

Silvia Columbu

Personal Information

Born Italy, Nuoro (NU), October the 13th, 1985
Citizenship Italian

Research area

Statistics (Italian sector classification: SSD SECS-S/01)

Current Position

since 28/12/2021 **Assistant Professor (Ricercatrice TD di tipo B)**, *Department of Mathematics and Computer Science*, University of Cagliari.

Education

- 23/04/2015 **PhD in Mathematic and Scientific computation**, *University of Cagliari*, Supervisor: Monica Musio, Thesis: "*Parametric modeling of dependence of bivariate quantile regression residuals' signs.*".
Main topics: Methodological and applied statistics.
- 11/04/2011 **Master degree in Mathematics**, *University of Cagliari*, Evaluation degree: 110/110, Thesis: "*Regressione di Poisson : Rischio globale e rischio standardizzato.*".
Subject: Statistics
- 29/09/2008 **Bachelor degree in Mathematics**, *University of Cagliari*, Evaluation degree: 109/110, Thesis: "*Introduzione all'analisi della Sopravvivenza con accenno ai metodi non parametrici.*".
Subject: Statistics

Work experiences (non academic)

- 2017 High school teacher of *Mathematics* for summer classes. Istituto di Istruzione Superiore "F.lli Costa Azara" in Sorgono.
High school teacher of *Mathematics* for summer classes. "Liceo delle Scienze Umane S. Satta" Nuoro.
- 2016 and 2017 Private Mathematical-statistical counseling for Società Risparmio srl (Cagliari)
- 2015 - 2017 GEV Assistant to the research evaluation for the area of Mathematics and Computer Sciences within the Italian research evaluation exercise VQR - 2011-2014 (CINECA/ANVUR)

Previous academic positions

- 28/12/2018 - **Assistant Professor (Non-tenure track) (Ricerca a tempo determinato TD di tipo A)**, *Department of Mathematics and Computer Science*, University of Cagliari.
Area: Statistics
- 28/11/2017 - **Post-DOC**, *Department of Political and Social Sciences, University of Cagliari*,
28/11/2018 Project Title: "The mobility of Sardinian students. A comparative analysis of tertiary education in Sardinia", Area: Statistics.
Scientific Advisor: Isabella Sulis
- April 2018 - July 2018 **Research collaboration**, *Department of Environmental and Life Sciences, University of Cagliari*, Main : "Technical support for the use of the statistical software R for linear modeling of ecological and environmental data".
- May - October 2015 **Research fellowship**, *Department of Mathematics and Computer Science, University of Cagliari*, Project: "Local scoring rules local quantile regression", Area: Statistics.
Scientific Advisor: Monica Musio

Periods abroad

- 15/04/2019 - **Visiting researcher**, *Department of Methodology and Statistics, University of Tilburg (The Netherland)*, (110 days in total), Collaboration with Professor J. Vermunt.
- 01/09/2015 - **Visiting researcher**, *Biostatistics Unit, Department of Environmental Medicine*,
20/10/2015 Karolinska Institute, Stockholm.
- 14/10/2014 - **Visiting Ph.D. student**, *Biostatistics Unit, Department of Environmental Medicine*, Karolinska Institut, Stockholm, Subject: *Quantile regression for multiple outcomes*.
24/10/2014 Advisor: Prof. Matteo Bottai
- 01/05/2014 - **Visiting Ph.D. student**, *Biostatistics Unit, Department of Environmental Medicine*, Karolinska Institute, Stockholm, Subject: *Quantile regression for multiple outcomes*.
31/05/2014 Advisor: Prof. Matteo Bottai
- 01/09/2013 - **Visiting Ph.D. student**, *Biostatistics Unit, Department of Environmental Medicine*, Karolinska Institute, Stockholm, Subject: *Quantile regression for multiple outcomes*.
30/11/2013 Advisor: Prof. Matteo Bottai
- 01/09/2012 - **Visiting Ph.D. student**, *Biostatistics Unit, Department of Environmental Medicine*, Karolinska Institute, Stockholm, Subject: *Quantile regression for multiple outcomes*.
27/02/2013 Advisor: Prof. Matteo Bottai
- 01/03/2009 - **Visiting student**, *Université de Strasbourg, Faculté de Médecin, Laboratory of Biostatistics*, Research fellowship of Applied Statistics and master thesis research, Topic: *Risk estimation in Poisson regression*.
30/06/2009 Advisor: Prof. Erik André Sauleau
- 10/10/2006 - **Erasmus student**, *Université Louis Pasteur Strasbourg*, UFR Mathématique et Informatique, Third year of Bachelor degree in Mathematics.
30/06/2007

