Beatrice Franzolini

Contact information

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Current position

Jul 2023–Present	*Fixed-Term Researcher (Italian RTD-A, equivalent to Assistant Professor)*, Bocconi Institute for Data Science and Analytics - BIDSA, Bocconi University (Milan, Italy)
Feb 2020–Present	*Research affiliate*, Bayesian Learning Laboratory - BayesLab, Bocconi University (Milan, Italy)

Past academic positions

Jan 2022–Jul 2023	*Research Fellow*, Singapore Institute for Clinical Sciences - SICS Agency for Science, Technology and Research - A*STAR (Singapore, Republic of Singapore)
Jan 2022–Jul 2023	*Member*, Division of Biomedical Data Science, Yong Loo Lin School of Medicine National University of Singapore - NUS (Singapore, Republic of Singapore)

Education

Sep 2017 - Feb 2022   ***PhD in Statistics*, Bocconi University** (Milan, Italy)

Advisors:	Antonio Lijoi, Igor Prünster
Thesis:	On Dependent Processes in Bayesian Nonparametrics: Theory, Methods, and Applications.
Final Mark:	with honors

Sep 2014 - Apr 2017   ***Master of Science in Finance*, Bocconi University** (Milan, Italy)

Advisor:	Massimo Guidolin
Thesis:	Can a Consumption-Based Stochastic Discount Factor Jointly Price the Cross-section of Commodity Futures Returns?
Final Mark:	110/110 with honors

Sep 2011- Jul 2014   ***Bachelor in Statistics*, University of Bologna** (Bologna, Italy)

Advisor:	Luca De Angelis
Thesis:	Utility Functions for C-CAPM: an Empirical Analysis to Compare CRRA Functions with Epstein and Zin Function.
Final Mark:	110/110 with honors

Research interests

My research interests include both methodological and applied aspects of Bayesian statistics and machine learning, with a focus on dependent processes, clustering and random partitions, change-point detection and dynamic models, zero-inflated data.

Publications

Articles in refereed journals

1. Ascolani, F., Franzolini, B., Lijoi, A., and Prünster, I. (2024, in press). Nonparametric priors with full-range borrowing of information, *Biometrika*, forthcoming. `https://doi.org/10.1093/biomet/asad063`

2. Franzolini, B. and Rebaudo, G. (2024, in press). Entropy regularization in probabilistic clustering, *Statistical Methods & Applications*, forthcoming. `https://doi.org/10.1007/s10260-023-00716-y`

3. Franzolini, B., Beskos, A., De Iorio, M., Poklewski-Koziell, W. P., and Grzeszkiewicz, K. (2024). Change-point detection in dynamic Gaussian graphical models: the impact of COVID-19 pandemic on US stock market, *The Annals of Applied Statistics*, 18(1), 555-584. `https://doi.org/10.1214/23-AOAS1801`

4. Franzolini, B., Cremaschi, A., van den Boom, W., and De Iorio, M. (2023). Bayesian clustering of multiple zero-inflated outcomes, *Philosophical Transactions of the Royal Society A*, 381(2247), 1-16. `https://doi.org/10.1098/rsta.2022.0145`

5. Franzolini, B., Lijoi, A., and Prünster, I. (2023). Model selection for maternal hypertensive disorders with symmetric hierarchical Dirichlet processes, *The Annals of Applied Statistics*, 17(1), 313-332. `https://doi.org/10.1214/22-AOAS1628`

Preprints and submitted papers

6. Franzolini, B., De Iorio, M., and Eriksson, J.G. (2024+). Conditional partial exchangeability: a probabilistic framework for multi-view clustering. arXiv:2307.01152 (status: submitted)

7. [**Cross-Disciplinary**] van den Boom, W., Cremaschi, A., Ng, N.B.H., Franzolini, B., Tan, K.B., Chan, J., Tan, K.H., Chong, Y.S., Eriksson, J.G., De Iorio, M. (2024+). Post-partum screening for type 2 Diabetes in Women with a History of Gestational Diabetes Mellitus: A Cost-Effectiveness Analysis in Singapore. (status: submitted)

Refereed proceedings and discussions

8. Rebaudo G., Fasano, A., Franzolini, B., and Müller, P. (2023). A discussion on: "Evaluating sensitivity to the stick-breaking prior in Bayesian nonparametrics" by Giordano, R., Liu, R., Jordan M. I. and Broderick T., *Bayesian Analysis*, 18(1), 287-366. `https://doi.org/10.1214/22-BA1309`

