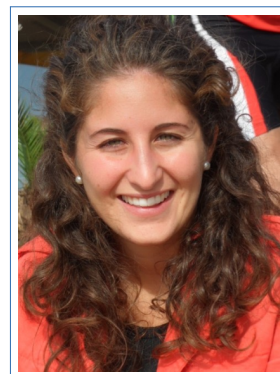


# Chiara Masci

## Academic Curriculum Vitae

Department of Economics, Management,  
and Quantitative Methods,  
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✉ [chiara.masci@unimi.it](mailto:chiara.masci@unimi.it)



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## Personal Information

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| Nationality    | Italian            |
| Date of Birth  | 11/11/1990         |
| Place of Birth | Milano             |
| Children       | One (born in 2025) |

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## Research Statement

I am **tenure-track researcher (RTT) in Statistics** at the Department of Economics, Management and Quantitative Methods at Università degli Studi di Milano. My track record comprises 25 journal articles, 1 collective book, 1 collective book chapter, 18 conference proceedings and 1 R package. I participated both as a speaker and invited speaker in more than 30 national and international conferences, I held 2 short courses as satellite events of international conferences and I took part at numerous funded national and international projects.

Throughout my academic journey, my primary research has been centered on the statistical analysis of **data with hierarchical structures**. Specifically, my expertise lies in **Mixed-Effects Models (MEMs)**, **Tree-based methods**, **Nonparametric statistics**, **Survival analysis**, **Maximum likelihood estimation**, and, more recently, **Cluster-Weighted Models**. My research in methodological statistics is deeply rooted in two key application areas: **Education** and **Health**. The inherent nested structure of data in these domains, such as students within schools or patients within hospitals, necessitates specialized treatment in data exploration, model inference, and prediction.

My significant contribution lies in the development of **innovative parametric and non-parametric mixed-effects models**, tailored to handle complex real-world data and to provide insights beyond the reach of existing methods.

During my PhD, I delved into MEMs focusing on the development of **tree-based MEMs** and **MEMs with discrete random effects**. The former integrates regression and classification trees and random forest techniques into MEMs to address non-linearities and variable interactions. The latter enhances classic MEMs by exploring latent patterns at the highest level of data grouping. Subsequently, I extended these frameworks to diverse areas, including **regression, classification, multivariate responses, time-to-event data, ordinal data, survival models and joint models for recurrent and terminal events**, enhancing the theoretical asset and exploring their potential in real-world applications. In my recent work, I have integrated multilevel modeling with **cluster-weighted models** to develop new tools for managing data with diverse sources of heterogeneity, motivated by the increasing interest in precision medicine, heterogeneity analysis, and the design of personalized interventions in many areas of application.

This research has facilitated **collaborations** with colleagues from other departments, with healthcare and education providers and policy makers and with colleagues **across Europe**. Extensive international visiting periods helped the establishment of a vibrant professional network.

My dedication underscores a commitment to **pushing the boundaries of both statistical research and its practical application**. I am focused on advancing statistical methodologies to effectively address complex data structures, produce interpretable results and unveil patterns that could distinctly help in understanding real world dynamics.

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## Present position

**February 2025 – present** – **Researcher Tenure-Track (RTT, SECS-S/01)**, *Department of Economics, Management, and Quantitative Methods, Università degli Studi di Milano, Italy*

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## Past position

**September 2020 – January 2025** – **Assistant Professor (Ricercatore TD Junior, SECS-S/01 L. 240/2010)**, *MOX – Dipartimento di Matematica, Politecnico di Milano, Italy*

**December 2018 – August 2020** – **Postdoc researcher (Assegnista di Ricerca L. 240/2010)**, *MOX – Dipartimento di Matematica, Politecnico di Milano, Italy*, Scholarship topic: "Learning Analytics"

**November 2015 – November 2019** – **PhD student in Mathematical Models and Methods in Engineering**, *MOX – Dipartimento di Matematica, Politecnico di Milano, Italy*, Supervisor: Anna Maria paganoni, PhD thesis title: "Semi-parametric mixed-effects models for assessing public education systems"

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## National Professional Qualification

**July 2023** – **National Academic Qualification as Associate Professor of Statistics (Abilitazione scientifica nazionale alla funzione di professore universitario di II fascia per il settore concorsuale 13/D1 Statistica, DD 553/2021)**

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## Education

- November 2015 – **PhD in Mathematical Models and Methods in Engineering, MOX – November 2019** *Dipartimento di Matematica, Politecnico di Milano, Italy*, Supervisor: Anna Maria paganoni, PhD thesis title: "Semi-parametric mixed-effects models for assessing public education systems"
- September 2009 – **Degree (Bachelor + MSc) in Mathematical Engineering, Politecnico December 2014** *di Milano, Italy, Curriculum: Statistics, 102/110*
- September 2004 – **Maturità Scientifica, Liceo Scientifico Bachelet, Abbiategrasso (MI) June 2009**

