

# Andrea Cappozzo

Curriculum Vitae  
May 2023

Department of Mathematics,  
Politecnico di Milano, Italy  
andrea.cappozzo@polimi.it  
@AndreaCappozzo  
AndreaCappozzo

## Research Interests

Mixture models, Model-based clustering and classification, Variable selection, Penalized estimation, Robust statistics, Statistical learning, Health Analytics

## Work Experience

2021/4 – Pres. **Assistant Professor** (Ricercatore SECS-S/01, tipo A), Department of Mathematics, Politecnico di Milano  
2017/9 – 2021/12 **Volunteer data scientist**, Heartindata, Milan  
2020/4 – 2021/3 **Postdoctoral researcher**, Department of Statistics & Quantitative Methods, University of Milano-Bicocca  
2020/1 – 2020/4 **Freelance Data Scientist**, DCG, Milan  
2015/9 – 2016/9 **Business analyst and planner**, HP Inc, Barcelona

## Teaching Experience

2022/2 – Pres. **Lecturer**, MSc course in Biostatistics, Politecnico di Milano  
2021/9 – Pres. **Teaching assistant and Lecturer**, MSc course in Nonparametric statistics, Politecnico di Milano  
2021/9 – 2021/9 **Lab with R**, Mixture models module, PhD in Economics, Statistics and Data Science, University of Milano-Bicocca  
2021/5 – 2021/5 **Lab with R**, Modelos de Mixtura con aplicaciones en R, Universidad Nacional de San Agustín de Arequipa  
2019/3 – 2021/9 **Teaching Assistant**, BSc courses in Statistics and Statistical Methods, University of Milano-Bicocca  
2019/3 – 2019/9 **Academic Tutor**, BSc courses in Statistical Models and Computer Science, University of Milano-Bicocca  
2017/9 – 2018/2 **Teaching Assistant**, BSc courses in Statistics, Bocconi University

## Education

2020/2 **Ph.D. in Statistics and Mathematical Finance** (Doctor Europaeus) University of Milano-Bicocca  
2018/8 **Deep Learning A-Z: Hands-on Artificial Neural Networks** udemy.com  
2018/4 **Python for Data Science and Machine Learning Bootcamp** udemy.com  
2017/2 **Statistical Learning online course** (completed with distinction) Stanford University  
2015/4 **M.Sc. in Statistical Sciences** (with honors) University of Padua  
2012/7 **B.Sc. in Statistics and Management** (with honors) University of Padua

## Visiting Periods

2018/3 – 2019/2 **Visiting PhD student**, Insight Centre for Data Analytics, University College Dublin, Ireland  
2014/1 – 2014/6 **Exchange Semester**, School of Economics and Management, Tilburg University, The Netherlands

## Publications

### Refereed journals

- Cappozzo, A, García-Escudero, LA, Greselin, F, & Mayo-Iscar, A. (2023). Graphical and Computational Tools to Guide Parameter Choice for the Cluster Weighted Robust Model. *Journal of Computational and Graphical Statistics*, 0(0), 1–20. <https://doi.org/10.1080/10618600.2022.2154218>
- Cappozzo, A et al. (2022). A blood DNA methylation biomarker for predicting short-term risk of cardiovascular events. *Clinical Epigenetics*, 14(1), 121. <https://doi.org/10.1186/s13148-022-01341-4>
- Casa, A, Cappozzo, A, & Fop, M. (2022). Group-Wise Shrinkage Estimation in Penalized Model-Based Clustering. *Journal of Classification*, 39(3), 648–674. <https://doi.org/10.1007/s00357-022-09421-z>
- Cappozzo, A, García Escudero, LAG, Greselin, F, & Mayo-Iscar, A. (2021). Parameter Choice, Stability and Validity for Robust Cluster Weighted Modeling. *Stats*, 4(3), 602–615. <https://doi.org/10.3390/stats4030036>
- Denti, F, Cappozzo, A, & Greselin, F. (2021). A two-stage Bayesian semiparametric model for novelty detection with robust prior information. *Statistics and Computing*, 31(4), 42. <https://doi.org/10.1007/s11222-021-10017-7>
- Cappozzo, A, Greselin, F, & Murphy, TB. (2021). Robust variable selection for model-based learning in presence of adulteration. *Computational Statistics & Data Analysis*, 158, 107186. <https://doi.org/10.1016/j.csda.2021.107186>
- Cappozzo, A, Duponchel, L, Greselin, F, & Murphy, TB. (2021). Robust variable selection in the framework of classification with label noise and outliers: applications to spectroscopic data in agri-food. *Analytica Chimica Acta*, 338245. <https://doi.org/10.1016/j.aca.2021.338245>
- Cappozzo, A, Greselin, F, & Murphy, TB. (2020). Anomaly and Novelty detection for robust semi-supervised learning. *Statistics and Computing*, 30(5), 1545–1571. <https://doi.org/10.1007/s11222-020-09959-1>