9. Franzolini, B., Bondi, L., Fasano, A., and Rebaudo, G. (2023). *Bayesian forecasting of multivariate longitudinal zero-inflated counts: an application to civil conflict.* In Book of Short Papers CLADAG 2023, 465-468. (Editors: Corretto, P., Giordano G., La Rocca, M., Parrella, M. L., Rampichini, C.) ISBN 9788891935632

10. Fasano, A., Anceschi, N., Franzolini, B., and Rebaudo, G. (2023). *Efficient computation of predictive probabilities in probit models via expectation propagation.* In Book of Short Papers CLADAG 2023, 449-452. (Editors: Corretto, P., Giordano G., La Rocca, M., Parrella, M. L., Rampichini, C.) ISBN 9788891935632

11. Fasano, A., Anceschi, N., Franzolini, B., and Rebaudo, G. (2023). *Efficient expectation propagation for posterior approximation in high-dimensional probit models.* In Book of Short Papers SIS 2023, 1133-1138. (Editors: Chelli, F. M., Ciommi, M., Mariani, F., Recchioni, M. C.) ISBN 9788891935618

12. Franzolini, B. and Rebaudo, G. (2022). *A regularized-entropy estimator to enhance cluster interpretability in Bayesian nonparametrics.* In Book of Short Papers SIS 2022, 387-397. (Editors: Balzanella, A., Bini, M., Cavicchia, C. and Verde, R.). ISBN 9788891932310

13. Ascolani, F., Franzolini, B., Lijoi, A., and Prünster, I. (2021). *On the dependence structure in Bayesian nonparametric priors.* In Book of Short Papers SIS 2021 (Editors: Perna, C., Salvati, N. and Schirripa Spagnolo, F.). ISBN 9788891927361

Ongoing research projects

- Multivariate species sampling models (*joint work with A. Lijoi, I. Prünster, and G. Rebaudo*) - *Part of this project is available in Chapter 2 of my Ph.D. thesis.*
- Geometry of scale mixtures (*joint work with M. De Iorio*)
- Scalable expectation propagation for generalized linear models (*joint work with N. Anceschi, A. Fasano and G. Rebaudo*)
- Detecting evolving communities in dynamic network data (*joint work with F. Gaffi*)
- Hierarchical multiplex networks (*joint work with D. Durante and V. Ghidini*)
- A longitudinal study of the gender gap in school grades via flexible Bayesian Beta regression with splines (*joint work with L. Bondi and M. Palma*)

Conference presentations and seminars

Invited talks

1. Frontiers of Bayesian Inference and Data Science, BIRS-CMO Workshop, Oaxaca, Mexico (September 2024 - upcoming).

2. 11th World Congress in Probability and Statistics - Bernoulli-IMS, Bochum, Germany (August 2024 - upcoming).

3. 3rd BNP Networking Workshop / IMS Interpretable Inference via Principled BNP Approaches in Biomedical Research and Beyond - residential research program in Singapore, Singapore, Republic of Singapore (July 2024 - upcoming).

4. 2024 World Meeting of the International Society for Bayesian Analysis (ISBA 2024), Venezia, Italy (July 2024 - upcoming).

5. International Symposium on Nonparametric Statistics 2024 (ISNPS 2024), Braga, Portugal (June 2024 - upcoming).

6. 52nd Meeting of the Italian Statistical Society (SIS 2024), Bari, Italy (June 2024 - upcoming).

7. 4th Italian Meeting on Probability and Mathematical Statistics 2024, Rome, Italy (June 2024 - upcoming).

8. 16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2023), Berlin, Germany (December 2023).

9. 6th International Conference on Econometrics and Statistics (ECOSTA 2023), Tokyo, Japan (August 2023).

10. Approximation Methods in Bayesian Analysis @ CIRM, Marseille, France (June 2023).

11. 2022 International Indian Statistical Association Conference (2022 IISA Conference), Bangalore, India (December 2022).

12. 15th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2022), London, UK (December 2022).

13. 2022 World Meeting of the International Society for Bayesian Analysis (ISBA 2022), Montreal, Canada (June 2022). Travel award (700 USD).

