October 24, 2025

Andrea Carta

Research Interests

Computational Statistics, Biostatistics, Portfolio Optimization, Machine Learning, Pharmacoeconomics, Decision Trees, Clustering, Classification, Semi-supervised modeling.

Academic Positions

University of Cagliari, Italy

Postdoctoral Researcher in Statistics
Department of Economics and Business Sciences — October, 2024 to present

- *Topic: Development of machine learning algorithms for the evaluation of territorial resilience and sustainability in the Italian regions.*

Research Grant
Department of Economics and Business Sciences — January, 2020 to June, 2021

- *Topic: Specification and implementation of statistical models to estimate the economic impact of pharmacogenetic tests on patients with major depressive disorder.*

National Research Council, Italy

Research Collaborator (Affiliated Researcher)
Institute of Genetic and Biomedical Research (IRGB-CNR) — July 2025 to present

- *Topic: Statistical analysis of dietary and multi-omic data within the project SEMICYCLE*

Education

University of Cagliari, Italy

Ph.D., Statistics, February 2025

- Title thesis: Essays on Nonparametric Prediction Models
- Supervision of thesis Luca Frigau

M.S., Economic Sciences, grade 110/110 *cum laude*, July 2019

B.S., Mathematics, grade 90/110, February 2018

Memberships

ISBIS - International Society for Business and Industrial Statistics

y-BIS - Young Statistician's group in the ISBIS

CLADAG - Classification and Data Analysis Group of the Italian Statistical Society

ENBIS - European Network for Business and Industrial Statistics

Committee Memberships

Member of the Organizing Committee of the 1st Summer School in Advanced Statistical Learning for Preference, Ranking, and Ordinal Data (PREFSTAT 2024) (Calasetta, Italy 2-6 September 2024)

Grant Project Memberships

Member of spoke 7 of the local unit of the Department of Economic and Business Sciences at the University of Cagliari for the multidisciplinary research project titled "GRINS - Growing Resilient Inclusive And Sustainable," Topic 9 "Economic and financial sustainability of systems and territories," funded by the National Recovery and Resilience Plan (PNRR) Extended Partnership - Investment 1.3 (CUP F53C22000760007).

Member of the local unit at the Institute of Genetic and Biomedical Research (IRGB-CNR), Monserrato, for the research project titled "SEMICYCLE – Deciphering female's SEx hormones - MIcrobiota interactions during a menstrual CYCLE for an efficient personalized medicine in cardiometabolic disorders" (Project Code: DSB.AD005.128), funded by the Horizon Europe programme, ERC Starting Grant 2022 (GA n. 101075624 – CUP B33C22002080006). Research activity focused on the implementation and application of statistical methods for the analysis of dietary and multi-omic data.

Member of the local unit of the Department of Economics and Business Sciences of the University of Cagliari for the the research project "The role of advanced statistics in the process of co-planning of interventions in support of non-self-sufficiency" funded by the National Social Security Institute as part of the notice of July 15th 2020 "Ricerca e selezione di Dottorati di ricerca Industria 4.0, Scienze statistiche e attuariali, Sviluppo sostenibile, Inps e Welfare"

Member of the local unit of the Department of Economic and Business Sciences at the University of Cagliari for the multidisciplinary research project titled "Pharmacogenetic study of antidepressant drugs: characterization of CYP2D6 and CYP2C19 cytochrome metabolization profiles in a Sardinian population of patients affected by major depressive disorder and the economic impact of the testx", funded by the Development and Cohesion Fund 2014-2020, Annuity 2017 (CUP F76C18000850002). Coordinator: Prof. Bernardo Carpiniello.

Visiting Positions

University of Texas State, USA — May to July, 2024
Visiting fellow at the Department of Information System and Analytics, The McCoy College of Business, Texas State University, USA, invited by Prof. Thair Ekin for collaborating in developing methodologies on nonparametric regression models.

Charles University in Prague, Czech Republic — February, 2024
Visiting fellow at the Department of Probability and Mathematical Statistics of Charles University in Prague, Czech Republic, invited by Prof. Jaromir Antoch for collaborating in developing of non parametric methodologies for denoising images.

