Giovanni Rebaudo

Contact Information

Address: Corso Unione Sovietica 218/bis 10134 Turin, Italy
Email: giovanni.rebaudo@unito.it
Website: https://giovannirebaudo.github.io

Current Positions

University of Torino, Turin, Italy

Assistant Professor of Statistics (RTDA secs-s/01) **3/2023–Present**

Department of Economics, Social Studies, Applied Mathematics and Statistics (ESOMAS)

Collegio Carlo Alberto, Turin, Italy

Research Affiliate, "de Castro" Statistics Initiative **3/2023–Present**

Bocconi Institute for Data Science and Analytics (BIDSA), Milan, Italy

Research Affiliate, Bayesian Learning Laboratory (Bayes Lab) **6/2020–Present**

Past Position

University of Texas at Austin, Texas, USA

Postdoctoral Research Fellow, Department of Statistics and Data Sciences **10/2020–2/2023**

Mentors: Peter Müller and Abhra Sarkar

Education

Bocconi University, Milan, Italy

Ph.D. in Statistics. Awarded with honors **9/2016–9/2020 (Thesis Defense 2/2021)**

- Thesis title: *Bayesian Inference for Complex Data Structures: Theoretical and Computational Advances*
- Advisors: Antonio Lijoi and Igor Prünster

University of Trieste, Trieste, Italy

M.S. in Statistical and Actuarial Sciences. Final mark: 110/110 with honors **9/2014–7/2016**

- Thesis title: *Bayesian Hierarchical Model: Theory and Application*
- Advisors: Francesco Pauli and Nicola Torelli

University of Milano-Bicocca, Milan, Italy

B.S. in Statistical and Economic Sciences. Final mark: 110/110 with honors **9/2011–7/2014**

- Thesis title: *A New Technique for Estimation of Logarithmic Time Series Models: Forecast Comparison Based on Economic Data*
- Advisor: Matteo Maria Pelagatti

Research Interests

Bayesian Methods and Computation, Cluster Analysis, Bayesian Nonparametrics, Dimensionality Reduction, Time-Series Analysis, Predictive Inference, Categorical Regression, Auditory Neuroscience, Single-Cell RNA.

Publications

Papers in Peer-Reviewed Journals

1. Rebaudo, G. and Müller, P. (2024). **Graph-aligned random partition model (GARP).** *Journal of the American Statistical Association (T & M)*, in press. DOI: 10.1080/01621459.2024.2353943.
2. Roark, C. L., Paulon, G., Rebaudo, G., McHaney, J. R., Sarkar, A., and Chandrasekaran, B. (2024). **Individual differences in working memory impact the trajectory of non-native speech category learning.** *PLOS ONE*, 19: e0297917, 1–26. DOI: 10.1371/journal.pone.0297917.
3. Franzolini, B. and Rebaudo, G. (2024) **Entropy regularization in probabilistic clustering.** *Statistical Methods & Applications*, 33, 37–60. DOI: 10.1007/s10260-023-00716-y.
4. Ascolani, F., Lijoi, A., Rebaudo, G., and Zanella, G. (2023). **Clustering consistency with Dirichlet process mixtures.** *Biometrika*, 110, 551–558. DOI: 10.1093/biomet/asac051.
5. Lijoi, A., Prünster, I., and Rebaudo, G. (2023). **Flexible clustering via hidden hierarchical Dirichlet priors.** *Scandinavian Journal of Statistics*, 50, 213–234. DOI: 10.1111/sjos.12578.
6. Fasano, A., Rebaudo, G., Durante, D., and Petrone, S. (2021). **A closed-form filter for binary time series**. *Statistics and Computing*, 31:47, 1–20. DOI: 10.1007/s11222-021-10022-w.

