

Fabio Centofanti

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fabio.centofanti@kuleuven.be



EDUCATION **University of Naples Federico II**, Naples, Italy

Ph.D, XXXIII Cycle, **Industrial Engineering**

17th September 2021, *Optimum cum laude*

- Thesis title: *Statistical Methodologies of Functional Data Analysis for Industrial Applications.*
- Supervisors: Prof. Biagio Palumbo, Ph.D (University of Naples Federico II), Prof. Simone Vantini, Ph.D (Politecnico di Milano).

University of Naples Federico II, Naples, Italy

M.Sc., **Management Engineering**

October 2017, *110/110 cum laude*

- Thesis title: *A Functional Data Analysis Approach to Real-Time Monitoring of Ship Operational Conditions and Prediction of CO₂ Emissions.*
- Advisors: Prof. Biagio Palumbo, Ph.D, and Antonio Lepore, Ph.D.

University of Naples Federico II, Naples, Italy

B.Sc., **Management Engineering**

October 2015, *110/110 cum laude*

Music Conservatory San Pietro a Majella, Naples, Italy

M.A., **Principal Piano**

March 2015, *10/10 cum laude and special mention*

Science High School Leon Battista Alberti , Naples, Italy

Secondary School Diploma

July 2012, *100/100*

POSITIONS **Postdoctoral researcher** (Borsa di ricerca), Department of Electrical Engineering and Information Technology, University of Naples Federico II, Naples, Italy

Interpretable methods for functional data analysis and prediction – Metodi statistici interpretabili per l'analisi e la previsione di dati funzionali

15 September 2021 - 15 January 2022

Postdoctoral researcher (Assegno di ricerca), Department of Civil, Building, and Environmental Engineering, University of Naples Federico II, Naples, Italy

Application of Functional Clustering and Regression Techniques to the Urban Traffic Context

1 February 2022 - 31 October 2022

Postdoctoral researcher (Assegno di ricerca), Department of Industrial Engineering, University of Naples Federico II, Naples, Italy

Interpretable Statistical Methods for Monitoring Energy Consumption in Industrial Processes Based on the Analysis of Complex Data

1 December 2022 - 10 September 2023

Postdoctoral researcher (Ricercatore TD - A, SECS/S-02), Department of Industrial Engineering, University of Naples Federico II, Naples, Italy

11 September 2023 - 31 December 2024

Postdoctoral researcher Statistics and Data Science Section, the Department of Mathematics, KU Leuven, Belgium

1 January 2025 - ongoing

VISITING

Politecnico di Milano, Milan, Italy

MOX (Laboratory for Modeling and Scientific Computing), Department of Mathematics “Francesco Brioschi”

January 2018 - July 2018

Technical University of Denmark, Copenhagen, Denmark

Department of Applied Mathematics and Computer Science

January 2021 - April 2021

Katholieke Universiteit Leuven (KU Leuven), Leuven, Belgium

Department of Mathematics

- February 2023 - July 2023

- 17 March 2024 - 25 March 2024

- 13 September 2024 - 15 November 2024

ARTICLES IN SCIENTIFIC JOURNALS

1. Palumbo, B., Centofanti, F., and Del Re, F. (2020). Function-on-function regression for assessing production quality in industrial manufacturing. *Quality and Reliability Engineering International* 36(8), 2738-2753.
2. Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., and Vantini S. (2021). Functional regression control chart. *Technometrics* 63(3), 281-294.
3. Capezza, C., F. Centofanti, A. Lepore, A. Menafoglio, B. Palumbo, and S. Vantini (2021). Functional regression control chart for monitoring ship CO₂ emissions. *Quality and Reliability Engineering International* 38(3), 1519-1537
4. Capezza, C., Centofanti, F., Lepore, A. and Palumbo B. (2021). Functional clustering methods for resistance spot welding process data in the automotive industry. *Applied Stochastic Models in Business and Industry* 37(5), 908-925.
5. Capezza, C., Centofanti, F., Lepore, A., and Palumbo, B. (2021). A functional data analysis approach for the monitoring of ship CO₂ emissions. *Gestão & Produção*, 28(3).
6. Centofanti, F., Fontana, M., Lepore, A., and Vantini, S. (2022). Smooth lasso estimator for the function-on-function linear regression model. *Computational Statistics & Data Analysis*, 176, 107556.
7. Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., and Vantini, S. (2023). Adaptive smoothing spline estimator for the function-on-function linear regression model. *Computational Statistics*, 38(1), 191-216.
8. Capezza, C., Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., and Vantini, S. (2023). Funcharts: Control charts for multivariate functional data in R. *Journal of Quality Technology*, 55(5), 566-583.