Research Projects

- 2020 **Statistical models for the study of the socio-economic situation in Sardinia induced by the Covid-19 pandemic. Applications and comparisons with other Italian regions**, *Member of the research project*, Supported by Fondazione di Sardegna for the year 2020.
- 2019 **Modeling time series with parametric quantile functions**, *Project PI*, Visiting Professors programme, funded by the Regione Autonoma della Sardegna.
Mobilità giovani ricercatori, *Mobility Project of the University of Cagliari*, Project title: “*Statistical methods for the analysis of complex multilevel data structures: multiple imputation techniques and latent profile analysis for multiple traits.*”, Site of the mobility period: University of Tilburg, The Netherlands.
- 2018 **STAGE (Statistica, Algebra e Geometria)**, *Member of the research project*, Supported by Fondazione di Sardegna for the year 2018.
- 2012 **Mathematical development in the methodological Statistics with applications to real problems**, *Member of the research project*, RAS Project 2012, funded by Regione Autonoma della Sardegna.

Scientific Publications

Research Articles

- 1 Cappelletti-Montano B., Columbu S., Montaldo S., Musio M., *Interpreting the outcomes of research assessments: a geometrical approach*, *Journal of Informetrics*, 16(1), 101254, (2022)
- 2 Columbu S., Porcu M., Primerano I., Vitale M.P., Sulis I., *Analyzing the determinants of university student mobility pathways conditioning upon disciplinary fields.*, *Genus*, 77(34), 00146-2, (2021)
- 3 Columbu S., Mameli V. , Musio M., Dawid A.P., *The Hyvärinen scoring rule in Gaussian linear time series models.*, *Journal of Statistical Planning and Inference*. 212, 126–140, (2021)
- 4 Cappelletti-Montano B., Columbu S., Montaldo S., Musio M., *New perspectives in bibliometric indicators: Moving from citations to citing authors*, *Journal of Informetrics*, 15(3), 101164, (2021)
- 5 Columbu S., Porcu M., Sulis I., *University choice and the attractiveness of the study area. Insights on differences between degree programs and fields of study from an analysis based on generalized mixed-effect models*, *Socio-Economic Planning Science*, 74, 100926, (2021)
- 6 Columbu S., Porcu M., Primerano I., Vitale M.P., Sulis I., *Geography of Italian student mobility: A network analysis approach*, *Socio-Economic Planning Science*, 73, 100918, (2021)
- 7 Dawid P., Musio M., Columbu S., *A Note on Bayesian Model Selection for Discrete Data Using Proper Scoring Rules*, *Statistics and Probability Letters*, 129, 101 – 106, (2017)

- 8 Mandas A., Congiu M. G., Abete C., Dessì S., Manconi P. E., Musio M., Columbu S., Racugno W., *Cognitive Decline and Depressive Symptoms in Late-Life Are Associated with Alterations in Peripheral Lipid Homeostasis: Evidence from a Population-Based Study of Sardinian Old People Living in Their Own Home*, *Neurological Research*, 36 (3), 247 – 254, (2014)

Submitted articles and pre-print

- 1 Pierucci A., Columbu S., Kell L.T., *MSC's performance evaluation: Why fisheries withdraw?*, Under review (2021)
- 2 Columbu S., Frumento P., Bottai M., *Parametric modeling the dependence of the sign of multivariate quantile-regression residuals* <http://arxiv.org/abs/2104.10436>, Under review (2020)

Book chapters

Columbu S. and Bottai M. *Logistic quantile regression to model cognitive impairment in Sardinian cancer patients*. Topics on Methodological and Applied Statistical Inference. Publisher: Springer International Publishing, Editor: Di Battista, Tonio and Moreno, Elías and Racugno, Walter, 65–73. (ISBN: 978-3-319-44093-4), (2016)