Charles University in Prague, Czech Republic — April to June, 2023
Visiting fellow at the Department of Probability and Mathematical Statistics of Charles University in Prague, Czech Republic, invited by Prof. Jaromir Antoch for collaborating in the development of Markov Chains classification models.

Publications in Peer-Reviewed Journals

1. **Carta, A.**, Frigau, L. (2025). Tree oblique for regression with weighted support vector machine. *Computational Statistics*. ISSN 0943-4062. DOI: 10.1007/s00180-025-01647-w

2. Squassina, A., Paribello, P., Pinna, M., Contu, M., Orrù, D., Upali, M., El Kacemi, S., Frau, I., Suprani, F., Corrias, C., Somaini, G., Pinna, F., Pisanu, C., Meloni, A., **Carta, A.**, Conversano, C., Mola, F., Del Zompo, M., Buson, L., Gennarelli, M., Minelli, A., Carpiniello, B., Manchia, M. (2025). Association of pharmacodynamic genes with treatment outcomes in major depressive disorder: results from a Sardinian cohort. *The Pharmacogenomics Journal*, 25(3), 10. ISSN 1473-1150. DOI: 10.1038/s41397-025-00373-2

3. Squassina, A., Paribello, P., Pinna, M., Contu, M., Pisanu, C., Congiu, D., Severino, G., Meloni, A., **Carta, A.**, Conversano, C., Mola, F., Del Zompo, M., Bernoni d'Aversa, F., Minelli, A., Gennarelli, M., Pinna, F., Carpiniello, B., Manchia, M. (2025). A naturalistic retrospective evaluation of the utility of pharmacogenetic testing based on CYP2D6 e CYP2C19 profiling in antidepressants treatment in a cohort of patients with major depressive disorder. *Progress in*

Neuro-Psychopharmacology and Biological Psychiatry, 137: 111292. ISSN: 1878-4216. DOI: 10.1016/j.pnpbp.2025.111292

4. Frigau, L., Contu, G., Ortu, M., **Carta, A.** (2024). Gauging Airbnb review sentiments and critical key-topics by small area estimation. *Statistical Methods and Applications*, 33(4), 1145–1170. ISSN: 1613-981X. DOI: 10.1007/s10260-024-00764-y.

5. Busonero, F., Lenarduzzi, S., Crobu, F., Gentile, R. M., **Carta, A.**, Cracco, F., Maschio, A., Camarda, S., Marongiu, M., Zanetti, D., Conversano, C., Di Lorenzo, G., Mazzà, D., De Seta, F., Girotto, G., Sanna, S. (2024). The Women4Health cohort: a unique cohort to study women-specific mechanisms of cardio-metabolic regulation. *European Heart Journal Open*, 4.2. ISSN: 2752-4191. DOI: 10.1093/ehjopen/oeae012

6. Ortu, M., Romano, M., **Carta, A.** (2024). Semi-Supervised Topic Representation Through Sentiment Analysis and Semantic Networks. *Big Data Research*, 37: 100474. ISSN: 2214-5796. DOI: 10.1016/j.bdr.2024.100474

7. Zammarchi, G., **Carta, A.**, Columbu, S, Frigau, L., Musio, M. (2023). A scientometric analysis of the effect of COVID-19 on the spread of research outputs. *Quality & Quantity*, 58(3), 2265–2287. ISSN: 1573-7845. DOI: 10.1007/s11135-023-01742-4

8. **Carta, A.**, Del Zompo, M., Meloni, A., Mola, F., Paribello, P., Pinna, F., Pinna, M., Pisanu, C., Manchia, M., Squassina, A., Carpiniello, B., Conversano, C. (2022). Cost-Utility Analysis of Pharmacogenetic Testing Based on CYP2C19 or CYP2D6 in Major Depressive Disorder: Assessing the Drivers of Different Cost-Effectiveness Levels from an Italian Societal Perspective. *Clinical Drug Investigation*, 42(9), 733–746. ISSN: 1179-1918. DOI: 10.1007/s40261-022-01182-2.

9. **Carta, A.**, Conversano, C. (2021). Cost utility analysis of Remdesivir and Dexamethasone treatment for hospitalised COVID-19 patients - a hypothetical study. *BMC Health Services Research*, 21(1), 986. ISSN: 1472-6963. DOI: 10.1186/s12913-021-06998-w.