14. 51st Meeting of the Italian Statistical Society (SIS 2022), Caserta, Italy (June 2022).

15. 5th International Conference on Econometrics and Statistics (ECOSTA 2022), Kyoto, Japan (June 2022).

16. Foundations of Objective Bayesian Methodology Workshop, Oaxaca, Mexico (November 2021).

17. 4th International Conference on Econometrics and Statistics (ECOSTA 2021), Hong Kong, virtual (June 2021).

18. 13th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMSTATISTICS 2020), London, UK, virtual (December 2020).

19. 45th Arkansas Spring Lectures Series - Mathematical Sciences, virtual lectures - Fayetteville, USA (November 2020).

Contributed talks

20. 8th INVALSI data: a tool for teaching and scientific research. (INVALSI Seminar 2023), Rome, Italy (November 2023).

21. 14th Scientific Meeting Classification and Data Analysis Group (Cladag 2023), Salerno, Italy (September 2023).

22. 13th International Conference on Bayesian Nonparametrics (BNP13 2022), Puerto Varas, Chile (October 2022). Travel award (1000 USD).

23. Workshop ISBA@CIRM, Marseille, France (June 2021).

24. 2021 World Meeting of the International Society for Bayesian Analysis (ISBA 2021), Kunming, China, virtual (June 2021).

25. 50th Meeting of the Italian Statistical Society (SIS 2021), virtual conference - Pisa, Italy (June 2021).

Awards and funding

- 2023-26 Task Member of *PE1 FAIR - Future Artificial Intelligence Research - CUP B43C22000800006*
- 2022 Travel award, BNP world meeting (1000 USD)
- 2022 Travel award, ISBA world meeting (700 USD)
- Nov 2021-Jan 2022 Research assistantship, Bocconi Institute for Data Science and Analytics, Bocconi University
- 2021 Merit-Based financial support, Department of Decision Sciences, Bocconi University
- 2017-21 Merit-based Ph.D. fellowship, Department of Decision Sciences, Bocconi University
- Apr 2017-Jul 2017 and Jul 2016-Sep 2016 Research assistantship, Department of Finance, Bocconi University

Teaching activities

Course title	Level	Univeristy	Type of activity*	Period	Duration
Bayesian Statistical Methods	MSc	Bocconi University	CD	a.y. 2023-24	48h
Statistics	BSc	Bocconi University	I	a.y. 2020-21	20h
Financial Econometrics and Empirical Finance	MSc	Bocconi University	I	a.y. 2020-21	12h
Statistics	BSc	Bocconi University	I	a.y. 2019-20	40h
Statistics	BSc	Bocconi University	TA	a.y. 2020-21	90h
Financial Economentric and Empirical Finance	MSc	Bocconi University	TA	a.y. 2020-21	18h
Statistics	BSc	Bocconi University	TA	a.y. 2019-20	90h
Financial Econometrics and Empirical Finance	MSc	Bocconi University	TA	a.y. 2019-20	18h
Statistics	BSc	Catholic Uni. of the Sacred Heart	TA	a.y. 2019-20	24h
Statistics	BSc	Bocconi University	TA	a.y. 2018-19	90h
Financial Econometrics and Empirical Finance	MSc	Bocconi University	TA	a.y. 2018-19	18h
Quantitative Methods for Finance	BSc	Bocconi University	TA	a.y. 2018-19	57h

* CD = Course Director; I = Instructor; TA = Teaching Assistant

Student supervision

- Vladimir Badalyan, MSc student, Bocconi University (expected graduation: 2024)
- Noemi Savelkoul, MSc student, Bocconi University (expected graduation: 2024)

