

Sandra Fortini

Department of Decision Sciences
Bocconi University
Via Röntgen 1, 20136 Milano, Italy
Sandra.fortini@unibocconi.it
<http://faculty.unibocconi.it/sandrafortini/>



Current Academic Position

MAY 2007 – *Associate Professor of Statistics, Bocconi University*

Past Positions

MAY 1995 – MAY 2007 *Assistant professor of Statistics, Bocconi University*

MAY 1994 – APR 1995 *Researcher,*

Institute for the Applications of Mathematics and Informatics, National Council of Research

MAY 1990 – APR 1994 *Research fellow,*

Institute for the Applications of Mathematics and Informatics, National Council of Research

Education

AUG 1993 *Master of Science in Applied Stochastic Systems – University College London*

JUL 1989 *Degree in Mathematics with honours (110/110 cum laude), University of Milano.*

Editorial activity

JAN 2016 –

Associate Editor, Sankhya – The Indian Journal of Statistics Series A – Mathematical Statistics and Probability

Main publications

- “Uncertainty directed factorial clinical trials”
Kotecha, G., Ventz S., Fortini S., Trippa L.
Biostatistics. Forthcoming.
<https://academic.oup.com/biostatistics/advance-article/doi/10.1093/biostatistics/kxad036/7603506?login=true>
- Deep Stable neural networks: large-width asymptotics and convergence rates.
Favaro S., Fortini S., Peluchetti S.
Bernoulli Journal, 29, 1350-7265. 2023
<https://projecteuclid.org/journals/bernoulli/volume-29/issue-3/Deep-stable-neural-networks--Large-width-asymptotics-and-convergence/10.3150/22-BEJ1553.full>

- “Prediction-based uncertainty quantification for exchangeable sequences”
Fortini S., Petrone S.
Philosophical Transactions of the Royal Society of London, Series A, **381**, 0142. 2023
<https://royalsocietypublishing.org/doi/abs/10.1098/rsta.2022.0142>

- “Infinite-color randomly reinforced urns with dominant colors”
Sariev, H., Fortini, S. and Petrone, S.
Bernoulli, 29(1) 132-152. 2023.
<https://doi.org/10.3150/21-BEJ1452>

- “Infinitely wide limits for deep Stable neural networks: sub-linear, linear and super-linear activation functions”
Bordino, A., Favaro, S. and Fortini, S.
Transactions of Machine Learning Research. 2022.
<https://openreview.net/forum?id=A5tIluhDW6>

- “Approximating the Operating Characteristics of Bayesian Uncertainty Directed Trial Designs”
Bonsaglio, M., Fortini, S., Ventz, S. and trippa, L.
Journal of Statistical Planning and Inference, 221, 90-99. 2022
<https://doi.org/10.1016/j.jspi.2022.03.001>

- “Infinite-channel deep convolutional stable neural networks”
Bracale, D. Favaro, S., Fortini, S. and Peluchetti, S.
Bayesian Deep Learning NeurIPS Workshop. 2021
<http://bayesiandeeplearning.org/2021/papers/4.pdf>

- Predictive constructions based on measure-valued Pólya urn processes
Sariev H., Fortini, S. and Petrone, S.
Mathematics, 9 (22), 2845. 2021
<https://doi.org/10.3390/math9222845>

- “Large-width functional asymptotics for deep Gaussian neural networks”
Bracale, D., Favaro, S., Fortini, S. and Peluchetti, S.
International Conference on Learning Representations, 2021
<https://openreview.net/pdf?id=0aW6lYOYB7d>

- “Stable behaviour of infinitely wide deep neural networks”
Favaro S., Fortini, S. and Pelucchetti, S.
Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics. 2020.
<http://proceedings.mlr.press/v108/peluchetti20b/peluchetti20b.pdf>

- “Quasi-Bayes properties of a procedure for sequential learning in mixture models”
Fortini, S., Petrone S.
Journal of the Royal Statistical Society B, 82(4), 1087-1114. 2020
<https://rss.onlinelibrary.wiley.com/doi/abs/10.1111/rssb.12385>

