Cristian Castiglione

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Research interests

Statistical computing, Spatial Statistics, Mixed and Additive Models, Matrix factorization, Network data.

Current position

Postdoctoral research fellow   Milan, Italy
Bocconi University, Bocconi Institute for Data Science and Analytics (BIDSA)   Apr 2025 – Mar 2026
Project: *sociogeNEsis of criMinal nEtworks: reconStruction, dIscovery and diSruption
(NEMESIS)* – ERC Grant
Advisor: Prof. Daniele Durante

Past academic positions

Postdoctoral research fellow   Milan, Italy
Bocconi University, Bocconi Institute for Data Science and Analytics (BIDSA)   Apr 2024 – Mar 2025
Project: *Causes of deAth dependence stRuctures and the cOmpositioNal effecT on ovErall
mortality (CARONTE)* – PRIN–MIUR Grant
Advisor: Prof. Daniele Durante

Postdoctoral research fellow   Padua, Italy
University of Padua, Department of Statistical Sciences   Feb 2023 – Apr 2024
Project: *Statistical methods and models for the integration of multiomic data*
Advisor: Prof. Davide Risso

Education

Ph.D. **University of Padua**, Department of Statistical Sciences   Padua, Italy
Course: Statistical Sciences   Oct 2019 – May 2023
Thesis: *Approximate inference for misspecified additive and mixed models*
Advisors: Prof. Mauro Bernardi
Co-advisors: Prof. Laura M. Sangalli, Prof. Alessio Farcomeni

M.S. **University of Padua**, Department of Statistical Sciences   Padua, Italy
Course: Statistical Sciences   Oct 2016 – Nov 2018
Thesis: *Dynamic quantile models for spatio-temporal data*
Advisor: Prof. Mauro Bernardi
Final mark: 110/110 cum Laude

B.S. **University of Padua**, Department of Statistical Sciences   Padua, Italy
Course: Statistics, Economics and Finance   Oct 2013 – Jul 2016
Thesis: *Multistate models for competing risks*
Advisor: Prof. Giuliana Cortese
Final mark: 110/110

Work experience

Blue BI S.R.L., Junior consultant in business intelligence and analytics   Vicenza, Italy
                                                                                          Jan 2019 - Sep 2019

Awards and fundings

Member of the ERC grant: *sociogeNEsis of criMinal nEtworks: reconStruction, dIscovery and diSruption (NEMESIS)*, Principal investigator: Daniele Durante — 2025 – Present

Member of the PRIN grant: *Causes of deAth dependence stRuctures and the cOmpositioNal effecT on ovErall mortality (CARONTE)*, Principal investigator: Daniele Durante — 2024 – Present

Member of the PRIN grant: *Complex Graphical Models for Biological Networks*, Principal investigator: Alberto Roverato — 2023 – Present

Merit-based Ph.D. fellowship, Department of Statistical Sciences, University of Padova — Padova, Italy 2019 – 2023

ISBA travel award at *ISBA 2022 world meeting*. — Montreal, Canada Jun 2019

Best Report Prize at *Stats Under the Stars 3 (SuS3)*. — Florence, Italy Jun 2019

Skills and technologies

Languages: Italian (native), English (good)

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

Database: MySQL (basic)

Markup: LaTeX (advanced)

Pubblications

Published articles

Di Battista I., De Sanctis M.F., Arnone E., **Castiglione C.**, Palummo A., Sangalli L.M. (2025)
A semiparametric space-time quantile regression model.
Journal of Nonparametric Statistics. (Accepted, to appear)

Castiglione, C., Bernardi, M. (2025)
Non-conjugate variational Bayes for pseudo-likelihood mixed effect models.
Journal of Computational and Graphical Statistics. (link ↗)

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. (link ↗)

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

Manuscripts

Anceschi N., **Castiglione C.**, Rigon T., Zanella G., Durante D. (2025+).
Optimal and computationally tractable lower bounds for logistic log-likelihoods.
arxiv.org/abs/2410.10309 ↗ (Submitted)

Romanò G., **Castiglione C.**, Durante D. (2025+).
Dependent stochastic block models for age-indexed sequences of directed causes-of-death networks.
arxiv.org/abs/2510.01806 ↗ (Under review)

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.
doi.org/10.1101/2025.03.24.644996 ☑ (Submitted)

Castiglione, C., Segers, A., Clement, L. and Risso, D. (2025+)
Stochastic gradient descent estimation of generalized matrix factorization models with application to single-cell RNA sequencing data.
arxiv.org/abs/2412.20509 ☑ (Under review)

Conference proceedings and contributed discussions

Castiglione, C., Romanò, G. (2025).
Age-Dependent Analysis of Mortality Patterns in Italy: A Network Perspective via Dynamic Stochastic Block Models.
Statistics for Innovation I, SIS 2025, Short Papers, Plenary, Specialized, and Solicited Sessions, pp. 271–276.

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.

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 ☑)

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

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

Romanò, G., **Castiglione, C.**, Durante, D. (2025) – Invited presentation.
Dependent stochastic block models for age-indexed sequences of directed causes-of-death networks.
The sixth meeting of the Multi-Cause network, Barcelona, Spain, 16-17 October, 2025.

Romanò, G., **Castiglione, C.**, Durante, D. (2025) – Invited presentation.
Dependent stochastic block models for age-indexed sequences of directed causes-of-death networks.
Climbing Mortality Models II [final workshop of CARONTE], Misurina, Italy, 27-29 August, 2025.