9. Centofanti, F., Colosimo, B. M., Grasso, M. L., Menafoglio, A., Palumbo, B., and Vantini, S. (2023). Robust functional ANOVA with application to additive manufacturing. *Journal of the Royal Statistical Society Series C: Applied Statistics*, 72(5), 1210-1234.
10. Centofanti, F., Lepore, A., and Palumbo, B. (2024). Sparse and smooth functional data clustering. *Statistical Papers*, 65(2), 795-825.
11. Capezza, C., Centofanti, F., Lepore, A., and Palumbo, B. (2024). Robust Multivariate Functional Control Chart. *Technometrics*, 66(4), 531-547.
12. Centofanti, F., Hubert, M., Palumbo, B., and Rousseeuw, P. J. (2024). Multivariate Singular Spectrum Analysis by Robust Diagonalwise Low-Rank Approximation. Accepted for publication in *Journal of Computational and Graphical Statistics*.
13. Capezza, C., Capizzi, G., Centofanti, F., Lepore, A., and Palumbo, B. (2024). An adaptive multivariate functional EWMA control chart. *Journal of Quality Technology*, 57(1), 1-15.
14. Centofanti, F., A. Lepore, M. Kulahci, and M. P. Spooner (2024). Real-time monitoring of functional data. Accepted for publication in *Journal of Quality Technology*.

BOOK CHAPTERS

1. Colosimo, B. M., and Centofanti, F. (2022). Model Interpretability, Explainability and Trust for Manufacturing 4.0. In *Interpretability for Industry 4.0: Statistical and Machine Learning Approaches* (pp. 21-36).
2. Capezza, C., Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., and Vantini, S. (2022). Functional Regression Control Charts with an Application to Ship Fuel Consumption Monitoring. *Wiley StatsRef: Statistics Reference Online*, 1-10.

PREPRINTS

1. Centofanti, F., Hubert, M. and Rousseeuw, P.J. (2024). Robust Principal Components by Casewise and Cellwise Weighting. *arXiv preprint arXiv: 2408.13596*.
2. Capezza, C., Centofanti, F., Forcina, D., Lepore, A., and Palumbo, B. (2024). Functional Mixture Regression Control Chart. *arXiv preprint arXiv:2410.20138*.

CONFERENCE CONTRIBUTIONS AND TALKS (SPEAKER IN BOLD)

1. Bocchetti, D., Lepore, A., Palumbo, B., **Capezza, C.**, Centofanti, F., Normalized ship fuel-speed curve for monitoring CO₂ emissions by multi-sensor system data. *Abstract at the 17th Annual Conference of the European Network for Business and Industrial Statistics*, Naples, Italy, 9-14 September, 2017.
2. Bocchetti, D., Capezza, C., Centofanti, F., Lepore, A., Di Matteo, R., Palumbo, B., **Vitiello, L.** A statistical framework for monitoring, reporting and verification of CO₂ emissions in the maritime transport. *Abstract at the 17th Annual Conference of the European Network for Business and Industrial Statistics*, Naples, Italy, 9-14 September, 2017.
3. **Centofanti, F.**, Lepore, A., Menafoglio, A., Palumbo, B., Vantini, S. A functional regression control chart for profile monitoring. *Proceeding at the 49th Scientific Meeting of the Italian Statistical Society*, Palermo, Italy, 20-22 June, 2018.
4. Centofanti, F., **Lepore, A.**, Menafoglio, A., Palumbo, B., Vantini, S. Run-length performance estimation of the functional regression control char. *Abstract at the Ninth Workshop on Simulation*, Barcelona, Spain, 25-29 June, 2018 (invited).

