

# Cristian Castiglione

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## Research interests

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Bayesian Statistics, Computational Statistics, Spatial Statistics, Mixed and Additive Models.

## Current position

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### Postdoctoral research fellow

Bocconi University, Bocconi Institute for Data Science and Analytics (BIDSA)  
Project: *sociogeNEsis of criMinal nEtworks: reconStruction, dlscoveRy and diSRuption*  
(NEMESIS) – ERC Grant  
Advisor: Prof. Daniele Durante

Milan, Italy  
Apr 2025 – Mar 2026

## Past academic positions

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### Postdoctoral research fellow

Bocconi University, Bocconi Institute for Data Science and Analytics (BIDSA)  
Project: *Causes of deAth dependence stRuctures and the cOMpositioNal effecT on ovErall mortality (CARONTE)* – PRIN–MIUR Grant  
Advisor: Prof. Daniele Durante

Milan, Italy  
Apr 2024 – Mar 2025

### Postdoctoral research fellow

University of Padua, Department of Statistical Sciences  
Project: *Statistical methods and models for the integration of multiomic data*  
Advisor: Prof. Davide Risso

Padua, Italy  
Feb 2023 – Apr 2024

## Education

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### Ph.D. University of Padua, Department of Statistical Sciences

Course: Statistical Sciences  
Thesis: *Approximate inference for misspecified additive and mixed models*  
Advisors: Prof. Mauro Bernardi  
Co-advisors: Prof. Laura M. Sangalli, Prof. Alessio Farcomeni

Padua, Italy  
Oct 2019 – May 2023

### M.S. University of Padua, Department of Statistical Sciences

Course: Statistical Sciences  
Thesis: *Dynamic quantile models for spatio-temporal data*  
Advisor: Prof. Mauro Bernardi  
Final mark: 110/110 cum Laude

Padua, Italy  
Oct 2016 – Nov 2018

### B.S. University of Padua, Department of Statistical Sciences

Course: Statistics, Economics and Finance  
Thesis: *Multistate models for competing risks*  
Advisor: Prof. Giuliana Cortese  
Final mark: 110/110

Padua, Italy  
Oct 2013 – Jul 2016

## Work experience

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Blue BI S.R.L., Junior consultant in business intelligence and analytics

Vicenza, Italy  
Jan 2019 - Sep 2019

## Awards and fundings

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<b>Member of the ERC grant:</b> <i>sociogeNEsis of criMinal nEtworks: reconStruction, dIscoveRy and diSrUption (NEMESIS)</i> , Principal investigator: Daniele Durante	2025 – Present
<b>Member of the PRIN grant:</b> <i>Causes of deAth dependence stRuctures and the cOmpositional effecT on ovErall mortality (CARONTE)</i> , Principal investigator: Daniele Durante	2024 – Present
<b>Member of the PRIN grant:</b> <i>Complex Graphical Models for Biological Networks</i> , Principal investigator: Alberto Roverato	2023 – Present
<b>Merit-based Ph.D. fellowship</b> , Department of Statistical Sciences, University of Padova	Padova, Italy 2019 – 2023
<b>ISBA travel award</b> at <i>ISBA 2022 world meeting</i> .	Montreal, Canada Jun 2019
<b>Best Report Prize</b> at <i>Stats Under the Stars 3 (SuS3)</i> .	Florence, Italy Jun 2019

## Skills and technologies

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**Languages:** Italian (native), English (good)

**Programming:** R (advances), Python (advanced), Julia (advanced), C++ (advances), Matlab (basic)

**Database:** MySQL (basic)

**Markup:** LaTeX (advanced)

## Publications

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### Published articles

De Sanctis M.F., Di Battista I., Arnone E., **Castiglione C.**, Palummo A., Bernardi M., Ieva F., Sangalli L.M. (2025)  
Exploring nitrogen dioxide spatial concentration via physics-informed multiple quantile regression.  
*Environmental and ecological statistics*. (Accepted, in press)

**Castiglione, C.**, Arnone, E., Bernardi, M., Farcomeni, A., Sangalli, L.M. (2024)  
PDE-regularised spatial quantile regression.  
*Journal of Multivariate Analysis*, 205, 105381. ([link](#))

Sottosanti, A., Risso, D., **Castiglione, C.** (2022)  
Contributed discussion: “Bayesian Nonstationary and Nonparametric Covariance Estimation for Large Spatial Data” by Kidd B. and Katzfuss M.  
*Bayesian Analysis*, 17(1): 337–339. ([link](#))

## Manuscripts

Segers A., **Castiglione C.**, Vanderaa C., De Baere E., Martens L., Risso D., Clement L. (2025)  
omicsGMF: a multi-tool for dimensionality reduction, batch correction and imputation applied to bulk- and single cell proteomics data.  
<https://doi.org/10.1101/2025.03.24.644996> (Submitted)