9. Cappozzo, A, Greselin, F, & Murphy, TB. (2020). A robust approach to model-based classification based on trimming and constraints. *Advances in Data Analysis and Classification*, 14(2), 327–354. <https://doi.org/10.1007/s11634-019-00371-w>

#### Submitted and working papers

1. Cappozzo, A, Ieva, F, & Fiorito, G. (2023). A general framework for penalized mixed-effects multitask learning with applications on DNA methylation surrogate biomarkers creation  
*Annals of Applied Statistics (to appear)* <https://arxiv.org/abs/2112.12719>
2. Benetti, L, Boniardi, E, Chiani, L, Ghirri, J, Mastropietro, M, Cappozzo, A, & Denti, F. (2023+). Variational Inference for Semiparametric Bayesian Novelty Detection in Large Datasets  
(Submitted) <https://arxiv.org/abs/2212.01865>

#### Monographs and refereed conference proceedings

1. Casa, A, Cappozzo, A, & Fop, M. (2023). Penalized model-based clustering with group-dependent shrinkage estimation. In LA García-Escudero, A Gordaliza, A Mayo, MA Lubiano Gomez, MA Gil, P Grzegorzewski, & O Hryniewicz (Eds.), *Building bridges between soft and statistical methodologies for data science* (pp. 73–78). Springer International Publishing.
2. Cappozzo, A, García-Escudero, LA, Greselin, F, & Mayo-Isar, A. (2023). Monitoring tools in robust CWM for the analysis of crime data. In LA García-Escudero, A Gordaliza, A Mayo, MA Lubiano Gomez, MA Gil, P Grzegorzewski, & O Hryniewicz (Eds.), *Building bridges between soft and statistical methodologies for data science* (pp. 65–72). Springer International Publishing.
3. Cappozzo, A, Ieva, F, & Fiorito, G. (2022). Mixed-effects high-dimensional multivariate regression via group-lasso regularization. In *Book of short papers SIS 2022* (pp. 652–657). Pearson.
4. Cappozzo, A, Casa, A, & Fop, M. (2021). Penalized model-based clustering for three-way data structures. In *Book of short papers SIS 2021* (pp. 758–763). Pearson.
5. Cappozzo, A, Casa, A, & Fop, M. (2021). Model-based clustering with sparse matrix mixture models. In GC Porzio, C Rampichini, & C Bocci (Eds.), *CLADAG 2021 BOOK OF ABSTRACTS AND SHORT PAPERS* (pp. 280–283). Firenze University Press. <https://doi.org/10.36253/978-88-5518-340-6>
6. Cappozzo, A, & Greselin, F. (2021). Monitoring tools for robust estimation of cluster weighted models. In *Book of short papers SIS 2021* (pp. 1245–1250). Pearson.
7. Cappozzo, A, Greselin, F, & Murphy, TB. (2021). Robust model-based learning to discover new wheat varieties and discriminate adulterated kernels in x-ray images. In S Balzano, GC Porzio, R Salvatore, D Vistocco, & M Vichi (Eds.), *Statistical learning and modeling in data analysis* (pp. 29–36). Springer International Publishing. [https://doi.org/10.1007/978-3-030-69944-4\\_4](https://doi.org/10.1007/978-3-030-69944-4_4)