5. Centofanti, F., **Lepore, A.**, Menafoglio, A., Palumbo, B., Vantini, S. Functional regression control chart for CO₂ emission monitoring. *Abstract at the 18th Annual Conference of the European Network for Business and Industrial Statistics (ENBIS)*, Nancy, France, 2–5 September, 2018 (invited).
6. **Centofanti, F.**, Fontana, M., Lepore, A., Vantini, S. Sparse estimation of function-on-function non-concurrent linear regression models. *Abstract at the Final CRoNoS Events and Workshop on Multivariate Data Analysis 2019*, Limassol, Cyprus, 14-16 April, 2019 (invited).
7. **Centofanti, F.**, Fontana, M., Lepore, A., Vantini, S. A sparse estimator for the function-on-function linear regression model. *Proceeding at SIS 2019 - Smart Statistics for Smart Applications*, Milan, Italy, 18-21 June, 2019 (invited).
8. Centofanti, F., **Lepore, A.**, Menafoglio, A., Palumbo, B., Vantini, S. Functional regression control chart. *Abstract at the 6th International Symposium on Statistical Process Monitoring*, Tunis, Tunisia, 8-12 July, 2019 (invited).
9. Palumbo, B., **Del Re F.**, Centofanti, F. Statistical engineering approach to additive manufacturing via functional data analysis. *Abstract at the 19th Annual Conference of the European Network for Business and Industrial Statistics (ENBIS)*, Budapest, Hungary, 2–4 September, 2019.
10. **Centofanti, F.**, Fontana, M. An interpretable estimator for the function-on-function linear regression model with application to the Canadian weather data. *Proceeding at the 50th Scientific Meeting of the Italian Statistical Society*, 2020 (invited).
11. **Centofanti, F.**, Lepore, A., Menafoglio, A., Palumbo, B., Vantini, S. Functional regression control chart with application to ship CO₂ emission monitoring *Abstract at the Virtual 2020 INFORMS Annual Meeting*, 8-13 November, 2020 (invited).
12. **Centofanti, F.**, Lepore, A., Menafoglio, A., Palumbo, B., Vantini, S. A spatially adaptive estimator for the function-on-function linear regression model with application to the Swedish Mortality dataset. *Proceeding at the 50th Scientific Meeting of the Italian Statistical Society*, 21-25 June, 2021.
13. **Centofanti, F.**, Robust functional ANOVA with application to Additive Manufacturing. *ENBIS Workshop: Interpretability for Industry 4.0*, Naples, Italy, 12-13 July, 2021 (invited).
14. **Centofanti, F.**, Lepore, A., Palumbo, B. Sparse and smooth cluster analysis of functional data. *Abstract at the ENBIS-21 online conference*, 13-15 September, 2021 (invited).
15. **Centofanti, F.**, Lepore, A., Kulahci, M., Spooner, M.P. Real-time monitoring of functional data. *Abstract at the ENBIS-21 online conference*, 13-15 September, 2021.
16. **Capezza C.**, Centofanti, F., Lepore A., Palumbo B. Analysis of resistance of spot welding process data in the automotive industry via functional clustering techniques. *Abstract at the ENBIS-21 online conference*, 13-15 September, 2021.
17. **Centofanti, F.**, Lepore, A., Palumbo, B. Sparse and smooth clustering for functional data. *Abstract at the 2021 INFORMS Annual Meeting*, 24-27 October, 2021 (invited).
18. **Capezza, C.**, Centofanti F., Lepore A., Menafoglio A., Palumbo B., and Vantini S. funcharts: An R package for the real-time monitoring of multivariate functional data. *Abstract at the 14th International Conference of the ERCIM*, London, UK, 18-20 December, 2021 (invited).
19. **Centofanti, F.**, Colosimo B. M., Grasso M. L., Menafoglio A. , Palumbo B., and Vantini S. Robust analysis of variance for functional data. *Abstract at the 2022 ISBIS Conference*, Napoli, Italy, 20-21 June, 2022 (invited).
20. Capezza C., Centofanti, F., **Lepore A.**, Palumbo B. Functional clustering techniques applied to resistance spot welding curves in the automotive industry 4.0. *Abstract at the 2022 ISBIS Conference*, Napoli, Italy, 20-21 June, 2022 (invited).