- "On a notion of partially conditionally identically distributed sequences"
Fortini, S., Petrone S. and Sporysheva P.
Stochastic Processes and their Applications. 128(3), 727- 1072. 2018.
<https://www.sciencedirect.com/science/article/abs/pii/S0304414917301631>

- "Predictive Characterization of Mixtures of Markov Chains"
Fortini, S. and Petrone S.
Bernoulli Journal 23(3), 1538-1565. 2017
<http://dx.doi.org/10.3150/15-BEJ787>
- "Predictive distribution (de Finetti's view)"
Fortini, S., Petrone S.
Statsref-Statistics Reference Online. Wiley. 2016
<http://onlinelibrary.wiley.com/doi/10.1002/9781118445112.stat07831/abstract>
- "Hierarchical reinforced urn processes"
Fortini, S., Petrone S.
Stat. Prob. Lett 82, 1521 - 1529. 2012
<http://www.sciencedirect.com/science/article/pii/S0167715212001551>
- "Predictive construction of priors in Bayesian nonparametrics"
Fortini, S., Petrone S.
Braz. J. Probab. Stat. 6,4,423 - 449. 2012
<https://projecteuclid.org/euclid.bjps/1341320251>
- "Central Limit Theorem with Exchangeable Summands and Mixtures of Stable Laws as Limits"
Fortini, S., Ladelli L, Regazzini, E.
BUMI 5,3, 515 - 542. 2012
<https://arxiv.org/abs/1204.4357>
- "Recursive Equations for the predictive distributions of some determinantal processes" Cifarelli D.M., Fortini, S.
Stat. Prob. Lett. 81, 8-15. 2011
<http://www.sciencedirect.com/science/article/pii/S0167715210002622>
- "A Poisson Approximation for Colored Graphs Under Exchangeability"
Fortini, S., Cerquetti A.
Sankhya A 68 183-197. 2006
<https://www.jstor.org/stable/25053492>
- "A characterization for mixtures of Semi Markov processes"
Epifani I., Fortini, S. and Ladelli L.
Stat. Prob. Lett. 60 (4): 445-457. 2002
<https://www.sciencedirect.com/science/article/abs/pii/S0167715202003243>
- "On mixtures of distributions of Markov chains"
Fortini, S., Ladelli L., Petris G., Regazzini E.
Stoch. Proc. Appl. 100, 147-165. 2002
<https://www.sciencedirect.com/science/article/pii/S0304414902000935>
- "On the use of the concentration function in Bayesian robustness"
Fortini, S and Ruggeri F.
In *Robust Bayesian Analysis. Lecture Notes in Statistics*, pp.109-126. Springer-Verlag. 2000
<https://www.springer.com/gp/book/9780387988665>
- "Exchangeability, predictive distributions and parametric models"
Fortini, S., Ladelli L.
Sankhya, A, Vol62-1, pp. 86-109. 2000
<https://www.jstor.org/stable/25051292>

- “On parametric models for invariant probability measures”.
Berti P., Fortini S., Ladelli L., Regazzini E., Rigo P.
Quaderni di Statistica. Portici, Vol. 2, pp. 39-57. 2000
- “Differential properties of the concentration function”.
Fortini S., Ruggeri F.
Sankhya, A, Vol. 59, pp. 345-364. 1997
<https://www.jstor.org/stable/25051164>
- “A central limit problem for partially exchangeable random variables”
Fortini S., Ladelli L., Regazzini E.
Theory Probab. Appl. Vol. 41, Num. 2, pp. 353-379. 1996
<http://www.mathnet.ru/links/a4695b480973bab2a1d2dea68c0d048b/tvp2943.pdf>
- “Concentration function and sensitivity to the prior”
Fortini S., Ruggeri F.
JISS, Vol. 4, pp. 283-297. 1995
<https://link.springer.com/article/10.1007/BF02589116>
- “On defining neighborhoods of measures through the concentration function”
Fortini S., Ruggeri F.
Sankhya, series A, Vol. 56, Parte 3, pp. 444 - 457. 1994
<https://www.jstor.org/stable/25051010>
- “Concentration functions and Bayesian robustness”
Fortini S., Ruggeri F.
J. Stat. Plann. Inference, Vol. 40, Num. 2/3, pp. 205 - 220. 1994
<https://www.sciencedirect.com/science/article/abs/pii/037837589490121X>
- “Concentration function and coefficients of divergence for signed measures”
Fortini S., Ruggeri F.
JISS Vol. 2, No. 1, pp. 17 - 34. 1993
<https://link.springer.com/article/10.1007/BF02589073>

