
USI, Dies Academicus 2011-12

Antonietta Mira

Professional Position

Professor of Statistics, Faculty of Economics, USI, Lugano, Switzerland
Professor of Statistics (part-time position), University of Insubria, Como, Italy

Education

- Ph. Doctorate in Statistics, University of Minnesota, Minneapolis, MN, USA, 1998
- Master of Science in Statistics, University of Minnesota, Minneapolis, MN, USA, 1996
- Ph. Doctorate in Methodological Statistics, University of Trento, Italy, 1995

Honors

- Fellow of the *Institute of Mathematical Statistics* (IMS), since 2022
- Fellow of the *International Society for Bayesian Analysis* (ISBA), since 2016
- Fellow of *Istituto Lombardo Accademia di Scienze e Lettere*, since 2016
- *Winner of the 6th edition of The Amerigo Four Freedoms Award* with the book: "The data pandemic. Here is the vaccine" (Mondadori education, 2020, with A. Massarenti)
- *Winner of the Italian national prize for science popularization (for the STEM area)* with the same book
- Visiting Fellow of the *Isaac Newton Institute for Mathematical Sciences* (Cambridge, UK), 2014, 2016
- Visiting Fellow of the *Queensland University of Technology (QUT* (Australia), 2024, 2023, 2015
- Public lecture for the *Festival of the Swiss Academy of Science 200 years anniversary*, October 2015

Main research interests

Bayesian statistical learning and Data science with a focus on theory and applications of Markov Chain Monte Carlo methods and other computational algorithms used to estimate parameters of complex modes in large data context. Interplay between Machine Learning and Statistics. Inference and prediction in problems mainly arising in economics and industry, finance, social, health and life science with an interdisciplinary attitude. Bayesian parametric and non-parametric methodology to include expert prior opinions in the inferential process.

Science dissemination

I have dedicated considerable time and energy towards the dissemination of science. To highlight this effort, see items marked with $\star$ in the subsequent sections.

Teaching

Until 2007, I carried out most of my undergraduate teaching activities at Insubria University. Since 2007, my teaching activity at Insubria University has been reduced to one course per year, mostly for the master's in Mathematics. At the same time, I started teaching introductory and advanced statistics courses in the master's in Finance at USI.
Graduate teaching has been held in the form of short PhD courses on Bayesian Statistics and Markov Chain Monte Carlo simulation in prestigious universities such as USI; Bocconi University, Milano; University of Padova; University of Pavia; University of Perugia; University of Napoli; University of Insubria; University of Cagliari.

PhD Students and Post-docs supervised

Ph.D students: P. Tenconi, R. Solgi (post-doc, Harvard University); F. Macaluso (Financial industry); C. Legnazzi (Financial industry); F. Bianchi (post-doc USI), C. Ghiringhelli (post-doc, Cattolica University), F. Denti (assistant professor, U. of Padova), F. Ravenda, C. Hassan (QUT, Brisbane), A. Bassi (ETHZ), A. Di Noia (ETHZ)
Post-Docs: A. Caimo (Assistant professor, U. College Dublin); R. Dutta (Assistant Professor, Warwick University); Stefano Peluso (Associate professor, Bicocca University), Anthony Ebert; Spyros Balafas (Assistant professor, San Raffaele University); Angela Andreella (Assistant professor, Venezia University); Wei Zhang

Professional Service (since 2020)

- **Advisory board of the Swiss Statistical Society**, since 2020
- **Member of the Federal Statistical Committee**, Switzerland, 2020-23
- **Member of the Lambert Prize Jury** (SWiss Statistical Society award), 2023
- **Reviewer for ERC Consolidator Grant**, 2022
- **International Statistical Literacy Project country coordinator** for Switzerland, since 2020
- USI local node leader for the **Swiss reproducibility Network**, since 2020
- **Chair of the Scientific Advisory Committee** for QUT Centre for Data Science, since 2019
- **Advisory board for the Harvard Data Science Review**, since 2019
- **Advisory board of CoSInES**, EPSRC founded 4 year project (£3M), since 2019
- **Advisory board of Bayes4health**, EPSRC founded 4 year project (£3M), since 2019
- **Advisory Board, Centre for Doctoral Training in Distributed Algorithms** founded by EPSRC, since 2019

• Member of the **Scientific and Strategic Board** of Consorzio AlmaLaurea, 2020-24
• Member of the **Lambert Award Commette**, 2021-22
• Member of the (International Society for Bayesian Analysis) **ISBA Fellows Committee**, 2019-22
• **Institute of Mathematical Statistics Task Force on the Ph.D. Curriculum in Stats and Probability**, 2019-21
• **Member of the ISBA Continuing Education Committee**, 2019-21
• **Member of Joint IMS/Bernoulli Society Publications Management Committee**, 2018-21
• Member of the **Advisory Board** of Consorzio AlmaLaurea, 2018-20
• **Member of the Institute of Mathematical Statistics council**, 2017-20

Invited lectures at international conferences and seminars (2023/24)