21. **Centofanti, F.**, Colosimo B. M., Grasso M. L., Menafoglio A. , B. Palumbo B., and Vantini S. A robust approach for functional ANOVA with application to additive manufacturing. *Proceeding at the 51th Scientific Meeting of the Italian Statistical Society*, Caserta, Italy, 22-24 June, 2022.
22. Capezza C., Centofanti, F., **Lepore A.**, Palumbo B. Interpretability in functional clustering with an application to resistance spot welding process in the automotive industry. *Proceeding at the 51th Scientific Meeting of the Italian Statistical Society*, Caserta, Italy, 22-24 June, 2022.
23. **Capezza, C.**, Centofanti F., Lepore A., Menafoglio A., Palumbo B., and Vantini S. An R package for the statistical process monitoring of functional data. *Proceeding at the 51th Scientific Meeting of the Italian Statistical Society*, Caserta, Italy, 22-24 June, 2022.
24. **Centofanti, F.**, Colosimo B. M., Grasso M. L., Menafoglio A. , Palumbo, B., and Vantini S. Functional analysis of variance in presence of outliers: the RoFANOVA approach. *Abstract at the 2022 ENBIS Conference*, Trondheim, Norway, 26-30 June, 2022.
25. **Capezza, C.**, Centofanti F., Lepore A., Menafoglio A., Palumbo B., and Vantini S. Statistical process control of multivariate functional data in R. *Abstract at the 2022 ENBIS Conference*, Trondheim, Norway, 26-30 June, 2022.
26. **Centofanti, F.**, Lepore, A., Palumbo, B. Sparse clustering of functional data. *Abstract at the 2022 European Conference on Data Analysis (ECDA)*, Naples, Italy, 14-16 September, 2022.
27. **Capezza, C.**, Centofanti F., Lepore A., Palumbo B. Robust Control Charts for Multivariate Functional Data. *Abstract at the 15th International Conference of the ERCIM*, London, UK, 17-19 December, 2022 (invited).
28. Capezza, C., **Centofanti, F.**, Lepore, A., Palumbo, B. Robust Profile Monitoring for Multivariate Functional Data. *Abstract at ICORS2023: International Conference on Robust Statistics - 2023*, Tolosa, Francia, 22-26 May, 2023 (invited).
29. **Centofanti, F.**, Lepore, A., Palumbo, B. Sparse clustering of functional data. *Proceeding at CLADAG 2023 14th Scientific Meeting*, Salerno, Italy, 11-13 September, 2023 (invited).
30. **Centofanti, F.**, Lepore, A., Palumbo, B. Sparse and smooth clustering of functional data. *Abstract at the 16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2023)*, Berlin, Germany, 13-15 December, 2023 (invited).
31. Centofanti, F., **Capezza, C.**, Forcina, D., Lepore, A., Palumbo, B. Control charts for functional data based on functional mixture regression. *Abstract at the 16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2023)*, Berlin, Italy, 13-15 December, 2023 (invited).
32. **Centofanti, F.**, Hubert, M., Palumbo, B., and Rousseeuw, P. J. RODESSA for robust multivariate singular spectrum analysis. *Proceeding at the 52nd Scientific Meeting of the Italian Statistical Society*, Bari, Italy, 17-20 June, 2024.
33. **Centofanti, F.**, Hubert, M., Palumbo, B., and Rousseeuw, P. J. Robust Multivariate Singular Spectrum Analysis by RODESSA. *Abstract at the 2nd INFORMS Conference on Quality, Statistics and Reliability*, Como, Italy, 1-4 July, 2024.
34. **Centofanti, F.**, Hubert, M., Palumbo, B., and Rousseeuw, P. J. Multivariate singular spectrum analysis by robust diagonalwise low-rank approximation. *Abstract at ICORS2024: International Conference on Robust Statistics - 2024*, Washington D.C., USA, 29 July-1 August, 2024 (invited).
35. **Centofanti, F.**, Hubert, M., Palumbo, B., and Rousseeuw, P. J. Multivariate Singular Spectrum Analysis by Robust Diagonalwise Low-Rank Approximation. *Abstract at the 24th Annual Conference of the European Network for Business and Industrial Statistics (ENBIS)*, Leuven, Belgium, 15-19 September, 2024 .

