daniel Pena. *TEST*, 28, 349-352.
10. Riani, M.; Atkinson, A. C.; CERIOLO, A.; Corbellini, A. (2019). Efficient robust methods via monitoring for clustering and multivariate data analysis. *PATTERN RECOGNITION*, 88, 246-260.
11. CERIOLO, A.; Farcomeni, A.; Riani, M. (2019). Wild adaptive trimming for robust estimation and cluster analysis. *SCANDINAVIAN JOURNAL OF STATISTICS*, 46, 235-256.

12. CERIOLI, A.; Barabesi, L.; Cerasa, A.; Menegatti, M.; Perrotta, D. (2019). Newcomb-Benford law and the detection of frauds in international trade. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*, 116, 106-115.
13. CERIOLI, A.; Riani, M.; Atkinson, A. C.; Corbellini, A. (2018). Rejoinder to the discussion of “The power of monitoring: How to make the most of a contaminated multivariate sample”. *STATISTICAL METHODS & APPLICATIONS*, 27, 661-666.
14. CERIOLI, A.; Riani, M.; Atkinson, A. C.; Corbellini, A. (2018). The power of monitoring: How to make the most of a contaminated multivariate sample (with discussion). *STATISTICAL METHODS & APPLICATIONS*, 27, 559-587.
15. CERIOLI, A.; Garcia-Escudero, L. A.; Mayo-Iscar, A.; Riani, M. (2018). Finding the Number of Normal Groups in Model-Based Clustering via Constrained Likelihoods. *JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS*, 27, 404-416.
16. Atkinson, A.C.; Riani, M.; CERIOLI, A. (2018). Cluster detection and clustering with random start forward searches. *JOURNAL OF APPLIED STATISTICS*, 45, 777-798.
17. Barabesi, L.; Cerasa, A.; CERIOLI, A.; Perrotta, D. (2018). Goodness-of-fit testing for the Newcomb-Benford law with application to the detection of customs fraud. *JOURNAL OF BUSINESS & ECONOMIC STATISTICS*, 36, 346-358.
18. Cerasa, A.; CERIOLI, A. (2017). Outlier-free merging of homogeneous groups of pre-classified observations under contamination. *JOURNAL OF STATISTICAL COMPUTATION AND SIMULATION*, 87, 2997-3020.
19. Barabesi, L.; Cerasa, A.; CERIOLI, A.; Perrotta, D. (2016) A new family of tempered distributions. *ELECTRONIC JOURNAL OF STATISTICS*, 10, 3871-3893.
20. Barabesi, L.; Cerasa, A.; Perrotta, D.; CERIOLI, A. (2016). Modelling international trade data with the Tweedie distribution for anti-fraud and policy support. *EUROPEAN JOURNAL OF OPERATIONAL RESEARCH*, 248, 1031-1043.
21. Salini, S.; CERIOLI, A.; Laurini, F.; Riani, M. (2016). Reliable Robust Regression Diagnostics. *INTERNATIONAL STATISTICAL REVIEW*, 84, 99-127.
22. Atkinson, A.C.; CERIOLI, A.; Riani, M. (2016). Discussion of “Asymptotic Theory of Outlier Detection Algorithms for Linear Time Series Regression Models” by Johansen and Nielsen. *SCANDINAVIAN JOURNAL OF STATISTICS*, 43, 349 –352.
23. Riani, M.; Perrotta, D.; CERIOLI, A. (2015). The Forward Search for Very Large Datasets. *JOURNAL OF STATISTICAL SOFTWARE*, 67, Code Snippet 1.
24. Riani, M.; CERIOLI, A.; Perrotta, D.; Torti, F. (2015). Simulating mixtures of multivariate data with fixed cluster overlap in FSDA library. *ADVANCES IN DATA ANALYSIS AND CLASSIFICATION*, 9, 461-481.
25. CERIOLI, A.; Farcomeni, A.; Riani, M. (2014). Strong consistency and robustness of the Forward Search estimator of multivariate location and scatter. *JOURNAL OF MULTIVARIATE ANALYSIS*, 126, 167-183.
26. Riani, M.; CERIOLI, A.; Torti, F. (2014). On consistency factors and efficiency of robust S-estimators. *TEST*, 23, 356-387.
27. Riani, M.; CERIOLI, A.; Atkinson, A.C.; Perrotta, D. (2014) Monitoring robust regression. *ELECTRONIC JOURNAL OF STATISTICS*, 8, 646-677.
28. CERIOLI, A.; Perrotta, D. (2014). Robust clustering around regression lines with high density regions. *ADVANCES IN DATA ANALYSIS AND CLASSIFICATION*, 8, 5-26.