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## Visiting

- January 2018 – **Visiting PhD student, Department of Medicine, Cambridge University March 2018** (UK), *Topic: Modelling dependence in single-cell RNA-seq data*, Hosting scholar: Prof. Leonardo Bottolo
- February 2017 **Visiting PhD student, Department of Economics and Management, Lancaster University (UK)**, *Topic: Analysis of student and school performance in the OECD-PISA via a machine learning approach*, Hosting scholar: Prof. Geraint Johnes
- January 2017 **Visiting at Department of Economics and Business, Katholieke Universiteit Leuven (BE)**, *Visiting period for EU H2020 EdEN project (<https://cordis.europa.eu/project/id/691676>)*, Prof. Kristof De Witte
- April 2015 – June 2015 **Visiting scholar at Department of Economics and Business, Katholieke Universiteit Leuven (BE)**, *Topic: The influence of school size and school managerial practices on students' performances, an efficiency analysis*, Hosting scholar: Prof. Kristof De Witte
- September 2013 – **Erasmus program at Universidade Nova de Lisboa (PT), One semester January 2014** *exams: Bayesian statistics, Optimization, Technical physics*

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## Awards and Recognition

- September 2018 **Award "Highly recommended paper" for the paper "Non-parametric Mixed-effects Models For Unsupervised Classification of Italian Schools"**, *Workshop on Efficiency in Education, Health and other Public Services, Huddersfield (UK)*

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## Conference/Workshop Organization

- April 2025 **Member of the organizing committee** of SDS (Statistics and Data Science) 2025 conference, <https://sds2025.sis-statistica.it/>
- November 2024 **Member of the organizing committee** of Workshop Math for Health - Dipartimento di Matematica, *Politecnico di Milano*, <https://www.mate.polimi.it/events/M4H24/>
- June 2024 **Member of the organizing and scientific committee** of Workshop "Gender Balance in Accademia: Sfide e Strategie", *Politecnico di Milano*
- September 2017 **Member of the scientific and organizing committee** of Young CLADAG - Satellite event of CLADAG conference 2017, *Politecnico di Milano*, <https://cladag2017.unimib.it/youngcladag-2/>

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## Refereeing activity

Referee for International Scientific Journals

**Advances in Data Analysis and Classification**

**Applied Economics**

**Automatika**

**European Journal of Operational Research**

**High Education Quarterly**

**Italian Journal of Applied Statistics**

**Journal of Biostatistics**

**Journal of Statistical Computation and Simulation**

**Large-scale Assessments in Education**

**PLOS ONE**

**Scientific reports**

**Socio-Economic Planning Science**

**Stat**

**Statistical Methods & Applications**

Referee of MSc theses in

**Mathematical Engineering**, *Politecnico di Milano*

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## Scientific production

Journal articles in preparation (pre-print)

Caldera, L., Cappozzo, A., **Masci, C.**, Forlani, M., Antonelli, B., Leoni, O., Paganoni, A. M., Ieva, F. (2025+) ‘Cluster-weighted modeling of lifetime hierarchical data for profiling COVID-19 heart failure patients’. *arXiv preprint arXiv:2507.12230*

Nicolussi, F.; **Masci, C.** (2025+). ‘Stratified Multilevel Graphical Models: Examining Gender Dynamics in Education’. *MOX-Report No. 14/2025*

Ragni, A.; Romani, G., **Masci, C.** (2025+). ‘TimeDepFrail: Time-Dependent Shared Frailty Cox Models in R’. *arXiv preprint arXiv:2501.12718*

Bergonzoli, G.; Rossi, L.; **Masci, C.** (2025+). ‘Ordinal Mixed-Effects Random Forest’. *arXiv preprint arXiv:2406.03130*

**Masci, C.**, Spreafico, M., Ieva, F. (2025+). ‘Joint modelling of recurrent and terminal events with discretely-distributed non-parametric frailty: application on re-hospitalizations and death in heart failure patients’. *arXiv preprint arXiv:2311.04103*

Journal articles

Ragni, A.; **Masci, C.**; Paganoni, A.M. (2026). ‘Analysis of Higher Education Dropouts Dynamics through Multilevel Functional Decomposition of Recurrent Events in Counting Processes’. *Journal of the Royal Statistical Society: Series C*, in press, <https://doi.org/10.1093/jrsssc/qlag015>