Peer reviewed Conference Proceedings

- 1 Cappelletti-Montano B., Columbu S., Montaldo S., Musio M. *Comparing the safety of COVID-19 vaccines: a geometrical approach*, Proceedings of the Virtual ISI World Statistics Congress 2021
- 2 Sulis I., Columbu S., Porcu M., *From measurement to explanatory approaches: an assessment of the attractiveness of the curricula programs supplied by Italian universities.*, Proceedings of the 50-th Italian Statistical Society Scientific meeting, Pisa 2020 (ISBN 978-88-91910-77-6)
- 3 Columbu, S., Primerano I., *A multilevel Analysis of University attractiveness in the network flows from Bachelor to Master's degree*, Proceedings of the 50-th Italian Statistical Society Scientific meeting, Pisa 2020 (ISBN 978-88-91910-77-6)
- 4 Columbu S., Porcu M., Sulis I., *Assessing quality in Italian Universities: a multilevel latent profile approach*, Proceedings of the 34th International Workshop of Statistical Modeling IWSM 2019, Guimaraes 8 – 12 July 2019 (ISBN 978-989-20-9630-8)
- 5 Columbu, S., Porcu, M., Primerano, I., Sulis, I., Vitale, M.P., *Exploring the Italian student mobility flows in higher education*, Book of Short Papers IES 2019 9th International Conference - Innovation & Society - Statistical evaluation systems at 360°: techniques, technologies and new frontiers, Rome 4–5 July 2019 (ISBN: 978-88-86638-65-4)
- 6 Columbu S., Porcu M., Sulis I., *University choice and the attractiveness of the study area. Insights from an analysis based on generalized mixed-effect models*, Proceedings of the 49-th SIS Scientific meeting, Palermo, 20 – 22 June 2018 (ISBN-978-88-9191-023-3)
- 7 Dawid P., Musio M., Columbu S., *Bayesian Discrete Model Selection Based on Proper Scoring Rules*, ISI 2017 Marrakech, 61st World Statistics Congress

- 8 Columbu S., Bottai M., *Conditional concordance of the signs of the residuals of quantile regressions of multivariate outcomes*, Proceedings of the 47-th Italian Statistical Society Scientific meeting, Cagliari, 11–13 June 2014, 1 – 9. (ISBN: 978-88-8467-874-4)
- 9 Columbu S., Bottai M. *Cognitive deterioration in cancer patients using logistic quantile regression*, Proceeding of the Italian Statistical Society thematic meeting “Advances in latent variables. Methods, Models and Applications.” Brescia, 19 – 21 June 2013, 1 – 6. (ISBN 978-88-343-2556-8)

Partecipazione a convegni in qualità di relatore e seminari

Convegni su invito

- 6/09/2021 - *Insights on the effect of network and individual characteristics on students' mobility choices*. EUSN (Fifth European Conference on Social Network), Naples (Italy)
- 29/10/2019 - *Assessing the determinants of university attractiveness (and its influence on the choice of the study field) in the tertiary education students mobility network*. ARS'19 (Seventh International Workshop on Social Network Analysis) , Salerno (Italy)
- 9/09/2019 - *The Geography of Italian Student Mobility: a Network Analysis Approach*. EUSN 12/09/2019 (Fourth European Conference on Social Network), Zurich (Switzerland)
- 11/04/2019 - *The dimensions of quality: a multilevel latent profile approach to compare degree programs at the University*. Workshop organized by the University of Cagliari with title “Students' mobility, university and post-university choices.”, Cagliari

