

Sonia Petrone

Full Professor



Knowledge group: Economics, Politics and Decision Sciences

Research domains: Business Data Analytics

Teaching domains:

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Biography

Sonia Petrone is a Full Professor in Statistics at Università Bocconi since 2014, where she played an active role in the development of the PhD in Statistics, as Vice-Director and Curricula Responsible (2004-2011) and Director (2011-2018). She is the Director of the Bocconi Summer School in Advanced Statistics and Probability since 2017. She held positions at the University of Pavia (1991-1998) and University of Insubria (1998-2001), before joining Bocconi in 2001. Throughout her career, she conducted extensive research visits in various universities across the USA, Latin America, Europe, India, and Russia. She was President of the International Society for Bayesian Analysis (ISBA) in 2014.

Her research interests focus on statistical learning and prediction, Bayesian theory and methods, Bayesian non parametrics and statistical machine learning, methods for complex dependence structures and latent variable models, dynamic and evolutionary systems, random graphs. She is the author of numerous books and articles on her topics of interest. Her works have been published in the Journal of the Royal Statistical Society, Journal of Statistical Software and Statistics and Computing, among others. She was the Editor of Statistical Science (2020-2022), and a co-Editor of Bayesian Analysis (2010-2014). She was awarded an IMS Medallion Lecture in 2018 and an ISBA Foundational Lecture in 2016.

She graduated in Discipline Economiche e Sociali at Università Bocconi and got a PhD in Statistics from Università degli Studi di Trento.

Articles in Scholarly Journals

Enriched Pitman–Yor processes

RIGON, T., S. PETRONE, B. SCARPA, "Enriched Pitman–Yor processes", Scandinavian Journal of Statistics, 2025, vol. 52, no. 2, pp. 631-657

Exchangeability, Prediction and Predictive Modeling in Bayesian Statistics

FORTINI, S., S. PETRONE, "Exchangeability, Prediction and Predictive Modeling in Bayesian Statistics", Statistical Science, 2025, vol. 40, no. 1, pp. 40-67

Bayesian Time-Varying Tensor Vector Autoregressive Models for Dynamic Effective Connectivity

ZHANG, W., I. CRIBBEN, S. PETRONE, M. GUINDANI, "Bayesian Time-Varying Tensor Vector Autoregressive Models for Dynamic Effective Connectivity", Bayesian Analysis, 2025, pp. 1-31

Prediction-based uncertainty quantification for exchangeable sequences

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Infinite-color randomly reinforced urns with dominant colors

SARIEV, H., S. FORTINI, S. PETRONE, "Infinite-color randomly reinforced urns with dominant colors", Bernoulli, 2023, vol. 29, no. 1, pp. 132-152

A closed-form filter for binary time series

FASANO, A., G. REBAUDO, D. DURANTE, S. PETRONE, "A closed-form filter for binary time series", Statistics and Computing, 2021, vol. 31, no. 4, pp. 47

Predictive Constructions Based on Measure-Valued Pólya Urn Processes

FORTINI, S., S. PETRONE, H. SARIEV, "Predictive Constructions Based on Measure-Valued Pólya Urn Processes", Mathematics, 2021, vol. 9, no. 22, pp. 2845-2846

Quasi-Bayes properties of a procedure for sequential learning in mixture models

FORTINI, S., S. PETRONE, "Quasi-Bayes properties of a procedure for sequential learning in mixture models", Journal of the Royal Statistical Society. Series B - Statistical Methodology, 2020, vol. 82, no. 4, pp. 1087-1114

On a notion of partially conditionally identically distributed sequences

FORTINI, S., S. PETRONE, P. SPORYSHEVA, "On a notion of partially conditionally identically distributed sequences", Stochastic Processes and their Applications, 2018, vol. 128, no. 3, pp. 819-846

Predictive characterization of mixtures of Markov chains

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Bayes and empirical Bayes: do they merge?

PETRONE, S., J. ROUSSEAU, C. SCRICCILOLO, "Bayes and empirical Bayes: do they merge?", Biometrika, 2014, vol. 101, no. 2, pp. 285-302

A Predictive Study of Dirichlet Process Mixture Models for Curve Fitting

WADE, S., S. G. WALKER, S. PETRONE, "A Predictive Study of Dirichlet Process Mixture Models for Curve Fitting", Scandinavian Journal of Statistics, 2014, vol. 41, no. 3, pp. 580-605

Improving prediction from Dirichlet process mixtures via enrichment

WADE, S. K., D. B. DUNSON, S. PETRONE, L. TRIPPA, "Improving prediction from Dirichlet process mixtures via enrichment", Journal of Machine Learning Research, 2014, vol. 15, pp. 1041-1071