- Asadi, F., Homayounfar, R., Mehrali, Y., **Masci, C.** & Zayeri, F. (2025). 'Innovative Statistical method for longitudinal and hierarchical data modeling: The GMEXGBoost Method'. *BMC Medical Research Methodology*, in press, <https://doi.org/10.1186/s12874-025-02751-7>
- Karimi Ghahfarokhi, M., Zayeri, F., Khalili, D., **Masci, C.**, Sheidaei, A., Mehrali, Y., Masaebi, F., Mehrabi, Y. (2025). 'Application of generalized linear mixed effects random forest for identifying risk factors of prediabetes in Tehran Lipid and Glucose Study'. *Scientific Reports*, 15(1), 41361, <https://doi.org/10.1007/s12351-025-00972-8>
- Lurani Cernuschi, A.; **Masci, C.**; Corso, F.; Muccini, C.; Ceccarelli, D.; Galli, L.; Ieva, F.; Paganoni, A.M.; Castagna, A. (2025). 'A neural-network approach for predicting time to cardiovascular diseases in HIV patients based on real-world data'. *Operational research*, <https://doi.org/10.1007/s12351-025-00972-8>
- Caldera, L.; **Masci, C.**; Cappozzo, A.; Forlani, M.; Antonelli, B.; Leoni, O. and Ieva, F. (2025). 'Uncovering mortality patterns and hospital effects in COVID-19 heart failure patients: a novel Multilevel logistic cluster-weighted modeling approach'. *Biometrics*, 81(2), <https://doi.org/10.1093/biomtc/ujaf046>
- Lema, M. L. D.; **Masci, C.**, Soncin, M.; Agasisti, T. (2025). 'Risky decline? Exploring the determinants of pupil's proficiency development over time.' *Socio-Economic Planning Sciences*, 99, 102207.
- Ragni, A.; **Masci, C.**, Ieva, F.; Paganoni, A.M. (2025). 'A Statistical Significance-Based Approach for Clustering Grouped Data via Generalized Linear Model with Discrete Random Effects'. *Journal of the Royal Statistical Society: Series A*, <https://doi.org/10.1093/jrjssa/qnaf007>
- Asadi, F.; Homayounfar, R.; Mehrali, Y.; **Masci, C.**; Yaseri, M.; Talebi, S.; Zayeri, F. (2024). 'Detection of cardiovascular disease cases using advanced tree-based machine learning algorithms'. *Scientific Reports*, 14, 22230 (2024), <https://doi.org/10.1038/s41598-024-72819-9>
- Masci, C.**; Ieva, F.; Paganoni, A.M. (2024). 'Inferential Tools for Assessing Dependence Across Response Categories in Multinomial Models with Discrete Random Effects'. *Journal of Classification*, <https://link.springer.com/article/10.1007/s00357-024-09466-2>, 1-29
- Ragni, A., Ippolito, D., **Masci, C.** (2024). 'Assessing the Impact of Hybrid Teaching on Students' Academic Performance via Multilevel Propensity Score-based techniques'. *Socio-Economic Planning Sciences*, <https://doi.org/10.1016/j.seps.2024.101824>
- Masci, C.**, Cannistrà, M., & Mussida, P. (2023). Modelling time-to-dropout via shared frailty Cox models. A trade-off between accurate and early predictions. *Studies in Higher Education*, 1-19.
- Bertoletti A., Cannistrà M., Diaz Lema M., **Masci, C.**, Mergoni A., Rossi L., Soncin M. (2023). 'The Determinants of Mathematics Achievement: A Gender Perspective Using Multilevel Random Forest'. *Economies* 11:32, DOI <https://doi.org/10.3390/economies11020032>.
- Masci, C.**, Ieva, F. and Paganoni, A.M. (2022). 'Semiparametric multinomial mixed-effects models: a university students profiling tool.' *The Annals of Applied Statistics*, 16 (3): 1608 - 1632.

Fiz, F., **Masci, C.**, Costa, G., Sollini, M., Chiti, A., Ieva, F., Torzilli, G. & Viganò, L. (2022) ‘LPET/CT-based radiomics of mass-forming intrahepatic cholangiocarcinoma improves prediction of pathology data and survival’ *European Journal of Nuclear Medicine and Molecular Imaging*, pp 1-14.

Cannistrà M., **Masci, C.**, Ieva, F., Agasisti T. and Paganoni, A.M. (2021). ‘Early-predicting dropout of university students: an application of innovative machine learning and multilevel statistical techniques’. *Studies in Higher Education*, 1-22, DOI:10.1080/03075079.2021.2018415.

Fontana, L., **Masci, C.**, Ieva, F. and Paganoni, A.M. (2021). ‘Performing learning analytics via generalized mixed-effects trees’. *Data*, 6, 74. <https://doi.org/10.3390/data6070074>.

Costa, G., Cavinato, L., **Masci, C.** et al. (2021). ‘Virtual Biopsy for Diagnosis of Chemotherapy-Associated Liver Injuries and Steatohepatitis: A Combined Radiomic and Clinical Model in Patients with Colorectal Liver Metastases’. *Cancers*, DOI: <https://doi.org/10.3390/cancers13123077>.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A.M. (2021). ‘Evaluating class and school effects on the joint achievements in different subjects: a bivariate semiparametric mixed-effects model’. *Computational Statistics*, 36(4), 2337-2377.

Pellagatti M., **Masci, C.**, Ieva, F. and Paganoni, A.M. (2021). ‘Generalized mixed-effects random forest: A flexible approach to predict university student dropout’. *Statistical Analysis and Data Mining: The ASA Data Science Journal*, 14(3), 241-257.

**Masci, C.**, Ieva, F. and Paganoni, A.M. (2018). ‘Semi-parametric mixed-effects models for unsupervised classification of Italian schools’. *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 182.4, pp. 1313-1342.

Schiltz, F., **Masci, C.**, Agasisti, T. and Horn, D. (2018). ‘Using regression tree ensembles to model interaction effects: a graphical approach’. *Applied Economics*, 50(58), pp. 6341-6354.

**Masci, C.**, Agasisti, T. and Johnes, G. (2018). ‘Student and school performance across countries: A machine learning approach’. *European Journal of Operational Research*, 269(3), pp. 1072-1085.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A.M. (2017). ‘Bivariate multi-level models for the analysis of mathematics and reading pupils’ achievements’. *Journal of Applied Statistics* 44.7, pp. 1296-1317.

**Masci, C.**, De Witte, K. and Agasisti, T. (2016). ‘The influence of school size, principal characteristics and school management practices on educational performance: An efficiency analysis of Italian students attending middle schools’. *Socio-Economic Planning Sciences* (61), pp. 52-69.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A. M. (2016). ‘Does class matter more than school? Evidence from a multilevel statistical analysis on Italian junior secondary school students’. *Socio-Economic Planning Sciences* (54), pp. 47-57.

### Books and Books chapters

**Masci, C.** (2019). ‘Semi-parametric mixed-effects models for assessing public education systems’. *Doctoral dissertation, Italy*.