Papers under Review

7. Anceschi, N., Fasano, A., Franzolini, B., and Rebaudo, G. **Scalable expectation propagation for generalized linear regressions.**

8. Rebaudo, G., Lin Q., and Müller, P. **Separate exchangeability as modeling principle in Bayesian nonparametrics.**
9. Rebaudo, G., Llanos, F., Chandrasekaran B., and Sarkar, A. **Bayesian mixed multidimensional scaling for auditory processing.**

Discussions

10. Catalano, M., Fasano, A., Giordano, M., and Rebaudo, G. (2024) **A discussion on: "Data fission: splitting a single data point" by Leiner, J., Duan, B., Wasserman, L. and Ramdas, A.** *Journal of the American Statistical Association*, in press. DOI: 10.1080/01621459.2023.2270748.
11. Catalano, M., Franzolini, B., Giordano, M., and Rebaudo, G. (2024) **A discussion on: "Sparse Bayesian factor analysis when the number of factors is unknown" by Frühwirth-Schnatter, S., Hosszejni, D., and Lopes, H. F.** *Bayesian Analysis*, in press. DOI: 10.1214/24-BA1423.
12. Catalano, M., Fasano, A., Giordano, M., and Rebaudo, G. (2024) **A discussion on: "Root and community inference on the latent growth process of a network" by Crane, H. and Xu, M.** *Journal of the Royal Statistical Society Series B*, 86, 874–875. DOI: 10.1093/jrsssb/qkae051.
13. Catalano, M., Fasano, A., and Rebaudo, G. (2023) **A discussion on: "Martingale posterior distributions" by Fong, E., Holmes C., and Walker S.** *Journal of the Royal Statistical Society Series B*, 85, 1406–1407. DOI: 10.1093/jrsssb/qkad095.
14. 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, 345–347. DOI: 10.1214/22-BA1309.

Conference Proceedings and Book Chapters (Peer-Reviewed)

15. Anceschi, N., Fasano, A., and Rebaudo, G. (2023). **Expectation propagation for the smoothing distribution in dynamic probit.** *Bayesian Statistics, New Generations New Approaches (BaYSM2022), Springer Proceedings in Mathematics and Statistics*, 435, 105–115. DOI: 10.1007/978-3-031-42413-7_10.
16. Fasano, A., Anceschi, N., Franzolini, B., and Rebaudo, G. (2023). **Efficient computation of predictive probabilities in probit models via expectation propagation.** *Book of Short Papers - CLADAG 2023*, 449–452. ISBN 9788891935632.
17. Franzolini, B., Bondi, L., Fasano, A., and Rebaudo, G. (2023). **Bayesian forecasting of multivariate longitudinal zero-inflated counts: an application to civil conflict.** *Book of Short Papers - CLADAG 2023*, 465–468. ISBN 9788891935632.
18. Fasano, A., Anceschi, N., Franzolini, B., and Rebaudo, G. (2023). **Efficient expectation propagation for posterior approximation in high-dimensional probit models.** *Book of Short Papers - SIS 2023*, 1133–1138. ISBN 9788891935618.
19. Fasano, A., Rebaudo, G., and Anceschi, N. (2022). **Bayesian inference for the multinomial probit model under Gaussian prior distribution.** *Book of Short Papers - SIS 2022*, 871–876. ISBN 9788891932310.
20. Franzolini, B. and Rebaudo, G. (2022). **A regularized-entropy estimator to enhance cluster interpretability in Bayesian nonparametric.** *Book of Short Papers - SIS 2022*, 387–398. ISBN 9788891932310.
21. Fasano, A. and Rebaudo, G. (2021). **Variational inference for the smoothing distribution in dynamic probit models.** *Book of Short Papers - SIS 2021*, 1076–1081. ISBN 9788891927361.

Awards

Academic Awards

[2024] National scientific qualification (ASN) for Associate Professor in Statistics (13/D1). Duration: 28/10/2024 – 28/10/2035.
[2023] Assistant Professor research prize (Premialità RTD), University of Torino.
[2020] Special financial support, Bocconi University.
[2020] Research fellowship, Bocconi University.
[2016-20] Merit-based Ph.D. fellowship, Bocconi University.

Data Competitions

[2018] **Predictive challenge:** best objective prediction. **Stat Under the Stars 4**.
[2017] **Predictive challenge:** first position. YoungCLADAG data contest.

Travel Awards

[2024] Travel award, BNP Networking Workshop (200$).
[2024] Travel award, ISBA world meeting (300$).

[2023] Travel award, IISA conference (750$).
[2022] Travel award, BNP world meeting (1000$).
[2022] Travel award, ISBA world meeting (300$).
[2019] Travel award, O'Bayes conference (400£).