Di Battista I., De Sanctis M.F., Arnone E., **Castiglione C.**, Palummo A., Sangalli L.M. (2025+)  
A semiparametric space-time quantile regression model. (Under review)

**Castiglione, C.**, Segers, A., Clement, L. and Risso, D. (2024)  
Stochastic gradient descent estimation of generalized matrix factorization models with application to single-cell RNA sequencing data.  
[arxiv.org/abs/2412.20509](https://arxiv.org/abs/2412.20509) (Under review)

**Castiglione, C.**, Bernardi, M. (2022)  
Bayesian non-conjugate regression via variational message.  
[arxiv.org/abs/2206.09444](https://arxiv.org/abs/2206.09444) (Under review)

## Conference proceedings

De Sanctis, M.F., Di Battista, I., Arnone, E., **Castiglione, C.**, Bernardi, M., Palummo, A., Sangalli, L.M. (2024).  
Penalised Spatial Quantile Regression: Application to Air Quality Data.  
*Book of Short Papers 2024, Proceedings of the 53rd Scientific Meeting of the Italian Statistical Society*, pp. 532–537.

**Castiglione, C.**, Arnone, E., Bernardi, M., Farcomeni, A., Sangalli, L. M. (2023).  
Penalized quantile regression for spatially distributed data.  
*Book of Short Papers GRASPA 2023, Proceedings of the GRASPA 2023 Conference*, pp. 124–129.

**Castiglione, C.**, Bernardi, M. (2022).  
Probabilistic load forecasting via dynamic quantile regression.  
*Book of Short Papers IWSM 2022, Proceedings of the 36th International Workshop on Statistical Modelling*, pp. 400–405.

**Castiglione, C.**, Bernardi, M. (2022).  
Sparse signal extraction via variational SVM.  
*Book of Short Papers SIS 2022, Proceedings of the 51th Scientific Meeting of the Italian Statistical Society*, pp. 864–870.

**Castiglione, C.**, Bernardi, M. (2021).  
Semiparametric variational inference for Bayesian quantile regression.  
*Book of Short Papers SIS 2021, Proceedings of the 50th Scientific Meeting of the Italian Statistical Society*, pp. 683–688.

## Ongoing projects

Romanò G., **Castiglione C.**, Durante D. (2025+).  
Dynamic stochastic block models for sequences of directed networks: an application to US causes of death.

**Castiglione C.**, Maestrini L., Bernardi M. (2025+).  
On frequentist variational inference for generalized additive models.

Bianco N., **Castiglione C.** (2025+).  
Improving Bayesian semi-parametric regression via increasing shrinkage priors.

## Conference presentations

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**Castiglione, C.**, Romanò, G., Durante, D. (2024).  
Dynamic stochastic block models with application to causes of death networks. (invited presentation)  
*18th International Joint Conference CFE-CMStatistics 2024*, London, UK, 14–16 December.

**Castiglione, C.**, Bianco, N. (2024).  
Improving Bayesian semiparametric regression via increasing shrinkage priors. (poster presentation)  
*2024 World Meeting of the International Society for Bayesian Analysis (ISBA 2024)*, Venice, Italy, 1–7 July.

- Castiglione, C.**, Arnone, E., Bernardi, M., Farcomeni, A., Sangalli, L. M. (2024).  
A flexible framework for spatial quantile regression via PDE regularization. (invited presentation)  
*International Symposium on Nonparametric Statistics (ISNPS 2024)*, Braga, Portugal, 25–29 July.
- Castiglione, C.**, Bianco, N. (2023).  
Increasing shrinkage in Bayesian nonparametric regression for differential expression analysis. (poster presentation)  
*2023 IMS International Conference on Statistics and Data Science (ICSIDS 2023)*, Lisbon, Portugal, 11–14 November.
- Castiglione, C.**, Arnone, E., Bernardi, M., Farcomeni, A., Sangalli, L. M. (2023).  
Penalized quantile regression for spatially distributed data. (poster presentation)  
*Biennial conference of the Italian research group for Environmental Statistics (GRASPA 2023)*, Palermo, Italy, 10–11 July.
- Castiglione, C.**, Bernardi, M. (2023).  
Approximate belief updating via semiparametric variational Bayes. (poster presentation)  
*Greek stochastics  $\nu'$ , Contemporary Bayesian Inference*, Naxos, Greece, 7–10 July.
- Castiglione, C.** (2022).  
Approximate belief updating via semiparametric variational Bayes. (poster presentation)  
*Statistical Methods and Models for Complex Data 2022*, Padova, Italy, 21–21 September.
- Castiglione, C.**, Bernardi, M. (2022).  
Approximate general Bayesian inference via semiparametric variational Bayes. (invited presentation)  
*24th Conference on Computational Statistics (COMPSTAT 2022)*, Bologna, Italy, 23–26 August.
- Castiglione, C.**, Bernardi, M. (2022).  
Probabilistic load forecasting via dynamic quantile regression. (poster presentation)  
*36th International Workshop on Statistical Modelling (IWSM 2022)*, Trieste, Italy, 18–22 July.
- Castiglione, C.**, Bernardi, M. (2022).  
Approximate general Bayesian inference via semiparametric variational Bayes. (oral presentation)  
*2022 World Meeting of the International Society for Bayesian Analysis (ISBA 2022)*, Montreal, Canada, 26 June – 1 July.
- Castiglione, C.**, Bernardi, M. (2022).  
Sparse signal extraction via Variational SVM. (oral presentation)  
*51th Scientific Meeting of the Italian Statistical Society (SIS 2022)*, Caserta, Italy, 22–24 June.
- Castiglione, C.** (2021).  
Approximate variational inference based on data augmentation methods. (oral presentation)  
*14th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2021)*, London, UK, 18–20 December.
- Castiglione, C.**, Bernardi, M. (2021).  
Variational inference for non-crossing quantile regression. (poster presentation)  
*2021 World Meeting of the International Society for Bayesian Analysis (ISBA 2021)*, Online, 28 June – 02 July.
- Castiglione, C.**, Bernardi, M. (2022).  
Semiparametric variational inference for Bayesian quantile regression. (oral presentation)  
*50th Scientific Meeting of the Italian Statistical Society (SIS 2021)*, Cagliari, Italy, 22–24 June.