Agasisti, T., Ieva, F., **Masci, C.**, Paganoni, A. M. and Soncin, M. (2017). ‘Using Statistical Analytics to Study School Performance through Administrative Datasets’. *Data Analytics Applications in Education. Auerbach Publications*, pp. 183-209.

Ieva, F., **Masci, C.** and Paganoni, A.M. (2016). ‘Laboratorio di statistica con R. 2/Ed. con MyLab e eText’. *Pearson, Ediz. mylab. Con espansione online.*

#### Conference proceedings

**Masci, C.** and Cappozzo, A. (2025). ‘A novel cluster-weighted multilevel model for two-levels clustering’. *ECOSTA Econometrics and Statistics, ISBN 978-9925-7812-9-4, CFE-CM Statistics Book of Abstract 2025.*

Nicolussi, F., **Masci, C.**, Bertarelli, G. and Mecatti, F. (2025). ‘Learning Procedure for Partially Observed Variables’. *Scientific Meeting of the Italian Statistical Society. Springer Nature Switzerland.*

Nicolussi, F. and **Masci, C.**(2024). ‘Stratified Multilevel Graphical Models: a gender perspective in Education’. *Methodological and Applied Statistics and Demography II, SIS 2024, Short Papers, Solicited Sessions. Pearson, ISBN 978-3-031-64350-7 - pp. 657-662.*

**Masci, C.**, Cappozzo, A., Ieva, F., Leoni, O., Forlani, M.m Antonelli, B. and Paganoni, A.M. (2024). ‘Model-Based Clustering of Nested Lifetime Data: Profiling COVID-19 Heart Failure Patients’. *Methodological and Applied Statistics and Demography IV, SIS 2024, Short Papers, Contributed Sessions 2. Pearson, ISBN 978-3-031-64446-7 - pp. 240-245.*

Ragni, A.,**Masci, C.** and Paganoni, A.M. (2024). ‘Analysis of Higher Education Dropout Dynamics Through Functional Decomposition of recurrent Events on Time-to-Event Processes’. *Methodological and Applied Statistics and Demography IV, SIS 2024, Short Papers, Contributed Sessions 2. Pearson, ISBN 978-3-031-64446-7 - pp. 461-466.*

**Masci, C.**, Spreafico, M. and Ieva, F. (2023). ‘Joint modelling of hospitalizations and survival in Heart Failure patients: a discrete non parametric frailty approach’. *Book of Short Papers SIS 2023. Pearson, ISBN 978-3-031-64446-7 - pp. 375-380.*

Ragni, A., **Masci, C.**, Ieva, F. and Paganoni, A.M. (2023). ‘A novel statistical-significance based semi-parametric GLMM for clustering countries standing on their innumeracy levels’. *Book of Short Papers SIS 2023. Pearson, ISBN 9788891935618AAVV - pp. 939-944.*

**Masci, C.**, Ieva, F., Paganoni A.M. (2022). ‘Multinomial Multilevel Models with Discrete Random Effects: a Multivariate Clustering Tool.’ *IFCS 2022 - Book of Abstract. p. 154, ISBN: 978-989-98955-9-1, Oporto.*

**Masci, C.**, Giovio, M. and Mussida, P. (2022). ‘Survival models for predicting student dropout at university across time’. *Book of Short Papers of Education and New Developments 2022 – Volume I. inScience Press, ISBN 978-989-53614-3-4 - pp. 203-207.*

**Masci, C.**, Giovio, M. and Mussida, P. (2022). ‘Modelling time to university dropout by means of time-dependent frailty COX PH models’. *Book of Short Papers SIS 2022. Pearson, ISBN 978-889-19323-1-0 - pp. 1771-1776.*

**Masci, C.**, Ieva, F. and Paganoni, A.M. (2021). ‘Multinomial semiparametric mixed-effects model for profiling engineering university students’. *Book of Short Papers SIS 2021*. Pearson, ISBN 9788891927361 - pp. 1481-1486.

F. Ieva, G. Baroni, L. Cavinato, **Masci, C.**, G. Costa, F. Fiz, A. Chiti and L. Vigano’ (2021). ‘Virtual biopsy in action: a radiomic-based model for CALI prediction’. *Book of Short Papers SIS 2021*. Pearson, ISBN 9788891927361 - pp. 1438-1443.

Cannistrà M., Agasisti T., Paganoni, A.M. and **Masci, C.** (2021). ‘How Much Tutoring Activities May Improve Academic Careers of At-Risk Students? An Evaluation Study’. *Book of Short Papers SIS 2021*. Pearson, ISBN 9788891927361 - pp. 318-323.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A.M. (2019). ‘Bivariate semi-parametric mixed-effects models for classifying the effects of Italian classes on multiple student achievements’. *Cladag 2019 Book of Short Papers*. ISBN: 9788883171086.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A.M. (2019). ‘Classification of Italian classes via bivariate semiparametric multilevel models’. *Book of Short Papers SIS 2019*. Pearson, pp. 971-976.

**Masci, C.**, Agasisti, T., Ieva, F. and Paganoni, A.M. (2018). ‘Unsupervised clustering of Italian schools via non-parametric multilevel models’. *Book of Short Papers SIS 2018*. Pearson, pp. 1-6.

**Masci, C.**, Agasisti, T., Ieva, F. and Paganoni, A.M. (2017). ‘Nonparametric mixed-effects model for unsupervised classification in the Italian education system’. *Cladag 2017 Book of Short Papers*. Universitas Studiorum.