Service to Profession

Referee (alphabetical order)

• Annals of Applied Statistics • Annals of Statistics • Bayesian Analysis • Bayesian Young Statisticians Meeting • Computational Statistics and Data Analysis • Electronic Journal of Statistics • Journal of Business & Economic Statistics • Journal of Machine Learning Research • Operations Research • Scandinavian Journal of Statistics • Statistical Methods & Applications • Statistical Science.

Evaluator/Committee Member for Paper Competitions

[2023, 2024] Student Paper Competition for Section on Bayesian Statistical Science (SBSS) of the American Statistical Association (ASA).

External Ph.D. Thesis Evaluator

- Ph.D. in Economics, Statistics and Data Science at the University of Milano-Bicocca.
- Ph.D. in Mathematics, Computer Science, and Statistics at the University of Firenze.

Organization of Scientific Events

- **Organizer** of European Young Statisticians Meeting (EYSM 2025) of the Bernoulli Society, Collegio Carlo Alberto, Turin, Italy.

Public Engagement (Terza Missione)

- European Researchers' Night. Turin, Italy (2024).
- European Researchers' Night. Milan, Italy (2019).

Local Duties

Students and Postdocs Supervised

Current Postdocs

Lorenzo Rimella, University of Torino (4/2024–Present).

Former B.Sc. Students

Paolo Ciriacì, B.Sc. in Economics and Data Science at the University of Torino (2023).

Committees

- Board member of the ESOMAS Department (Giunta di Diparimento) at the University of Torino (2024–2027).
- Committee member for the assignment of teaching positions at the University of Torino (2023–Present).
- Committee member for the assignment of postdoctoral positions at the University of Torino (2023–Present).
- Committee member for Allievi Honors Program thesis defenses at Collegio Carlo Alberto (2024–Present).

Webmaster

- "de Castro" Statistics Initiative within the Collegio Carlo Alberto website (2023-2024).

Research Networks & Memberships

I am a member of the:
Complex Data Modeling Research Network led by MiDaS, Institute of Mathematical Statistics [IMS], International Society for Bayesian Analysis [ISBA], Italian Statistical Society [SIS].

Grants & Funding

Principal Investigator of the ESOMAS Department research project "Bayesian models for interpretable random structures" (Duration: 2023-25).

Member of the PNRR Research Project of National Interest (PRIN-PNRR) group "Measuring biodiversity via Bayesian nonparametrics: estimation, clustering and uncertainty quantification." (National Coordinator: Igor Prünster; Duration: 2023-25).

Member of the Research Project of National Interest (PRIN) group "Discrete random structures for Bayesian learning and prediction." (National Coordinator: Antonio Lijoi; Duration: 2023-25).

Member of the NIH project research group "Bayesian methods for optimizing combination antiretroviral therapy for mental health in people with HIV" (Principal Investigator: Yanxun Xu; Duration: 2022-27).

Member of the NSF project research group "Novel statistical frameworks for local inference in neuroscience of learning" (Principal Investigator: Abhra Sarkar; Duration: 2020-23).

Member of the NSF project research group "Collaborative research: Bayesian inference for interpretable random structures" (Principal Investigator: Peter Müller; Duration: 2020-23).

Member of the Research Project of National Interest (PRIN) group "Modern Bayesian nonparametric methods" (National Coordinator: Igor Prünster; Duration: 2017-20).

Teaching Experience

Lecturer at **University of Torino**, Turin, Italy

- Statistical Machine Learning - M.Sc. (AY 2024/25).
- Introduction to Data Science: Statistical Learning and Data Analytics - B.Sc. (AY 2024/25, 2023/24, 2022/23).
- Statistics - B.Sc. (AY 2023/24, 2022/23).

Guest Lecturer at **University of Texas at Austin**, Texas, USA

- Monte Carlo Methods - Ph.D. (AY 2022/23).
- Mathematical Statistics I - Ph.D. (AY 2022/23).
- Introduction to Mathematical Statistics - B.Sc. (AY 2022/23).

Teaching Assistant at **Bocconi University**, Milan, Italy

- Machine Learning II - M.Sc. (AY 2020/21, 2019/20).
- Data Analysis - M.Sc. (AY 2019/20, 2018/19, 2017/18).