10. Pinna, M., Manchia, M., Pisanu, C., Pinna, F., Paribello, P., **Carta, A.**, Meloni, A., Conversano, C., Del Zompo, M., Mola, F., Squassina, A., Carpiniello, B. (2021). Protocol for a pharmacogenetic study of antidepressants: characterization of drug-metabolizing profiles of cytochromes CYP2D6 and CYP2C19 in a Sardinian population of patients with major depressive disorder. *Psychiatric Genetics*, 31(5), 186–193. ISSN: 0955-8829. DOI: 10.1097/YPG.0000000000000293.

11. **Carta, A.**, Conversano, C. (2020). On the use of Markov models in Pharmacoeconomics: pros and cons and implications for policy makers. *Frontiers in Public Health*, 8. ISSN 2296-2565. DOI: 10.3389/fpubh.2020.569500.

12. **Carta, A.**, Conversano, C. (2020). Practical Implementation of the Kelly criterion: optimal growth rate, number of trades and rebalancing frequency for equity portfolios. *Frontiers in Applied Mathematics and Statistics*, 6. ISSN 2297-4687. DOI: 10.3389/fams.2020.577050.

Submissions in Peer-Reviewed Journals

Working papers

1. Carta, A. Frigau L., Antoch J. Classification through Markov Chain.

2. Frigau L, Carta A. Classification and Regression Trees for Spatial Data.

3. Frigau L, Carta A. Oblique Regression Random Forests

Book Chapters

1. **Carta, A.**, Frigau, L. (2025). Weighted Logistic Oblique Tree for Regression. In: D'Ambrosio, A., de Rooij, M., De Roover, K., Iorio, C., La Rocca, M. (eds) *Supervised and Unsupervised Statistical Data Analysis. CLADAG-VOC 2025. Studies in Classification, Data Analysis, and Knowledge Organization.* Springer, Cham, pp. 70–82. DOI: 10.1007/978-3-032-03042-9_7.

2. Ortu, M., Romano, M., **Carta, A.** (2024). SMARTS: SeMi-Supervised Clustering for Assessment of Reviews Using Topic and Sentiment. In: Davino, C., Palumbo, F., Wilhelm, A.F.X., Kestler, H.A. (eds) *Recent Trends and Future Challenges in Learning from Data. ECDA 2022. Studies in Classification, Data Analysis, and Knowledge Organization.* Springer, Cham, pp. 95–106. DOI: 10.1007/978-3-031-54468-2_9.

Conference Proceedings

1. **Carta, A.**, Frigau, L. (2025). Weighted Logistic Oblique Tree for Regression. *CLADAG-VOC 2025 Book of Abstracts*, pp. 202. ISBN: 978-88-919-3563-2.

2. **Carta, A.**, & Frigau, L. (2025). Feature-selective oblique trees for regression: Application to STEM graduate wage prediction in Italy. *Proceedings of the 7th International Conference on Statistics: Theory and Applications (ICSTA '25)* (Paper No. 149). Paris, France. ISBN: 978-1-990800-59-7; ISSN: 2562-7767.

3. Frigau, L., Contu, G., Ortu, M., **Carta, A.** (2023). A Method to Validate Clustering Partitions. *CLADAG 2023 Book of Abstracts and Short Papers*, pp. 473–476. ISBN: 978-88-919-3563-2.

4. **Carta, A.** (2023). A support vector machine approach to create oblique decision trees for regression. *CLADAG 2023 Book of Abstracts and Short Papers*, pp. 374-377. ISBN: 978-88-919-3563-2.

5. Squassina, A., **Carta, A.**, Congiu, D., Conversano, C., Galbiati, C., Gennarelli, M., Manchia, M., Meloni, A., Minelli, A., Mola, F., Paribello, P., Pinna, F., Pinna, M., Pisanu, C., Carpiniello, B. (2023). Utility and cost-effectiveness of pharmacogenetic testing based on CYP2D6 and CYP2C19 genes in depression. *Neuroscience Applied*, 2, 103490. DOI: 10.1016/j.nsa.2023.103490.