Empirical Bayes methods in classical and Bayesian inference

PETRONE, S., S. RIZZELLI, J. ROUSSEAU, C. SCRICCILOLO, "Empirical Bayes methods in classical and Bayesian inference", Metron, 2014, vol. 72, no. 2, pp. 201-215

Predictive construction of priors in Bayesian nonparametrics

FORTINI, S., S. PETRONE, "Predictive construction of priors in Bayesian nonparametrics", Revista Brasileira De Probabilidade e Estatística, 2012, vol. 26, no. 4, pp. 423-449

Hierarchical reinforced urn processes

FORTINI, S., S. PETRONE, "Hierarchical reinforced urn processes", Statistics & Probability Letters, 2012, vol. 82, no. 8, pp. 1521-1529

State Space Models in R

PETRIS, G., S. PETRONE, "State Space Models in R", Journal of Statistical Software, 2011, vol. 41, no. 4, pp. 1-25

An enriched conjugate prior for Bayesian nonparametric inference

WADE, S., S. MONGELLUZZO, S. PETRONE, "An enriched conjugate prior for Bayesian nonparametric inference", Bayesian Analysis, 2011, vol. 6, no. 3, pp. 359-386

Extended Bernstein prior via reinforced urn processes

TRIPPA, L., P. BULLA, S. PETRONE, "Extended Bernstein prior via reinforced urn processes", Annals of the Institute of Statistical Mathematics, 2011, vol. 63, no. 3, pp. 481-496

Feller operators and mixture priors in Bayesian nonparametrics

PETRONE, S., P. VERONESE, "Feller operators and mixture priors in Bayesian nonparametrics", Statistica Sinica, 2010, vol. 20, pp. 379-404

Hybrid Dirichlet mixture models for functional data

PETRONE, S., M. GUINDANI, A. E. GELFAND, "Hybrid Dirichlet mixture models for functional data", Journal of the Royal Statistical Society. Series B - Statistical Methodology, 2009, vol. 71, no. 4, pp. 755-782

Non parametric mixture priors based on an exponential random scheme

PETRONE, S., P. VERONESE, "Non parametric mixture priors based on an exponential random scheme", Statistical Methods and Applications, 2002, vol. 11, no. 1, pp. 1-20

Consistency of Bernstein polynomial posteriors

PETRONE, S., L. WASSERMAN, "Consistency of Bernstein polynomial posteriors", The Journal of The Royal Statistical Society, Series B (Statistical Methodology), 2002, vol. 64, no. 1, pp. 79-100

Generalized dynamic linear models for financial time series

CAMPAGNOLI, P., P. MULIERE, S. PETRONE, "Generalized dynamic linear models for financial time series", Applied Stochastic Models in Business and Industry, 2001, vol. 17, no. 1, pp. 27-39

Random Bernstein Polynomials

PETRONE, S., "Random Bernstein Polynomials", Scandinavian Journal of Statistics, 1999, vol. 26, no. 3, pp. 373-393

Bayesian density estimation using bernstein polynomials

PETRONE, S., "Bayesian density estimation using bernstein polynomials", Canadian Journal of Statistics - Revue Canadienne de Statistique, 1999, vol. 27, no. 1, pp. 105-126

A note on convergence rates of Gibbs sampling for nonparametric mixtures

PETRONE, S., G. O. ROBERTS, J. S. ROSENTHAL, "A note on convergence rates of Gibbs sampling for nonparametric mixtures", Far East Journal of Theoretical Statistics, 1999, vol. 3, no. 2, pp. 213-225

A note on the Dirichlet process prior in Bayesian nonparametric inference with partial exchangeability

PETRONE, S., A. E. RAFTERY, "A note on the Dirichlet process prior in Bayesian nonparametric inference with partial exchangeability", Statistics and Probability Letters, 1997, vol. 36, no. 1, pp. 69-83

Entry (in Dictionary or Encyclopedia)

Predictive Distribution (de Finetti's View)

FORTINI, S., S. PETRONE, "Predictive Distribution (de Finetti's View)" in Wiley StatsRef: Statistics Reference Online., N. Balakrishnan, Theodore Colton, Brian Everitt, Walter Piegorsch, Fabrizio Ruggeri, Jozef L. Teugels (Eds.), Wiley, pp. 1-9, 2016

Edited Books

Complex Models and Computational Methods in Statistics

GRIGOLETTO, M., F. LISI, S. PETRONE (Eds.), "Complex Models and Computational Methods in Statistics" - 2013, Springer