Teaching Certificates

- IRIDI START: Quality teaching, evaluation and inclusion by the University of Torino (2024).
- Bocconi Excellence in Advanced Teaching by BUILT (**BEAT**) (2019).

Schools

[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).

[2017] **Statistical Causal Learning**.
Bocconi Summer School in Advanced Statistics and Probability. Como, Italy.
Instructors: B. Schölkopf (Max Planck Institute for Intelligent Systems, Tübingen), I. Tolstikhin (Google AI, Zürich) and D. Lopez-Paz (Facebook AI Research, Paris).

Presentations

Invited Presentations

[2025] Int. Conf. on Recent Developments in the Techniques of Bayesian Paradigm. Varanasi, India.
[2024] Frontiers of Bayesian Inference and Data Science [BIRS–CMO Workshop]. Oaxaca, Mexico.
[2024] ISBA-BNP Networking workshop [International Society of Bayesian Analysis - BNP]. Singapore, SG.
[2024] Interpretable Inference via Principled BNP Approaches in Biomedical Research and Beyond. Singapore, SG.
[2024] ISNPS 2024 [International Symposia on Nonparametric Statistics]. Braga, Portugal.
[2023] EcoSta 2023 [International Conference on Econometrics and Statistics]. Tokyo, Japan.
[2023] Approximation Methods in Bayesian Analysis [CIRM Workshop]. Luminy, France.
[2022] IISA Conference 2022 [International Indian Statistical Association]. Bangalore, India.
[2022] ISBA 2022 [International Society of Bayesian Analysis]. Montreal, Canada.
[2021] CMStatistics–ERCIM 2021 [14th Int. Conf. ERCIM WG, Comput. and Methodol. Stat.]. London, UK (online).
[2021] Foundations of Objective Bayesian Methodology [BIRS–CMO Workshop]. Oaxaca, Mexico.
[2021] EcoSta 2021 [International Conference on Econometrics and Statistics]. Hong Kong (online).
[2021] BISP 12 [Bayesian Inference in Stochastic Processes]. Milan, Italy, with discussion (online).
[2020] CMStatistics–ERCIM 2020 [13th Int. Conf. ERCIM WG, Comput. and Methodol. Stat.]. London, UK (online).
[2019] IIASA Conference 2019 [International Indian Statistical Association]. Mumbai, India.
[2019] Second Italian Meeting on Probability and Mathematical Statistics. Vietri sul Mare, Italy.

Contributed Presentations

[2022] BNP13 [International Conference on Bayesian Nonparametrics]. Puerto Varas, Chile.
[2022] ENAR Meeting [Eastern North American Region International Biometric Society]. Houston, USA (online).

Poster Presentations

[2024] ISBA 2024 [International Society of Bayesian Analysis]. Venice, Italy.
[2019] O'Bayes 2019 [Objective Bayes Methodology Conference]. Warwick, United Kingdom.
[2019] BNP12 [International Conference on Bayesian Nonparametrics]. Oxford, United Kingdom.

Seminars

[2024] Mathematics & Statistics Seminar Series. Dept. of Economics at the University of Bergamo, Italy.
[2021] SDS Seminar Series. Dept. of Statistics and Data Sciences, the University of Texas at Austin, USA (online).

Software

Statistical Software and Programming Language: R, Python, SAS, STAN, MATHEMATICA.

Public Software

- GitHub repository `EPglm`: R codes for expectation propagation in generalized linear models.
- GitHub repository `SEP-BNP`: R codes for separately exchangeable Bayesian nonparametric models.
- GitHub repository `MSSP`: R codes for multivariate species sampling processes.
- GitHub repository `GARP`: R codes for graph-aligned random partition model.
- GitHub repository `EPprobit-SN`: R code for efficient expectation propagation for Bayesian probit models.
- GitHub repository `ERC`: R code for Entropy regularization in probabilistic clustering.
- GitHub repository `Dynamic-Probit-EP`: code for expectation propagation for the smoothing distribution in dynamic probit.
- GitHub repository `Dynamic-Probit-PFMVB`: R code for variational inference for the smoothing distribution in dynamic probit models.