Working papers

- Leveraging External Data for Testing Experimental Therapies with Biomarker Interactions in Randomized Clinical Trials.
Ren, B. Ferrari, F. Fortini, S. Trippa, S., Vents, S.
- Exchangeability, prediction and predictive modeling in Bayesian statistics.
Fortini, S., Petrone, S.
<https://arxiv.org/abs/2402.10126>
- “Non-asymptotic approximations of Gaussian neural networks via second-order Poincaré inequalities”
Bordino, A., Favaro, S., Fortini, S.
<https://arxiv.org/abs/2304.04010>

- “Large-width asymptotics for ReLU neural Networks with α -stable initializations”
Favaro, S., Fortini, S., Peluchetti, S.
<https://arxiv.org/abs/2206.08065>

Recent talks, events and seminars

Un'introduzione ai limiti di scala delle reti neurali artificiali
UMI-PRISMA Webinar – 5-2-2024.
<https://www.youtube.com/watch?v=5puCfBWCdRA>

Predictive constructions based on Measure-valued Pólya urn processes.
King's College Webinar
31-3-2022.

Making AI for everyone: the case of business and media
Bocconi Hephaestus event
10 April 2024.

Dialogo sui fondamenti della Probabilità
Round Table – Bocconi University
16 March 2023

Large-width asymptotics for ReLU neural networks with α -stable initializations
IMS International Conference on Statistics and Data Science
Lisbon, 18-21 December 2023

Prediction-based uncertainty quantification in learning models
European Meeting of Statisticians
Warsaw, 2-7 July 2023

Stochastic Approximation Techniques for Bayesian Uncertainty Directed Trial Designs
IMS Meeting
London, 27-30 June 2022

Machine Learning: come le macchine apprendono dai dati
MeetMeTonight19
Milano 27-28 September 2019

Research groups

- 2022 PRIN-PNRR – *Measuring Biodiversity via Bayesian Nonparametrics: Estimation, Clustering and Uncertainty Quantification*
- 2017 – 2020 PRIN – *Modern Bayesian nonparametric methods*
- 1996 – 1998 PRIN – *Decisioni statistiche: teoria e applicazioni.*
- 1998 – 2000 PRIN – *Modelli statistici: basi probabilistiche e procedure per l'inferenza e le decisioni.*
- 1993 – 1994 PRIN – *Inferenza statistica: basi probabilistiche e sviluppi metodologici.*

Scientific Societies

*Institute of Mathematical Statistics,
International Society for Bayesian Analysis,
Italian Statistical Society,
Italian Mathematical Society.*

Main teaching activities

Bachelor

2020 – *Probability BAI*
2007 – 2020 *Quantitative Methods for Finance CLEF*

Master

2023 – 2024 *Statistics and Probability DSBA*
2007 – 2021 *Financial Econometrics and Empirical Finance CLEFIN.*

PhD

2005 – *Probability I, PhD Statistics*
2018 – *Stochastic Processes I, PhD Statistics*
2006 – *Probability, PhD in Economics and Finance*

Main teaching publications

Fortini, S., Gaffi F. Introduction to Probability – *BAI Series, Volume 2*, EGEA 2023

Fortini, S. Modelli Statistici per le Applicazioni Finanziarie. EGEA 2010