Contributed conferences

- 18/12/2021 - *Multilevel latent class models for cross-classified data* 14th International Conference of the ERCIM WG on Computational and Methodological Statistics, London (UK)
- 11/07/2021 - *Comparing the safety of COVID-19 vaccines: a geometrical approach*. Virtual 16/07/2021 ISI World Statistics Congress 2021.
- 03/09/2018 - *University choice and the attractiveness of the study area. Insights from an analysis based on generalized mixed-effect models*. International Conference della Royal Statistical Society 2018 (RSS 2018), Cardiff (UK)
- 20/06/2018 - *University choice and the attractiveness of the study area. Insights from an analysis based on generalized mixed-effect models*. 49-th Meeting of the Italian Statistical Society 2018, Palermo (Italy)
- 12/12/2015 - *Hyvärinen scoring rule estimators for a single linear time series*. 8th International Conference of the ERCIM WG on Computational and Methodological Statistics, London (UK)
- 06/12/2014 - *Quantiles of multivariate response variables: conditional concordance of quantile regression residuals*. 7th International Conference of the ERCIM WG on Computational and Methodological Statistics, Pisa (Italy)
- 11/06/2014 - *Conditional concordance of the signs of the residuals of quantile regressions of multivariate outcomes*. 47-th Meeting of the Italian Statistical Society, Cagliari (Italy)

- 19/06/2013 - *Cognitive deterioration in cancer patients using logistic quantile regression.*
21/06/2013 Thematic Meeting of the Italian Statistical Society, *Advances in Latent Variables methods models and applications*, Brescia (Italy)

Poster

- 08/07/2019 - *Assessing quality in Italian Universities: a multilevel latent profile approach.*
12/07/2019 IWSM (International Workshop on Statistical Modelling) 2019, Guimaraes (Portugal)

Seminars

- 22/12/2021 - Web Seminars of training in *Statistics* for high school teachers. (15 hours)
01/02/2022
- 10/12/2021 *Invasione di dati: saperli interpretare ed errori da evitare* Monographic Course in educational guidance addressed to high school students. Organized from the Faculty of Science of the University of Cagliari
- 05/01/2021 *The Hyvärinen scoring rule in Gaussian linear time series models.* Department of Mathematics and Computer Science, University of Cagliari
- 14/01/2020 *On the use of the Multilevel Latent Classes approach to measure University Quality and some possible methodological extensions.* Department of Mathematics and Computer Science, University of Cagliari
- 24/09/2019 *On the use of the Multilevel Latent Classes approach to measure University Quality and some possible methodological extensions for cross classified structures.* Department of Methodological Statistics, University of Tilburg.
- 19/09/2018 *Mobilità studentesca e attrattività dei Corsi di Studio e delle Università. Un'analisi delle determinanti della scelta degli studenti*, Workshop day on "Student mobility, university and post-university choices". Department of Political and Social Sciences, University of Cagliari
- 21/11/2013 *Multivariate models as mixed effects models.* Department of Environmental Medicine at Karolinska Institute, Stockholm
- 25/07/2013 *Modelli Quantilici Misti.* Department of Mathematics and Computer Science, University of Cagliari
- 17/04/2013 *Uno sguardo sulla regressione quantilica.* Department of Mathematics and Computer Science, University of Cagliari

Organization of conferences and scientific meetings

- 21/06/2021 - Member of the Technical Committee of the 49-th International Conference of the
25/06/2021 Italian Statistical Society (SIS), online conference
- 11/04/2019 - Member of the Scientific Committee del Workshop "Student mobility, university
12/04/2019 and post-university choices", University of Cagliari

Referee

Referee for:

Biostatistics

Electronic Journal of Applied Statistical Analysis

Journal of Informetrics

Scientific societies

Since 2013 member of SIS (Italian Statistical Society)

Teaching

Lecturer

- 2021 *Introduction to Finite Mixture Models and Latent Class Analysis* PhD School of Mathematics and Computer Science, University of Cagliari.
Statistical Models for the Master in Mathematics, University of Cagliari.
Mathematical Statistical Laboratory for the Bachelor in Mathematics, University of Cagliari. Co-lecturer responsible of the part regarding the introduction to descriptive statistics and use of R software.
Introduzione ai modelli di mistura finita. Reading course for the Master in Mathematics, University of Cagliari.
- 2020 *Statistical Models* for the Master in Mathematics, University of Cagliari.
Mathematical Statistical Laboratory for the Bachelor in Mathematics, University of Cagliari. Co-lecturer responsible of the part regarding the introduction to descriptive statistics and use of R software.
R labs within the XXVI Summer School in Statistical Inference for Biology and Human Sciences Biostat2019, ASTI 1-5 July 2019.
- 2018 *Elements of Probability and Statistics* for the Master in Mathematics, University of Cagliari.
- 2017 *Statistics Applied to the Natural Sciences* for the Bachelor in Natural Sciences, University of Cagliari.
Mathematics for the Degree of Pharmacy, University of Cagliari.
Mathematics, Faculty of Medicine and Chirurgy of the University of Cagliari, within the Training Course for the admission tests to the Biomedical Faculties.
- 2016 *Elements of Probability and Statistics* for the Master in Mathematics, University of Cagliari.

