

# Fabio Centofanti

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CONTACT INFORMATION    [ROBUST@Leuven](mailto:ROBUST@Leuven)  
Section of Statistics and Data Science  
Department of Mathematics  
KU Leuven [fabio.centofanti@kuleuven.be](mailto:fabio.centofanti@kuleuven.be)

Personal website    —    [GitHub](#)    —    [ORCID](#)    —    [Google Scholar](#)



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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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. 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.
13. Centofanti, F., Lepore, A., Kulahci, M., and Spooner, M. P. (2025). Real-time monitoring of functional data. *Journal of Quality Technology*, 57(2), 135-152.
14. Centofanti, F., Lepore, A., and Palumbo, B. (2025). An Adaptive Multivariate Functional Control Chart. *Technometrics*, 67(4), 603-616.
15. Capezza, C., Centofanti, F., Forcina, D., Lepore, A., and Palumbo, B. (2025). Functional Mixture Regression Control Chart. Accepted for publication in *Annals of Applied Statistics*.
16. Centofanti, F., Hubert, M., Palumbo, B., and Rousseeuw, P. J. (2025). Multivariate Singular Spectrum Analysis by Robust Diagonalwise Low-Rank Approximation. *Journal of Computational and Graphical Statistics*, 34(1), 360-373.
17. Simonelli, F., Centofanti, F., Lepore, A., Pariota, L., Marzano, V., and Palumbo, B. (2025). Data-driven investigation of traffic spatial correlation through functional data analysis. *Transportation Research Part C: Emerging Technologies*, 174, 105088.
18. Centofanti, F. (2026). Statistical Process Monitoring Based on Functional Data Analysis. *WIREs Computational Statistics*, 18(1).

#### 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. (2023). Functional Regression Control Charts with an Application to Ship Fuel Consumption Monitoring. *Wiley StatsRef: Statistics Reference Online*, 1-10.
3. Capezza, C., Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., and Vantini, S. (2024). Statistical Process Monitoring Methods Based on Functional Data Analysis. In *Multimodal and Tensor Data Analytics for Industrial Systems Improvement*, Springer Optimization and Its Applications, vol. 211, pp. 41-55. Springer.

#### 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. Centofanti, F., Hubert, M. and Rousseeuw, P.J. (2025). Cellwise and Casewise Robust Covariance in High Dimensions. *arXiv preprint arXiv:2505.19925*.
3. Hirari, M., Centofanti, F., Hubert, M., and Van Aelst, S. (2025). Robust Multilinear Principal Component Analysis. *arXiv preprint arXiv:2503.07327*.

1. Bocchetti, D., Lepore, A., Palumbo, B., **Capezza, C.**, Centofanti, F., Normalized ship fuel-speed curve for monitoring CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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., M. 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.
36. **Centofanti, F.**, Hubert, M., and Rousseeuw, P. J. Cellwise and Casewise Robust Covariance in High Dimensions. *Talk at the International Conference on Robust Statistics 2025*, Stresa, Italy, 19–23 May, 2025.
37. **Centofanti, F.** Robust Principal Components by Casewise and Cellwise Weighting. *Contributed talk at the Leuven Statistics Days*, KU Leuven, Leuven, Belgium, 26–28 May, 2025.
38. **Centofanti, F.**, Hubert, M., and Rousseeuw, P. J. Cellwise and Casewise Robust Covariance in High Dimensions. *Talk at the 15th Scientific Meeting of CLADAG (Classification and Data Analysis Group)*, University of Naples Federico II, Naples, Italy, 8–10 September, 2025.
39. **Centofanti, F.**, Lepore, A., and Palumbo, B. An Adaptive Multivariate Functional Control Chart. *Talk at the 25th Annual Conference of the European Network for Business and Industrial Statistics (ENBIS)*, University of Piraeus, Piraeus, Greece, 14–18 September, 2025.