8. Cappozzo, A, Duponchel, L, Greselin, F, & Murphy, TB. (2021). Robust classification of spectroscopic data in agri-food: First analysis on the stability of results. In GC Porzio, C Rampichini, & C Bocci (Eds.), *CLADAG 2021 BOOK OF ABSTRACTS AND SHORT PAPERS* (pp. 49–52). Firenze University Press. <https://doi.org/10.36253/978-88-5518-340-6>
9. Cappozzo, A, García Escudero, LAG, Greselin, F, & Mayo-Isar, A. (2021). Exploring solutions via monitoring for cluster weighted robust models. In GC Porzio, C Rampichini, & C Bocci (Eds.), *CLADAG 2021 BOOK OF ABSTRACTS AND SHORT PAPERS* (pp. 284–287). Firenze University Press. <https://doi.org/10.36253/978-88-5518-340-6>
10. Denti, F, Cappozzo, A, & Greselin, F. (2021). Outlier and novelty detection for functional data: A semiparametric bayesian approach. In *Book of short papers of the 5th international workshop on models and learning for clustering and classification* (pp. 33–38). Ledizioni.
11. Cappozzo, A, Greselin, F, & Murphy, TB. (2020). Variable selection for robust model-based learning from contaminated data. In *Book of short papers SIS 2020* (pp. 1117–1122). Pearson.
12. Denti, F, Cappozzo, A, & Greselin, F. (2020). Bayesian nonparametric adaptive classification with robust prior information. In *Book of short papers SIS 2020* (pp. 655–660). Pearson.
13. Cappozzo, A, & Greselin, F. (2019). Detecting wine adulterations employing robust mixture of factor analyzers. In *Statistical learning of complex data* (pp. 13–21). Springer Berlin Heidelberg. [https://doi.org/10.1007/978-3-030-21140-0\\_2](https://doi.org/10.1007/978-3-030-21140-0_2)
14. Cappozzo, A, Greselin, F, & Manzi, G. (2019). Predicting and improving smart mobility: A robust model-based approach to the BikeMi BSS. In *Smart statistics for smart applications 2019 - book of short papers* (pp. 737–742). Pearson.
15. Cappozzo, A, Greselin, F, & Murphy, TB. (2019). Supervised learning in presence of outliers, label noise and unobserved classes. In *Book of short papers | Cladag2019* (pp. 104–107). Centro Editoriale di Ateneo Università di Cassino e del Lazio Meridionale.
16. Cappozzo, A, Ferraccioli, F, Stefanucci, M, & Secchi, P. (2018). An object oriented approach to multimodal imaging data in neuroscience. In *Studies in neural data science : Startup research 2017, siena, italy, june 25-27* (Vol. 257, pp. 57–73). Springer New York LLC. [https://doi.org/10.1007/978-3-030-00039-4\\_4](https://doi.org/10.1007/978-3-030-00039-4_4)

17. Cappozzo, A, Greselin, F, & Murphy, TB. (2018). The role of trimming and variable selection in robust model-based classification for food authenticity studies. In *COMPSTAT 2018 book of abstracts* (pp. 35–35). COMPSTAT; CRoNoS.
18. Greselin, Francesca, & Cappozzo, A. (2017). Wine authenticity assessed via trimming. In *Book of short papers | Cladag2017*. Universitas Studiorum Srl.