Tutoring and exercises

- 2018 *Socio-economic Indicators* for the Master in International Relations, University of Cagliari.
Labs of Mathematics for High school students within the project: National Plan for Scientific Degrees, University of Cagliari.
- 2017 *Models and Methods for services evaluation* for the Master in Administration Science, University of Cagliari.
Statistical Methods for the Evaluation for the Master in Politics, Society and Territory, University of Cagliari.
Statistics 1 for the Bachelor in Economics and Business Administration, University of Cagliari.
Statistics for the Bachelor in Mathematics, University of Cagliari.
Statistics and Information Theory for the Bachelor in Computer Science, University of Cagliari.

- 2016 *Statistics* for the Bachelor in Mathematics, University of Cagliari.
Labs of Mathematics for High school students within the project: National Plan for Scientific Degrees, University of Cagliari.
- 2015 *Statistics 1* for the Bachelor in Economics and Business Administration, University of Cagliari.
Statistics for the Bachelor in Mathematics, University of Cagliari.
- 2011 *Labs of Mathematics* for High school students within the project: National Plan for Scientific Degrees, University of Cagliari.

Supervision of Students

- 2021 Master thesis in Mathematics with title *Finite Mixture Models and extensions for multilevel structures*
 Tutor for a research internship in Statistical Methodology within the Master degree in Mathematics. Research topic: *Computational Methods for Multilevel Cross-Classified Models*.
 Master thesis in Mathematics. Joint supervision with Matteo Bacchetti from the Astronomic Observatory of Cagliari. Title *Studying the aperiodic X-ray variability of the Ultraluminous X-ray sources in the M82 Galaxy*
- 2019 Co-supervisor bachelor thesis in Natural Sciences and Technological Sciences for the environment. Title *Indagine sull'apprendimento, sull'interesse e sulla sensibilità raggiunta dagli studenti della Scuola di Villasimius coinvolti nel Progetto Res Maris Scuola*

Courses and schools attendance

- 28/10/2019 - *Multiplex Networks e Multilevel networks* within ARS'19 (Seventh International Workshop on Social Network Analysis), Salerno
- 28/01/2019 *Advances in Multilevel and Longitudinal Modelling*, Department of Statistical Sciences, University of Padova
- 12/06/2016 *Computational methods in Bayesian Statistics* within ISBA 2016 World Meeting, Cagliari
- 18/06/2015 - *Structural Equation Models (SEM): Mplus software and epidemiological applications*, Department of Mathematics, University of Turin
- 15/09/2014 - *Data acquisition and analysis in metabolomics* International Summer School, Pula (Italy), organized from University of Cagliari
- 14/06/2014 *Bayesian Variable Selection: Past, Present and Future* and *Advances in Bayesian Bioinformatics: Models and Integrative Inference for High-Throughput Data*, University of Cagliari within IYSM 2014 - International Young Statistician Meeting. y-SIS Satellite event of XLVII riunione scientifica della Società Italiana di Statistica
- 2/07/2012 - *Bayesian Modeling for Cognitive Science with WinBUGS*, International Summer School organized from Department of Psychology, University of Amsterdam
- 17/06/2011 - *Basic course of Statistics and Epidemiology*, Summer School of Public Health and Epidemiology, University Paris-Sud 11, Faculty of Medicine, Paris

24/03/2011 - *New generation GIS to map the variability in the territory*, workshop organized
01/04/2011 from Faculty of Science, University of Cagliari

Informatic skills

Software R, Stata, Latent Gold, MLwiN, MatLab, Microsoft Office (Word e Excel), C, C++, Python

Languages

Mothertongue Italian

Other Languages English, French, Spanish

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV

Last update: February 22, 2022