Professional service

- **Chair** for j-ISBA section of ISBA - junior section of the International Society for Bayesian Analysis (y. 2024).
- **Chair-Elect** for j-ISBA section of ISBA - junior section of the International Society for Bayesian Analysis (y. 2023).
- **Service in scientific committees for conferences and awards**
  - Satellite workshop to International Society for Bayesian Analysis (ISBA) world meeting, at Università della Svizzera Italiana (USI), Lugano, Switzerland. (y. 2024)
  - the BAyesian Young Statisticians Meeting 2023 (BAYSM 2023) [**Chair of the SC**] (y. 2023)
  - the Blackwell-Rosenbluth award by ISBA and j-ISBA [**j-ISBA liaison of the SC Executive Board**] (y. 2023)
- **Session organizer** at
  - Bernoulli-IMS 2024 World Congress, Bochum, Germany - Session title: "New Trends in Bayesian Nonparametrics"
  - Joint statistical meeting 2024 (JSM 2024), Portland, Oregon - Session title: "Blackwell-Rosenbluth Award" [ISBA endorsed session]
  - 4th Italian Meeting on Probability and Mathematical Statistics 2024, Rome, Italy - Session title: "Recent Advances in Bayesian Nonparametric Statistics "
  - RSS International Conference 2024 (RSS 2024), Brighton, UK. - Session title: "Bayesian methods for spatio-temporal data that don't take ages"
  - International Symposium on Nonparametric Statistics 2024 (ISNPS 2024), Braga, Portugal. - Session title: "Random partitions and Bayesian dependent clustering". (invited organizer)

- 6th International Conference on Econometrics and Statistics (ECOSTA 2023), Tokyo, Japan. - Session title: "Advances in Bayesian nonparametrics and model-based clustering". (invited organizer)

- **Referee** for
  - Journals: *Bayesian Analysis*, *Biostatistics*, *Computational Statistics and Data Analysis*, *Electronic Journal of Statistics*, *Journal of the American Statistical Association*, *Stat*, *Statistical Science*, and *Statistics and Computing*.
  - Competitive grant funding of Italian Ministry for University and Scientific Research.
  - Conference Proceedings: *BAYSM*.

- **Coordinator**, monthly reading group of Statistics, at NUS and A*STAR, 2022-2023 (Singapore, Republic of Singapore).

- **Volunteer and outreach activities** for
  - Data analyses for RiminiInRete, a digital database for studying and improving Rimini's school system (y. 2021-present, Rimini, Italy),
  - Webinar "STEM Morning - Science, Technology, Engineering, Mathematics" for high-school students at the University of Bologna (y. 2022, online).
  - Training course "Statistics and Data-analysis with Excel" for high-school and elementary teachers (y. 2022, online)
  - Webinar "About the relationship between students behavior and civic education grades" for high-school and elementary school teachers (y. 2022, online)
  - Seminar "Gender Differences in Primary and Secondary Schools in the Province of Rimini: Evidence from the RIR Project" for high-school and elementary school teachers (y. 2021, online)
  - European Researchers' Night 2019 (Milan, Italy),
  - Fondazione Rodolfo Debenedetti, project: racCONTAMI 2018, Third Census of Homeless People in Milan (Milan, Italy).

- **Writing assistantship** for Chapter 1 of the book "*Essentials of time series for financial applications*, Guidolin M. and Pedio M., Academic Press, 2018."

Society memberships and research networks

Institute of Mathematical Statistics (IMS); International Society for Bayesian Analysis (ISBA) [sections: Junior-ISBA, Bayesian Nonparametrics, Biostatistics and Pharmaceutical Statistics]; Italian Statistical Society (SIS) [sections: y-SIS, Classification and Data Analysis Group]; Complex Data Modeling Research Network (MiDaS).

Public softwares

1. GitHub repository FuRBI: Python and R codes for *Nonparametric priors with full-range borrowing of information*.
2. GitHub repository CPE: R code for *Conditional partial exchangeability: a probabilistic framework for multi-view clustering*.
3. GitHub repository ERC: R code for *Entropy regularization in probabilistic clustering*.
4. GitHub repository DynamicGGM: R code for *Change point detection in dynamic Gaussian graphical models*.
5. GitHub repository MFMmultiHurdle: R code for *Bayesian Clustering of Multiple Zero-Inflated Outcomes*.
6. GitHub repository sHDP: Python code for *Model Selection for Maternal Hypertensive Disorders with Symmetric Hierarchical Dirichlet Processes*.

Other education

2023	**Grant writing** , Introduction to grant writing: writing effective grant proposals (Singapore) *Instructor*: J. Lebrun	
2018	**Graphical Models**, Bocconi Summer School in Advanced Statistics and Probability (Como, Italy) *Instructors*: S. Lauritzen (University of Copenhagen) and R. Evans (University of Oxford)	
2018	**Bocconi Excellence in Advanced Teaching** (BEAT) by BUILT (Milan, Italy)	

Other work experience

2016–2019   *Contributing editor*, Zanichelli editore S.p.A, (Bologna, Italy)