Proceedings/Presentations

Bayesian modeling with nested random partitions

PETRONE, S., L. TRIPPA, "Bayesian modeling with nested random partitions" in S.Co.2009 - Complex Data Modeling and Computationally Intensive Statistical Methods for Estimation and Prediction - 14-16 September, 2009, Milano, Italy

Bayesian inference for dynamic linear models with random variances

PETRIS, G., S. PETRONE, "Bayesian inference for dynamic linear models with random variances" in The Sixth Scientific Meeting of the CLAssification and Data Analysis Group (CLADAG) of the Italian Statistical Society

- 12-14 September, 2007, Macerata, Italy

On the role of mixtures in Bayesian nonparametrics

PETRONE, S., "On the role of mixtures in Bayesian nonparametrics" in XLII Riunione Scientifica della Società Italiana di Statistica - 9-11 June, 2004, Bari, Italy

Analisi bayesiana di modelli "annidati" (Bayesian analysis of nested models)

PETRONE, S., "Analisi bayesiana di modelli "annidati" (Bayesian analysis of nested models)" in XXXIX Riunione Scientifica della Società Italiana - 14-17 Aprile, 1998, Sorrento, Italy

Discussion on "Choosing among models when none of them are true", by Key, J.T., Pericchi, L.R. and Smith, A.F.M.

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Polinomi di Bernstein e processo di Dirichlet

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Su alcune classi complete di funzioni di decisione

BERTI, P., S. PETRONE, P. RIGO, "Su alcune classi complete di funzioni di decisione" in XXXVII Riunione scientifica della Società Italiana di Statistica - 6-8 Aprile, 1994, San Remo, Italy

Research Monographs

Dynamic Linear Models with R

CAMPAGNOLI, P., S. PETRONE, G. PETRIS - "Dynamic Linear Models with R" - 2009, Springer

Contribution to Chapters, Books or Research Monographs

Nonparametric quantile inference with Dirichlet processes

HJORT, N. L., S. PETRONE, "Nonparametric quantile inference with Dirichlet processes" in Advances In Statistical Modeling And Inference: Essays In Honor Of Kjell A Doksum., Nair Vijay (Ed.), World Scientific Publishers, pp. 463-492, 2007

Discussion on "Approximating interval hypothesis: p-values and Bayes factors", by J. Rousseau

PETRONE, S., "Discussion on "Approximating interval hypothesis: p-values and Bayes factors", by J. Rousseau" in Bayesian Statistics 8., J.M. Bernardo, M.J. Bayarri, J.O. Berger, A.P. Dawid, D. Heckerman, A.F.M. Smith, M. West (Eds.), Oxford University Press, pp. 444-451, 2007

Bayesian nonparametric modelling for spatial data using Dirichlet processes

GELFAND, A. E., M. GUINDANI, S. PETRONE, "Bayesian nonparametric modelling for spatial data using Dirichlet processes" in Bayesian Statistics 8., J.M. Bernardo, M.J. Bayarri, J.O. Berger, A.P. Dawid, D. Heckerman, A.F.M. Smith, M. West (Eds.), Oxford University Press, pp. 175-200, 2007

A predictive point of view on Bayesian nonparametrics

PETRONE, S., "A predictive point of view on Bayesian nonparametrics" in Highly Structured Stochastic Systems., Peter J Green , Nils Lid Hjort , Sylvia Richardson (Eds.), Oxford University Press, pp. 282-287, 2003

Discussion on "Robustifying Bayesian procedures", by Walker, S.G. and Gutierrez-Pena, E.

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Bayesian hierarchical nonparametric inference for change-point problems

MIRA, A., S. PETRONE, "Bayesian hierarchical nonparametric inference for change-point problems" in Bayesian Statistics 5., J.M. Bernardo, J.O. Berger, A.P. Dawid, A.F.M. Smith (Eds.), Oxford University Press, pp. 693-703, 1996

A sample monotone dependence function based on the generalized Lorenz curve of concomitants of order statistics

MULIERE, P., S. PETRONE, "A sample monotone dependence function based on the generalized Lorenz curve of concomitants of order statistics" in Research on Economic Inequality, Vol 6, Income Distribution, Social Welfare, Inequality and Poverty., C. Dagum, A. Lemmi (Eds.), JAI Press, pp. 289-300, 1995

Comments, Discussions, Replies in Journal

Discussion on "Bayesian nonparametric inference for random distributions and related functions", by Walker, S.G., Damien, P., Laud, P.W., Smith, A.F.M.

PETRONE, S., "Discussion on "Bayesian nonparametric inference for random distributions and related functions", by Walker, S.G., Damien, P., Laud, P.W., Smith, A.F.M.", Journal of the Royal Statistical Society. Series B - Statistical Methodology, 1999, vol. 61, pp. 522-523