29. CERIOLI, A.; Farcomeni, A.; Riani, M. (2013). Robust distances for outlier-free goodness-of-fit testing. *COMPUTATIONAL STATISTICS & DATA ANALYSIS*, 65, 29-45.

30. CERIOLI, A.; Farcomeni, A. (2011). Error rates for multivariate outlier detection. *COMPUTATIONAL STATISTICS & DATA ANALYSIS*, 55, 544-553.
31. Atkinson, A.C.; Riani, M.; CERIOLI, A. (2010). Rejoinder: The forward search: Theory and data analysis (with discussion). *JOURNAL OF THE KOREAN STATISTICAL SOCIETY*, 39, 161-163.
32. Atkinson, A.C.; Riani, M.; CERIOLI, A. (2010). The forward search: Theory and data analysis (with discussion). *JOURNAL OF THE KOREAN STATISTICAL SOCIETY*, 39, 117-134.
33. Riani, M.; CERIOLI, A.; Rousseeuw, P. (2010). Special issue on robust methods for classification and data analysis. *ADVANCES IN DATA ANALYSIS AND CLASSIFICATION*, 4, 85-87.
34. CERIOLI, A. (2010). Multivariate Outlier Detection With High-Breakdown Estimators. *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*, 105, 147-156.
35. CERIOLI, A.; Riani, M.; Atkinson, A. C. (2009). Controlling the size of multivariate outlier tests with the MCD estimator of scatter. *STATISTICS AND COMPUTING*, 19, 341-353.
36. Riani, M.; Atkinson, A. C.; CERIOLI, A. (2009). Finding an unknown number of multivariate outliers. *JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES B*, 71, 447-466.
37. Riani, M.; CERIOLI, A.; Chiandotto, B. (2006). Special issue on robust multivariate analysis and classification. *STATISTICAL METHODS & APPLICATIONS*, 15, 267-269.
38. Atkinson, A.C.; Riani, M.; CERIOLI, A. (2006). Discussion on "A survey of robust statistics" by S. Morgenthaler". *STATISTICAL METHODS & APPLICATIONS*, 15, 278-280.
39. Zani, S.; CERIOLI, A.; Riani, M.; Vichi, M. (Eds.) (2006). *DATA ANALYSIS, CLASSIFICATION AND THE FORWARD SEARCH*. Springer, Berlin.
40. CERIOLI, A. (2005). K-means cluster analysis and Mahalanobis metrics: a problematic match or an overlooked opportunity? *STATISTICA APPLICATA – ITALIAN JOURNAL OF APPLIED STATISTICS*, 17, 61-73.
41. Atkinson, A.C.; Riani, M.; CERIOLI, A. (2004). *EXPLORING MULTIVARIATE DATA WITH THE FORWARD SEARCH*. Springer, New York.
42. CERIOLI, A.; Riani, M. (2002). Robust methods for the analysis of spatially autocorrelated data. *STATISTICAL METHODS & APPLICATIONS*, 11, 335-358.
43. CERIOLI, A. (2002). Tests of homogeneity for spatial populations. *STATISTICS & PROBABILITY LETTERS*, 58, 123-130.
44. CERIOLI, A. (2002). Testing mutual independence between two discrete-valued spatial processes: a correction to Pearson chi-squared. *BIOMETRICS*, 58, 888- 897.
45. CERIOLI, A.; Riani, M. (1999). The Ordering of Spatial Data and the Detection of Multiple Outliers. *JOURNAL OF COMPUTATIONAL AND GRAPHICAL STATISTICS*, 8, 239-258.
46. CERIOLI, A. (1998). Analysis of binary variables observed at an irregular network of spatial locations. *METRON*, 56, 121-137.
47. CERIOLI, A. (1997). Comparing three partitions: An inferential approach based on multi-way contingency tables. *COMMUNICATIONS IN STATISTICS. THEORY AND METHODS*. 26, 2457-2471.
48. CERIOLI, A. (1997). Modified tests of independence in 2x2 tables with spatial data. *BIOMETRICS*, 53, 619-628.
49. CERIOLI, A.; Zani S. (1990). A fuzzy approach to the measurement of poverty. In C. Dagum, M. Zenga (Eds.): "INCOME AND WEALTH DISTRIBUTION, INEQUALITY AND POVERTY". Springer, Berlin. Reprinted as Chapter 5 of "THE ECONOMICS OF POVERTY AND INEQUALITY – Vol. II", by F. A. Cowell, Edward Elgar, Cheltenham, 2003: <http://www.e-elgar.com/shop/the-economics-of-poverty-and-inequality>.