**Masci, C.**, Ieva, F., Agasisti, T. and Paganoni, A. M. (2016). ‘Analysis of pupils’ INVALSI achievements by means of bivariate multilevel models’. *Book of Short Papers SIS 2016*. Pearson, pp. 1-6.

### Open-Source Software

Ragni, A., Romani, G., **Masci, C.** (2024). ‘**TimeDepFrail**: Time-Dependent Shared Frailty Cox Models in R’, *R package*, <https://cran.r-project.org/web/packages/TimeDepFrail/index.html>

**Masci, C.**, Ragni, A., Ieva, F., Paganoni, A.M. (2024). ‘**SpMEMs**: an R package for semi-parametric mixed-effects models’, *R package*, Work in progress

### Book editor

**De Battisti F., Leorato S., Masci C., Nicolussi F.**, *Statistical Methods for Data Analysis and Decision Sciences (SDS 2025)*, Springer, Switzerland  
<https://link.springer.com/book/9783032189875>, print ISBN: 978-3-032-18987-5, eBook ISBN: 978-3-032-18988-2

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## Talks and Seminars

### Invited seminars

September 2024 **Invited seminar at Department of Management, Economics and Industrial Engineering of Politecnico di Milano (IT)**, Title: *A two-levels clustering tool to evaluate student-specific education production function*

- November 2023 **Invited seminar at Department of Economics at Università di Modena e Reggio Emilia (IT)**, *Title: Tree-based mixed-effects models for the assessment of education systems*
- November 2020 **Invited seminar at MOX, Department of Mathematics, Politecnico di Milano (IT)**, *Title: Semiparametric multinomial mixed-effects models: a university students profiling tool*
- February 2017 **Invited seminar at Huddersfield Business School at The University of Huddersfield (UK)**, *Title: Regression trees in education: explaining the added value of Hungarian schools in a flexible way*
- May 2015 **Invited seminar at School of Business and Economics, Maastricht University (NL)**, *Title: Bivariate Multilevel Models for the Analysis of Reading and Maths Pupils' Achievements*

#### [Invited talks at Conferences](#)

- December 2025 **Invited speaker at CFE-CM Statistics 2025, Session "Complex data uncovered: methodology and practical insights"**, *Title: A novel cluster-weighted multilevel model for two-levels clustering*, London (UK)
- September 2021 **Invited speaker at XLV Annual Meeting of the Italian Association for Mathematics Applied to Economic and Social Sciences (AMASES)**, *Title: Semiparametric multinomial multilevel models for predicting higher education dropout*, On-line
- July 2021 **Invited speaker at 31<sup>st</sup> European Conference on Operational Research**, *Title: Profiling university students through an innovative semiparametric mixed-effects multinomial model*, Athens (EL)
- December 2020 **Invited speaker at ERCIM 2020 – CMStatistics 2020**, *Title: Semiparametric multinomial mixed-effects linear models - An EM algorithm for predicting student dropout*, On-line - London (UK)
- September 2019 **Invited speaker at CLADAG 2019 – Classification and Data Analysis Group**, *Title: Bivariate semi-parametric mixed-effects models for classifying the effects of Italian classes on multiple student achievements*, Cassino (IT)

#### [Talks at Conferences](#)

- January 2026 **Lisbon Economics and Statistics of Education (LESE)**, *Title: Exploring Hidden Patterns in Education via a Two-Levels Cluster-Weighted Model*, Lisbon (PT)
- September 2024 **Workshop on Efficiency in Education, Health and other Public Services**, *Title: A two-levels clustering tool to evaluate student-specific country effect on education*, Milano (IT)
- June 2024 **Italian Statistical Society (SIS) Conference 2024**, *Title: Model-based clustering of nested lifetime data: profiling COVID-19 heart failure patients*, Bari (IT)
- January 2024 **LESE - Lisbon Economics and Statistics of Education**, *Title: Time-Varying Shared Frailty Cox Models for the Analysis of University Students Dropout*, Lisbon (PT)
- June 2023 **Italian Statistical Society (SIS) Conference 2023**, *Title: Joint modelling of hospitalizations and survival in Heart Failure patients: a discrete non parametric frailty approach*, Ancona (IT)