Castiglione, C., Romanò, G. (2025) – Invited presentation.
Age-Dependent Analysis of Mortality Patterns in Italy: A Network Perspective via Dynamic Stochastic Block Models.
SIS 2025. Statistics for Innovation, Genoa, Italy, 16-18 June, 2025.

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

Castiglione, C., Bianco, N. (2024) – Poster presentation.
Improving Bayesian semiparametric regression via increasing shrinkage priors.
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) – Invited presentation.
A flexible framework for spatial quantile regression via PDE regularization.
International Symposium on Nonparametric Statistics (ISNPS 2024), Braga, Portugal, 25–29 July.

Castiglione, C., Bianco, N. (2023) – Poster presentation.
Increasing shrinkage in Bayesian nonparametric regression for differential expression analysis.
2023 IMS International Conference on Statistics and Data Science (ICSDS 2023), Lisbon, Portugal, 11–14 November.

Castiglione, C., Arnone, E., Bernardi, M., Farcomeni, A., Sangalli, L. M. (2023) – Poster presentation.
Penalized quantile regression for spatially distributed data.
Biennial conference of the Italian research group for Environmental Statistics (GRASPA 2023), Palermo, Italy, 10–11 July.

Castiglione, C., Bernardi, M. (2023) – Poster presentation.
Approximate belief updating via semiparametric variational Bayes. (poster presentation)
Greek stochastics ν', Contemporary Bayesian Inference, Naxos, Greece, 7–10 July.

Castiglione, C. (2022) – Poster presentation.
Approximate belief updating via semiparametric variational Bayes.
Statistical Methods and Models for Complex Data 2022, Padova, Italy, 21–21 September.

Castiglione, C., Bernardi, M. (2022) – Invited presentation.
Approximate general Bayesian inference via semiparametric variational Bayes.
24th Conference on Computational Statistics (COMPSTAT 2022), Bologna, Italy, 23–26 August.

Castiglione, C., Bernardi, M. (2022) – Poster presentation.
Probabilistic load forecasting via dynamic quantile regression.
36th International Workshop on Statistical Modelling (IWSM 2022), Trieste, Italy, 18–22 July.

Castiglione, C., Bernardi, M. (2022) – Contributed presentation.
Approximate general Bayesian inference via semiparametric variational Bayes.
2022 World Meeting of the International Society for Bayesian Analysis (ISBA 2022), Montreal, Canada, 26 June – 1 July.

Castiglione, C., Bernardi, M. (2022) – Contributed presentation.
Sparse signal extraction via Variational SVM.
51th Scientific Meeting of the Italian Statistical Society (SIS 2022), Caserta, Italy, 22–24 June.

Castiglione, C. (2021) – Contributed presentation.
Approximate variational inference based on data augmentation methods.
14th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2021), London, UK, 18–20 December.

Castiglione, C., Bernardi, M. (2021) – Poster presentation.
Variational inference for non-crossing quantile regression.
2021 World Meeting of the International Society for Bayesian Analysis (ISBA 2021), Online, 28 June – 02 July.

Castiglione, C., Bernardi, M. (2022) – Contributed presentation.
Semiparametric variational inference for Bayesian quantile regression.
50th Scientific Meeting of the Italian Statistical Society (SIS 2021), Cagliari, Italy, 22–24 June.

Software

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

Contract instructor, 2 hours
Bocconi University
Course: *Quantitative Methods for Social Sciences (Module II - Data Analytics)*,
Bachelor in International Politics and Government

Milan, Italy
Feb 2025 - Jul 2025

Teaching assistant, 14 hours
Bocconi University
Course: *Quantitative Methods for Social Sciences (Module II - Data Analytics)*,
Bachelor in International Politics and Government

Milan, Italy
Feb 2025 - Jul 2025

Contract instructor, 4 hours
Bocconi University
Course: *Machine Learning (Module I - Introduction)*,
Bachelor in International Politics and Government

Milan, Italy
Feb 2025 - Jul 2025

Teaching assistant, 20 hours
Bocconi University
Course: *Machine Learning (Module I - Introduction)*,
Bachelor in International Politics and Government

Milan, Italy
Feb 2025 - Jul 2025

Teaching assistant, 10 hours
Bocconi University
Course: *Foundations of Data Science*,
Bachelor in CLEAM, CLEF, CLEACC, BESS-CLES, WBB, BIEF, BIEM, BIG, BEMACS, BAI

Milan, Italy
Feb 2025 - Jul 2025

Contract instructor, 14 hours
University of Padua, Department of Statistical Sciences
Course: *Multivariate data analysis*, Bachelor in Statistics

Padua, Italy
Oct 2024 - Jan 2025

Contract instructor, 22 hours
University of Padua, Department of Statistical Sciences
Course: *Statistical Models 1*, Bachelor in Statistics

Padua, Italy
Feb 2024 - Jul 2024

Contract instructor, 14 hours
University of Padua, Department of Statistical Sciences
Course: *Multivariate data analysis*, Bachelor in Statistics

Padua, Italy
Oct 2023 - Jan 2024

Academic tutor, 25 hours
University of Padua, Department of Statistical Sciences
Course: *Advanced statistics*, Master in Statistics

Padua, Italy
Sep 2017 - Sep 2018

Academic tutor, 25 hours
University of Padua, Department of Statistical Sciences
Course: *Calculus 1*, Bachelor in Statistics

Padua, Italy
Sep 2017 - Sep 2018

Supervising experience

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

Referee service

Journal of Computational and Graphical Statistics, Bernoulli, Statistical Modelling, STAT, Demonstratio Mathematica.