6. Paribello, P., Pinna, F., Ubezio, F., Somaini, G., Suprani, F., Upali, M., El Kacemi, S., Pinna, M., Pisanu, C., Meloni, A., Mola, F., Conversano, C., **Carta, A.**, Squassina, A., Manchia, M., Carpiniello, B. (2022). Characterising pharmacogenetic predictors of treatment response in major depressive disorder: preliminary data of a retrospective cohort from an outpatient clinic. *ECNP Congress, Neuroscience Applied*, 1, 100218. DOI: 10.1016/j.nsa.2022.100218.

Conference Presentations

1. ISI WSC 2025 - ISI World Statistics Congress 2025, presentation title *A novel approach for oblique decision trees for regression.* October 05–09, 2025. The Hague, Netherlands.

2. ENBIS 2025 - European Network for Business and Industrial Statistics 2025, (**invited**) presentation title *Oblique Random Forests for Regression Using Weighted Support Vector Machines.* September 14–18, 2025. Piraeus, Greece.

3. CLADAG-VOC 2025 - 14th Scientific Meeting of the CLAssification and Data Analysis Group of the Italian Statistical Society, presentation title *Weighted Logistic Oblique Tree for Regression.* September 08–10, 2025. Naples, Italy.

4. ICSTA 2025 - International Conference on Statistics: Theory and Applications, presentation title *Feature-selective oblique trees for regression: Application to STEM graduate wage prediction in Italy.*. August 17–19, 2025. Paris, France.
5. ENBIS 2024 - European Network for Business and Industrial Statistics 2024, (**invited**) presentation title *SVM Regression Oblique Trees: A Novel Approach to Regression Tasks*. September 15–19, 2024. Leuven, Belgium.
6. COTS 2024 - 43rd Annual Conference of Texas Statisticians 2024, poster title *A Statistical Learning Approach for Cost-Utility Analysis.*. May 9–10, 2024. Houston, USA.
7. CLADAG 2023 - 14th Scientific Meeting of the CLAssification and Data Analysis Group of the Italian Statistical Society, presentation title *A support vector machine approach to create oblique decision trees for regression*. September 11–13, 2023. Salerno, Italy.

Referee service

Quality & Quantity; SSM - Qualitative Research in Health; Applied System Innovation; Healthcare; npj Digital Medicine; Journal of Pharmaceutical Innovation.

Honors and Awards

Classification and Data Analysis Group

- Young Researcher Paper Award, Naples, Italy, 2025

International Conference on Statistics: Theory and Applications

- Best Paper Award, Paris, France, 2025

Teaching Experience

Lecturer

Master's Level Courses (at University of Cagliari, Italy)

- Statistical Models for Portfolio Asset Allocation (degree in Economics, Finance and Public Policies, 36 hours, Fall 2025)
- Basis of Scientific Methodology (degree in Cellular and Molecular Biology, 32 hours, Spring 2025)
- Statistical Models for Portfolio Asset Allocation (degree in Economics, Finance and Public Policies, 36 hours, Fall 2024)
- Basis of Scientific Methodology (degree in Cellular and Molecular Biology, 32 hours, Spring 2024)

Teaching Assistant, at University of Cagliari, Italy

Responsibilities have included leading practice and computing lab sessions, holding office hours, creating lab content, and grading.

- Statistical Learning for Data Science (degree in Data Science, Business Analytics and Innovation, 36 hours, Fall 2024)
- Statistical Learning for Data Science (degree in Data Science, Business Analytics and Innovation, 36 hours, Fall 2023)
- Statistical Models for Portfolio Asset Allocation (degree in Economics, Finance and Public Policies, 10 hours, Fall 2023)
- Statistics (degree in Economics and Business Management, 32 hours, Spring 2023)
- Statistical Models for Portfolio Asset Allocation (degree in Economics, Finance and Public Policies, 10 hours, Fall 2022)
- Statistical Models for Portfolio Asset Allocation (degree in Economics, Finance and Public Policies, 10 hours, Fall 2021)
- Statistics for Business Application (degree in Economics and Management of Tourist Services, 30 hours, Spring 2021)
- Statistics (degree in Economics and Business Management, 24 hours, Spring 2021)

Technical Skills Computer Applications: TEX (LATEX, BIBTEX)

R language

MATLAB, PYTHON, STATA

Operating Systems: Microsoft Windows family