## Presentations

### Invited

- 2022/12 **CMStatistics 2022**, Senate House University of London, United Kingdom
- 2022/9 **10th International Conference on Soft Methods in Probability and Statistics**, University of Valladolid, Spain
- 2022/7 **17th conference of the International Federation of Classification Societies**, University of Porto, Portugal
- 2021/9 **22nd European Young Statisticians Meeting**, virtual conference
- 2019/9 **Scientific meeting CLADAG 2019**, University of Cassino and Southern Lazio, Italy
- 2018/8 **COMPSTAT 2018**, Unirea Hotel, Iasi, Romania

### Seminars

- 2022/2 **Mox seminar series**, Politecnico di Milano, Italy
- 2021/5 **Mox seminar series**, Politecnico di Milano, Italy
- 2020/9 **IR-group meeting**, virtual seminar
- 2019/12 **Mock talk II**, University of Milano-Bicocca, Italy
- 2019/7 **Mock talk I**, University of Milano-Bicocca, Italy
- 2018/10 **Working Group on Statistical Learning**, University College Dublin, Ireland

### Contributed

- 2021/9 **Scientific meeting CLADAG 2021**, virtual conference
- 2021/6 **SIS 2021- 50th Meeting of the Italian statistical society**, virtual conference
- 2021/2 **e-CHIMIOMETRIE 2021**, virtual conference
- 2020/9 **MBC<sup>2</sup> Workshop on Models and Learning for Clustering and Classification**, virtual conference
- 2020/6 **e-Rum 2020**, virtual conference
- 2019/12 **CMStatistics 2019**, Senate House University of London, United Kingdom
- 2019/6 **Smart Statistics for Smart Applications - SIS conference**, Catholic University of the Sacred Heart, Italy
- 2017/9 **Scientific meeting CLADAG 2017**, University of Milano-Bicocca, Italy

### Poster/software sessions

- 2021/10 **Working Group on Model-Based Clustering**, Athens, Greece
- 2021/4 **International workshop on Spectroscopy and Chemometrics**, virtual conference
- 2021/1 **DS<sup>3</sup> Data science summer school**, virtual conference
- 2020/7 **Young-ISA Twitter Poster Conference**, virtual conference
- 2019/7 **Working Group on Model-Based Clustering**, Wirtschaftsuniversität Wien, Austria
- 2018/9 **MBC<sup>2</sup> Workshop on Model-Based Clustering and Classification**, University of Catania, Italy

## Summer Schools and Workshops

- 2018/4 **Robust Statistics: Foundations and Recent Developments**, University of Milano-Bicocca, Italy
- 2017/11 **Introduction to Functional Data Analysis**, Università degli Studi di Bergamo, Italy
- 2017/6 **Startup Research**, Certosa di Pontignano, Italy
- 2017/5 **International Summer School on Classification and Data Analysis**, University of Bologna, Italy

## Awards

- 2018/9 **Best poster presentation**, MBC<sup>2</sup> Workshop on Model-Based Clustering and Classification, Catania
- 2017/9 **Member of the third winning team**, Young CLADAG - Data science competition, Politecnico di Milano
- 2017/6 **Member of one of the four winning teams**, Stats Under the Stars 3 - Data science competition, University of Florence

## Theses supervision

### Master's Theses

- 2022/12 Anna Iob Master's Degree in Mathematical Engineering Politecnico di Milano

## Service to profession

### Referee service

BMC Bioinformatics, Advances in Data Analysis and Classification, Computational Statistics and Data Analysis, IEEE Transactions on Knowledge and Data Engineering, Journal of Computational and Graphical Statistics, Metron, Scientific reports, Statistical Methods & Applications, Statistical Modelling, Statistics and Computing, Risk Analysis.

**Membership**

Institute of Mathematical Statistics, Italian Statistical Society, CLAssification and Data Analysis Group (CLADAG)

**Computer skills**

R (advanced), latex (advanced), markdown (advanced), bash (intermediate), C++ (intermediate), git (intermediate), python (intermediate), mathematica (basic), matlab (basic), SQL (basic).

**Languages**

Italian (mother tongue), English (proficient), Spanish (good knowledge).