- March 2023 **8<sup>th</sup> LEER Conference on Education Economics**, Title: *Modelling time-to-dropout via Shared Frailty Cox Models: a trade-off between accurate and early predictions*, Leuven (BE)
- July 2022 **IFCS 2022 - Classification and Data Science in the Digital Age**, Title: *Multinomial multilevel models with discrete random effects: a multivariate clustering tool*, July 2022, Oporto (PT)
- June 2022 **Italian Statistical Society (SIS) Conference 2022**, Title: *Modelling time to university dropout by means of time-dependent frailty COX models*, Caserta (IT)
- June 2022 **END - Education and New Developments 2022**, Title: *Survival models for predicting student dropout at university across time*, Madeira (PT)
- January 2022 **LESE - Lisbon Economics and Statistics of Education**, Title: *Time-dependent frailty COX models for predicting student dropout at university*, Lisbon (PT)
- June 2021 **Italian Statistical Society (SIS) Conference 2021**, Title: *Multinomial semiparametric mixed-effects model for profiling engineering university students*, On-line - PISA (IT)
- September 2019 **7<sup>th</sup> International Workshop on Efficiency in Education, Health and other Public Services**, Title: *Performing Learning Analytics via Generalized Mixed-Effects Trees*, Barcelona (SP)
- July 2019 **European Meeting of Statisticians (EMS) 2019**, Title: *Evaluating class effects on the joint student achievements in different subjects: a bivariate semi-parametric mixed-effects model*, Palermo (IT)
- June 2019 **Italian Statistical Society (SIS) Conference 2019**, Title: *Classification of Italian classes via bivariate semiparametric multilevel models*, Milan (IT)
- April 2019 **Workshop on Efficiency in Education**, Title: *Analysis of university students dropout via Generalized Mixed-Effects Trees*, Leuven (BE)
- January 2019 **LESE - 5<sup>th</sup> Lisbon Research Workshop on Economics, Statistics and Econometrics of Education**, Title: *Performing Learning Analytics via Generalized Mixed-Effects Trees*, Lisbon (PT)
- November 2018 **International Conference on Education Economics**, Title: *Bivariate semi-parametric mixed-effects models for classification of Italian classes*, Budapest (HU)
- September 2018 **Workshop on Efficiency in Education, Health and other Public Services**, Title: *EM algorithm for non parametric mixed-effects models. An application to INVALSI data for unsupervised classification of schools*, Huddersfield (UK)
- June 2018 **Italian Statistical Society (SIS) Conference 2018**, Title: *Unsupervised clustering of Italian schools via non-parametric multilevel models*, Palermo (IT)
- June 2018 **International Society for Nonparametric Statistics (ISNPS) Conference 2018**, Title: *EM algorithm for non-parametric mixed-effects models. An application to INVALSI data for unsupervised classification of schools*, Salerno (IT)
- March 2018 **Workshop on Efficiency in Education**, Title: *Non-parametric mixed-effects model for unsupervised classification of Italian schools*, Leuven (BE)
- November 2017 **II seminario "I dati INVALSI: uno strumento per la ricerca"**, Title: *Bivariate multilevel models for the analysis of pupils achievements*, Firenze (IT)

- October 2017 **Workshop on Efficiency in Education**, Title: *Using Machine Learning to Model Interaction Effects in Education: a Graphical Approach*, Budapest (HU)
- September 2017 **CLADAG 2017 – Classification and Data Analysis Group**, Title: *Non parametric mixed-effects model for unsupervised classification in the Italian education system*, Milan (IT)
- June 2017 **Italian Statistical Society (SIS) Conference 2017**, Title: *Student and school performance in the OECD - a Machine learning approach*, Florence (IT)
- March 2017 **LEER workshop on Education Economics**, Title: *A flexible analysis of PISA 2015 data across countries, by means of Multilevel Trees and Boosting*, Leuven (BE)
- January 2017 **Fourth Lisbon Research workshop, Economics, Statistics and Econometrics of Education**, Title: *Explaining school value-added in a flexible way: An application of regression trees*, Lisbon (PT)
- June 2016 **Workshop on Efficiency in Education**, Title: *Seeing the forest for the trees. Explaining the added value of schools using a flexible approach*, Milan (IT)
- June 2016 **Italian Statistical Society (SIS) Conference 2016**, Title: *Analysis of pupils' INVALSI achievements by means of bivariate multilevel models*, Salerno (IT)
- November 2015 **Workshop on Efficiency in Education**, Title: *The influence of school size and school managerial practices on students' performances: an efficiency analysis*, Leuven (BE)
- June 2015 **LECCEWEPA 2015 – Workshop on the Econometrics and Statistics of Efficiency Analysis: Recent Developments and Perspectives**, Title: *Bivariate multilevel models for the analysis of mathematics and reading pupils' achievements*, Lecce (IT)

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## Teaching & Mentoring Activity

### Courses for PhD or Researchers

- May 2019 Lecture "How do statistical models explain student learning?" at **Comunicare la ricerca scientifica**, Phd course at Politecnico di Milano, (2 hours)

### Postgraduate Master Courses

- 2023 Data Scientist School Ed. 6-7, MIP - Graduate School of Management Politecnico di Milano, Course for GENERALI, (8 hours)

### MSc Courses

- 2025 **Advanced Multivariate Statistics**, MSc course at Data Science for Economics and Health, Università degli Studi di Milano, Editions 2025-2026, (40 hours)
- 2025 **Coding for Data Science and Data Management**, MSc course at Data Science for Economics and Health, Università degli Studi di Milano, Editions 2025-2026, (20 hours)
- 2025 **Statistica per l'analisi dei dati**, MSc course at Economia aziendale, diritto e governance d'impresa, Università degli Studi di Milano, Editions 2024-2025, (8 hours (pre-maternity leave))
- 2022-2024 Lecture "Mixed-effects models" at **Applied Statistics**, MSc course at Mathematical Engineering, Politecnico di Milano, Laboratory session(4 hours)