INVITED
SEMINARS

1. Sparse and smooth functional data clustering. *The fourth One World webinar organized by YoungStatS: Recent Advances in Functional Data Analysis*, 30 June, 2021.
2. Robust Diagonalwise Multivariate Singular Spectrum Analysis. *Research Institute for Statistics and Information Science*, University of Geneva, Geneva, Switzerland, 27 October, 2023.
3. Multivariate Singular Spectrum Analysis by Robust Diagonalwise Low-Rank Approximation. *Department of Mathematics*, KU Leuven, Leuven, Belgium, 31 October, 2024.

BOOKS

- Palumbo, B., Lepore, A., Capezza, C., Centofanti, F. Introduzione ai modelli di analisi multivariata a variabili latenti. Applicazioni per l'ingegneria. *Aracne editrice*, 2018.

OTHER
CONTRIBUTIONS

- Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., Vantini, S. Functional Regression Control Chart: a New Framework for Profile Monitoring. *Contribution to YoungStats: the blog of Young Statisticians Europe (YSE)*, 2020.

MEMBERSHIP
IN SOCIETIES

- SIS Italian Statistical Society 2018-today.
- ySIS - Young SIS 2018- today.
- European Network for Business and Industrial Statistics (ENBIS) 2018- today.
- Institute for Operations Research and the Management Science (INFORMS), Quality, Statistics, and Reliability (QSR) section 2022-today.

AWARDS,
GRANT, AND
HONOURS

Personal Awards:

- *Best graduate students with Bachelor degree in Management Engineering of the year 2015* (12 winners) from Dept. of Industrial Engineering - University of Naples Federico II (Apr 2016),
- Winner of the *Young Researcher Paper Award* at CLADAG 2023 14th Scientific Meeting, four winners, 400€.
- Winner of several piano competitions in southern Italy.

Grants:

- *ENBIS knowledge fund* for participation at the ENBIS 2024 conference, 500€ + free registration at the conference.
- *Grant for a scientific stay in Flanders 2024* of 4.356,00€ from Research Foundation -Flanders (FWO).
- *Grant for a scientific stay in Flanders 2023* of 5.082,00€ from Research Foundation – Flanders (FWO).
- Program of *Scambi Internazionali per mobilità di breve durata* of 1.949,50€ from University of Naples Federico II.

Honours:

- Member elected of the ySIS board for the 2022-2023.
- Member of the Local Organising Committee of the 2022 ISBIS Conference, Napoli, Italy, 20-21 June 2022.
- Member of the Program Committee of the Convegno Intermedio SIS – Ancona 21-23 giugno 2023.

Saturday 4th January, 2025