## Software

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**sgdGMF:** An R/C++ package for the estimation of high-dimensional generalized matrix factorization (GMF) models via adaptive stochastic gradient descent (SGD).

CRAN package [github/repo](#)

**BayesGLMM:** A Julia package for the estimation of Bayesian generalized linear mixed effect models (GLMM) via variational approximations and non-conjugate variations message passing.

[github/repo](#)

## Teaching

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<b>Contract instructor</b> , 2 hours Bocconi University Course: <i>Quantitative Methods for Social Sciences (Module II - Data Analytics)</i> , Bachelor in International Politics and Government	Milan, Italy Feb 2025 - Jul 2025
<b>Teaching assistant</b> , 14 hours Bocconi University Course: <i>Quantitative Methods for Social Sciences (Module II - Data Analytics)</i> , Bachelor in International Politics and Government	Milan, Italy Feb 2025 - Jul 2025
<b>Contract instructor</b> , 4 hours Bocconi University Course: <i>Machine Learning (Module I - Introduction)</i> , Bachelor in International Politics and Government	Milan, Italy Feb 2025 - Jul 2025
<b>Teaching assistant</b> , 20 hours Bocconi University Course: <i>Machine Learning (Module I - Introduction)</i> , Bachelor in International Politics and Government	Milan, Italy Feb 2025 - Jul 2025
<b>Teaching assistant</b> , 10 hours Bocconi University Course: <i>Foundations of Data Science</i> , Bachelor in CLEAM, CLEF, CLEACC, BESS-CLES, WBB, BIEF, BIEM, BIG, BEMACS, BAI	Milan, Italy Feb 2025 - Jul 2025
<b>Contract instructor</b> , 14 hours University of Padua, Department of Statistical Sciences Course: <i>Multivariate data analysis</i> , Bachelor in Statistics	Padua, Italy Oct 2024 - Jan 2025
<b>Contract instructor</b> , 22 hours University of Padua, Department of Statistical Sciences Course: <i>Statistical Models 1</i> , Bachelor in Statistics	Padua, Italy Feb 2024 - Jul 2024
<b>Contract instructor</b> , 14 hours University of Padua, Department of Statistical Sciences Course: <i>Multivariate data analysis</i> , Bachelor in Statistics	Padua, Italy Oct 2023 - Jan 2024
<b>Academic tutor</b> , 25 hours University of Padua, Department of Statistical Sciences Course: <i>Advanced statistics</i> , Master in Statistics	Padua, Italy Sep 2017 - Sep 2018
<b>Academic tutor</b> , 25 hours University of Padua, Department of Statistical Sciences Course: <i>Calculus 1</i> , Bachelor in Statistics	Padua, Italy Sep 2017 - Sep 2018

## Supervising experience

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<b>Master thesis</b> , course in Mathematical Engineering, Politecnico di Milano Title: <i>Penalised quantile spatial regression: simultaneous estimation and spatio-temporal modelling</i> Students: Ilenia Di Battista, Marco F. De Sanctis Advisors: Prof. Laura M. Sangalli, Eleonora Arnone, <b>Cristian Castiglione</b>	2023
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## Referee service

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Bernoulli, Statistical Modelling, STAT, Demonstratio Mathematica.