### BSc Courses

- 2025 **Advanced Data Analysis**, BSc course at *International Politics, Law and Economics (IPLE)*, Università degli Studi di Milano, Editions 2024-2025, (20 hours)
- 2024 **Statistics**, BSc course at *Mechanical Engineering*, Politecnico di Milano, Editions 2024-2025, (5 CFU)
- 2021-2024 **Business Data Analytics**, BSc course at *Mathematical Engineering*, Politecnico di Milano, Editions 2021-2022, 2022-2023, 2023-2024, (5 CFU)
- [Teaching assistant and laboratory sessions](#)
- 2021-2024 **Modelli e Metodi dell’Inferenza statistica**, BSc course in *Mathematical Engineering*, Politecnico di Milano, Teaching assistant and R laboratory, Editions 2020-2021, 2021-2022, 2022-2023, 2023-2024 (10 CFU)
- 2019-2024 **Applied Statistics**, Tutor of *Applied Statistics projects*, MSc course in *Mathematical Engineering*, Politecnico di Milano, Editions: 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024
- 2020 **Business Data Analytics**, BSc course in *Management Engineering*, Politecnico di Milano, Teaching assistant and R laboratory, Editions 2020-2021 (5 CFU)
- 2019-2020 **Statistics**, *Tutoring activities for PoliMi students*, Editions: 2019-2020
- 2016-2019 **Probability and mathematics statistics**, BSc course in *Management Engineering*, Politecnico di Milano, Teaching assistant, Editions 2016-2017, 2017-2018, 2018-2019, 2019-2020 (5 CFU)
- 2015-2016 **Basics of statistics and biomedical signals**, BSc course in *Biomedical Engineering*, Politecnico di Milano, R laboratory sessions, Editions 2015-2016, 2016-2017 (5 CFU)
- 2015 **Statistics**, BSc course in *Economic and management*, Università degli studi di Milano, Teaching assistant, Editions 2015-2016 (5 CFU)
- [PhD thesis co-advisor](#)
- 2021-2024 Alessandra Ragni. **Statistical Methods for Hierarchical and Recurrent Event Data in Learning and Healthcare Analytics**, *PhD in Data Analytics and Decision Sciences - Politecnico di Milano*
- [Master thesis advisor](#)
- 2024 Chiara Danesi. **Time-varying Cox shared frailty models for the prediction of university students dropout**, *Ingegneria Matematica - Politecnico di Milano*.
- Alessio Frezza. **Algorithmic Improvements for Multilevel Logistic Cluster-Weighted Model Estimation: Development and Evaluation of New Variants**, *Ingegneria Matematica - Politecnico di Milano*
- Greta Camplese. **Semi-parametric cluster-weighted multilevel models for two-levels clustering**, *Ingegneria Matematica - Politecnico di Milano*

- Francesca Pessina. **Profiling Healthcare Providers in Lombardia via Semi-Parametric Multilevel Generalized and time-to-event Models**, *Ingegneria Matematica - Politecnico di Milano*
- Alessandra Sala. **Multilevel Multivariate and Hurdle Models to predict academic shortterm performance through online admission test**, *Ingegneria Matematica - Politecnico di Milano*
- 2023 Giulia Bergonzoli. **Ordinal Mixed-Effects Random Forest: an innovative statistical method to perform learning analytics**, *Ingegneria Matematica - Politecnico di Milano*
- Luca Caldera. **Multilevel logistic cluster-weighted model for profiling and clustering of heart failure patients in Lombardy region using administrative database**, *Ingegneria Matematica - Politecnico di Milano*
- Giulia Romani. **Time-Varying Shared Frailty Cox Models for the Analysis of University Students Dropout**, *Ingegneria Matematica - Politecnico di Milano*
- Alessio Tranchida. **Multinomial multilevel models for predicting Master students careers at Politecnico di Milano**, *Ingegneria Matematica - Politecnico di Milano*
- Davide Lo Piccolo. **SpMEMs: an R package for semiparametric mixed-effects models**, *Ingegneria Matematica - Politecnico di Milano*
- Daniel Ippolito. **Blended teaching evaluation through Multilevel Propensity Score**, *Ingegneria Matematica - Politecnico di Milano*
- 2022 Mirko Giovio. **Survival models for predicting student dropout at university across time**, *Ingegneria Matematica - Politecnico di Milano*
- 2021 Agostino Lurani. **A neural network approach to survival analysis with time-dependent covariates for modelling time to Cardiovascular diseases in HIV patients**, *Ingegneria Matematica - Politecnico di Milano*
- Luca Pirazzini. **Time-Invariant and Time-Dependent Cox Models for Predicting Student Dropout at University**, *Ingegneria Matematica - Politecnico di Milano*
- [Master thesis co-advisor](#)
- 2025 Ardiana Prekazi. **Joint Modelling of Re-hospitalizations and Mortality Through Discrete Bivariate Frailty in Heart Failure Patients**, *Ingegneria Matematica - Politecnico di Milano*
- Gilda Matteucci. **Integration of Radiomic Features and Intra-Patient Heterogeneity of Colorectal Cancer Metastases for Prognostic Modeling**, *Ingegneria Matematica - Politecnico di Milano*
- Ardiana Prekazi. **Joint Modelling of Re-hospitalizations and Mortality Through Discrete Bivariate Frailty in Heart Failure Patients**, *Ingegneria Matematica - Politecnico di Milano*
- 2024 Sofia Moroni. **Non-Parametric Survival Learning for Prognostic Modeling Integrating**, *Ingegneria Matematica - Politecnico di Milano*
- 2023 Lorenzo Angiolini. **Model-based clustering of lifetime data with frailties and random covariates for the profiling of COVID-19 heart failure patients**, *Ingegneria Matematica - Politecnico di Milano*