#### 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.
4. Cellwise and Casewise Robust Covariance in High Dimensions. *Department of Economics and Law*, University of Cassino, Cassino, Italy, 12 September, 2025.

#### 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.

#### 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.
- Classification and Data Analysis Group (CLADAG), 2026 -today.

AWARDS, GRANT, AND HONOURS	<p>Personal Awards:</p> <ul style="list-style-type: none"> <li>• <i>Best graduate students with Bachelor degree in Management Engineering of the year 2015</i>(12 winners) from Dept. of Industrial Engineering - University of Naples Federico II (Apr 2016),</li> <li>• Winner of the <i>Young Researcher Paper Award</i> at CLADAG 2023 14th Scientific Meeting, four winners, 400€.</li> </ul> <p>Grants:</p> <ul style="list-style-type: none"> <li>• <i>ENBIS knowledge fund</i> for participation at the ENBIS 2024 conference, 500€ + free registration at the conference.</li> <li>• <i>Grant for a scientific stay in Flanders 2024</i> of 4.356,00€ from Research Foundation -Flanders (FWO).</li> <li>• <i>Grant for a scientific stay in Flanders 2023</i> of 5.082,00€ from Research Foundation – Flanders (FWO).</li> <li>• Program of <i>Scambi Internazionali per mobilità di breve durata</i> of 1.949,50€ from University of Naples Federico II.</li> </ul> <p>Honours:</p> <ul style="list-style-type: none"> <li>• Member elected of the ySIS board for the 2022-2023.</li> <li>• Member of the Local Organising Committee of the 2022 ISBIS Conference, Napoli, Italy, 20-21 June 2022.</li> <li>• Member of the Program Committee of the Convegno Intermedio SIS – Ancona 21-23 giugno 2023.</li> <li>• National Scientific Qualification (ASN) as Associate Professor in Statistics – obtained in 2025.</li> </ul>
SOFTWARE PACKAGES	<ul style="list-style-type: none"> <li>• Capezza C., Centofanti F., Lepore A., Menafoglio A., Palumbo B., Vantini S. (2023). <i>funcharts: Functional Control Charts</i>. R package version 1.6.0.</li> <li>• Centofanti F. (2026). <i>slasso: S-LASSO Estimator for the Function-on-Function Linear Regression</i>. R package version 1.0.1.</li> <li>• Centofanti F. (2026). <i>rofanova: Robust Functional Analysis of Variance</i>. R package version 1.0.1.</li> <li>• Centofanti F., Lepore A., Menafoglio A., Palumbo B., Vantini S. (2023). <i>adass: Adaptive Smoothing Spline (AdaSS) Estimator for the Function-on-Function Linear Regression</i>. R package version 1.0.0.</li> <li>• Centofanti F. (2026). <i>sasfunclust: Sparse and Smooth Functional Clustering</i>. R package version 1.0.1.</li> </ul>
REFEREING ACTIVITY	<p>Referee for international peer-reviewed journals, including <i>Journal of Quality Technology</i>, <i>Quality Technology &amp; Quantitative Management</i>, <i>Statistical Papers</i>, <i>Computational Statistics</i>, <i>Statistics and Computing</i>, <i>Computational Statistics and Data Analysis</i>, <i>Statistical Analysis and Data Mining</i>, and <i>Journal of Computational and Graphical Statistics</i>.</p>
OTHER CONTRIBUTIONS AND INITIATIVE	<ul style="list-style-type: none"> <li>• Centofanti, F., Lepore, A., Menafoglio, A., Palumbo, B., Vantini, S. <i>Functional Regression Control Chart: a New Framework for Profile Monitoring</i>. <i>Contribution to YoungStats: the blog of Young Statisticians Europe (YSE)</i>, 2020.</li> <li>• Organizer of the <i>Seminar Series on Robust Statistics and Data Science</i> Section of Statistics and Data Science, Department of Mathematics, KU Leuven, 2025 - ongoing.</li> </ul>

Monday 19<sup>th</sup> January, 2026