- 2022 Riccardo Scaramuzza. **Joint modelling of hospitalizations and survival in Heart Failure patients: a discrete non parametric frailty approach**, *Ingegneria Matematica - Politecnico di Milano*
- 2020 Veronica Marino. **An Application of Neural Network for Learning Analytics**, *Ingegneria Matematica - Politecnico di Milano*  
 Andrea Maggioni. **Semi-parametric generalized linear mixed effects model: an application to Engineering BSc dropout analysis**, *Ingegneria Matematica - Politecnico di Milano*
- 2019 Massimo Pellagatti. **Generalized Mixed Effects Random Forest for classification: an application to predict university students' dropout**, *Ingegneria Matematica - Politecnico di Milano*
- 2018 Luca Fontana. **Statistical analysis of engineering BSc dropout through mixed effects models**, *Ingegneria Matematica - Politecnico di Milano*
- 2016 Matteo Rivolta. **Metodi di imputazione per dati mancanti : applicazione al dataset INVALSI**, *Ingegneria Matematica - Politecnico di Milano*
- [Internship students host](#)
- 2024 Théo Cadene, Engineering student at ENSTA Paris. **Traineeship title: Learning Analytics**, *Erasmus+ program*, may 2024-july 2024
- 2022 Marceau Germe, Engineering student at ENSTA Paris. **Traineeship title: Modelling student dropout at Politecnico di Milano in R**, *Erasmus+ program*, may 2022-july 2022

### [Other Educational Activities](#)

- January 2024 **One-day course on Machine Learning in Education**, *LESE conference: Lisbon Economics and Statistics of Education*, 17th January 2024, (8 hours)  
 Lisbon (PT)
- Spring 2022 **Statistical Learning - Corsi di orientamento per i licei PNRR**, *Istituto Scolastico Don Carlo Gnocchi, Carate Brianza (MB); IIS A.Volta, Lodi (LO)*, Editions 2022-2023  
 (15 hours each)
- October 2017 **One-day course on Machine Learning in Education**, *5<sup>th</sup> Workshop on Efficiency in Education*, 17th October 2017, (8 hours)  
 Budapest (HU)
- August 2017 **Volunteering mathematics teaching** in Kibuye Village, Uganda, within the Arise And Shine Uganda (AASU) project, *Primary school*, (1 month)
- 2015-2020 **Meet me Tonight - Notte dei Ricercatori**, *Editions 2015, 2016, 2017, 2018, 2019, 2020*, Activities for primary school students

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## [Research Projects](#)

### [Research Project funded by Competitive Research Grants](#)

- 2025-ongoing **Promuovere e sostenere lo sviluppo delle competenze e del capitale umano pubblico**, *Role: participant*, Funding agency: Dipartimento della Funzione Pubblica, Unione Europea, Partner: Università degli Studi di Milano

- 2015-2018 **FARB - Research on Health and Education systems Assessment using administrative Data**, <http://www.head.polimi.it/>, Role: participant, Funding agency: Politecnico di Milano  
Partner: Department of Management, Economics, Industrial Engineering (DIG) of Politecnico di Milano
- 2016-2018 **Education Economics Network (EdEN) - H2020**, <https://cordis.europa.eu/project/id/691676>, Role: participant, Funding agency: EU  
Partners: Politecnico di Milano (DMAT and DIG), Katholieke Universiteit Leuven, Maastricht University, University of Budapest
- Research Projects funded by Private Companies and Public Institutions**
- 2025 **MHEO - Milan Higher Education Observatory**, <https://mheo.unimi.it>, Role: participant, Contractor: PNR  
Partner: Università degli Studi di Milano
- 2023-2025 **ENHANCE-HEART: Efficacy evaluationN of the therapeutic-care patH-ways, of the heAlthcare providers effects aNd of the risk stratifiCation in patiEnts suffering from HEART failure**, Role: participant, Contractor: Regione Lombardia, Partner: Politecnico di Milano
- 2021 **Cardiovascular disease events in HIV patients**, Role: participant, Contractor: Ospedale San Raffaele
- 2020-2021 **LIVMETRAD - LIVRAD1: Image mining analyses of tumor and of liver-tumor interface in patients with colorectal liver metastases.**, Role: participant, Contractor: Humanitas
- 2019-2020 **PiacenzaOrienta - High school dropout prevention**, <https://www.piacenzafuturo.com/rete-piacenzaorienta>, Role: participant, Funding agency: PiacenzaOrienta  
Contractor: rete PiacenzaOrienta

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## Collateral activities at my department

- 2025-ongoing **Contact person for Laboratories of the course Data Science for Economics and Health (DSEH)**, Università degli Studi di Milano, <https://dseh.cdl.unimi.it/en/courses/laboratories>
- 2026-ongoing **Admissions Committee Member for the Master's Program in Data Science for Economics and Health (DSEH)**, Università degli Studi di Milano, <https://dseh.cdl.unimi.it/en/courses/laboratories>
- 2023-2025 **Member of the gender balance commission at Department of mathematics, PoliMi**, Organize STEM orientation activities for female students, training courses about gender balance for the department staff, and motivational meetings for female students in mathematical engineering.
- 2023-2025 **Member of the social and communication commission at MOX- Modelling and Scientific Computing laboratory, Department of mathematics, PoliMi**, Assistance in managing the LinkedIn, X (formerly Twitter), and ResearchGate pages of MOX.
- 2019-2024 **Member of the Data Analytics Unit (DAU) at Politecnico di Milano**, Learning analytics project for the analysis of educational data at PoliMi to inform decision making.

- 2020-2024 **Supervisor of the tutoring activities of ‘Probabilità e statistica matematica’ at Politecnico di Milano**
- 2020-2024 **Participation in numerous selection committees for comparative evaluation procedures for the assignment of teaching support positions at Politecnico di Milano**