• Keynote, International Bayesian Statistical Conference, Gold Coast, Australia, January 2024
• Keynote, 31st World Meeting of the International Society for Bayesian Analysis, Venezia, July 2024
• Organizer and chair, Round table discussion on *European Data Market and AI, perspectives*, Venezia, July 2024
• Co-organizer and speaker at the workshop at the *Isaac Newton Institute for Mathematical Sciences* (Cambridge, UK) on "Accelerating inference via probabilistic prediction", August 2024
• Keynote, Conference of the Australian Women in Mathematics Special Interest Group (WIMSIG) of the Australian Mathematical Society, Sydney, October 2024
• International Conference on Statistics, Probability, Data Science and Related Areas and XXXXII Annual Convention of the Indian Society for Probability and Statistics, Cochin, 4-6 January 2023
• Bayesian Inference of Epidemics, BayesComp satellite conference, Levi, Finland, March 2023
• QUT, public lecture on *Data Science Meets Life Science: Some Success Stories*, Brisbane June 2023
• University of Wollongong, "2023 Data Science and Statistic Lecture", August 2023
• Invited seminar on *Statistical Science meets Life Science* at Stockholm University, October 2023

Main editorial boards: **Co-Editor**, *Bayesian Analysis*, 2008-16; **Associate Editor** of the *Journal of Computational and Graphical Statistics*, 2006-08; **Associate Editor** for *Statistica Sinica*, 2005-08.

Organization of Conferences and Science Dissemination Events (Main, since 2020)

• **Scientific committee** of the joint ISBA - Cini Foundation event on Algorithms & Privacy, Venezia, 7 July 2024
⋆ **Scientific and organizing committee** of the *Lugano Longevity Summit*, Aula Magna USI, Lugano, March 2024
⋆ **Chair scientific committee**, Festival Brain and Movie, Lugano, November 2023
• **Scientific committee of the Bayes Comp, 2023** Levi, Finland, March 2023
• **Scientific and organizing committee of the Bayes Comp satellite meeting** Levi, Finland, March 2023
• **Scientific committee, "One World Approximate Bayesian Computation"**, 39 webinars on ABC since 2020
• **Scientific committee, International Centre for Mathematical Sciences meeting 2022**, Isle of Skye, May 2022
• **Scientific committee, SSES 2022** conference in Fribourg
• **Scientific committee** of one week doctorate winter school on *Lifting Inference with Kernel Embeddings*, Bern, 2022
• **Scientific and organizing committee** of one week doctorate school, joint University of Pavia and USI, 12.2021
• **Scientific committee**, one week workshop on *End-to-end Bayesian learning methods*, 2021, supported by CIRM
• **Scientific committee** of the *International Conference on Data Analytics for Business and Industry], online, 2020*

Publications *(since 2019)*

Peer-reviewed articles

1. *S. Peluso, S. Chib, A. Mira, Semiparametric Multivariate and Multiple Change-Point Modeling.* Bayesian Analysis*, Volume 14, Number 3, pp. 727-751, 2019*

2. *F. Maire, N. Friel, A. Mira, AE Raftery, Adaptive Incremental Mixture Markov chain Monte Carlo,* Journal of Computational and Graphical Statistics*, 28(4), pp. 790-805, 2019*

3. *NJ Tierney, A. Mira, HJ Reinhold, G. Arbia, S. Clifford, A. Auricchio, T. Moccetti, S. Peluso, K. Mengersen, Evaluating health facility access using Bayesian spatial models and location analysis methods,* PLoS one*, 14(8): e0218310, 2019*

4. *G. Arbia, C. Ghiringhelli, A. Mira, Estimation of spatial econometric linear models with large datasets: How big can spatial Big Data be?,* Regional Science and Urban Economics*, pp. 76:67-73, 2019*

5. *B. Lepori, A. Geuna, A. Mira, Scientific output scales with resources. A comparison of US and European universities* PLoS one*, 14(10): e0223415, 2019*

6. *A. Auricchio, L. Gianquintieri, M. L. Caputo, R. Burkart, C. Benvenuti, S. Muschietti, S. Peluso, A. Mira, T. Moccetti, Real-life time and distance covered by lay first responders alerted by means of smartphone application: implications for early initiation of cardiopulmonary resuscitation and access to automatic external defibrillators.* Resuscitation*, 141:182-187, 2019*

7. *S. Peluso, A. Mira and P. Muliere, Conditionally Gaussian Random Sequences for Robust Integrated Variance Estimation.* Applied Stochastic Models in Business and Industry*, Volume 35, Issue 5, pp. 1282-1297, 2019*

8. *S. Chen, A. Mira and JP Onnela, Flexible Model Selection for Mechanistic Network Models* Journal of Complex Networks*, Vol. 8, Issue 2, p. cnz024, 2020*

9. *G. Barone-Adesi, N. Fusari, A. Mira, C. Sala, Option Market Trading Activity and the Estimation of the Pricing Kernel: a Bayesian Approach* Journal of Econometrics*, Volume 216, Issue 2, pp. 430-449, 2020*

10. *S. Peluso, A. Mira, H. Rue, N. Tierney, C. Benvenuti, R. Cianella, ML Caputo, A. Auricchio, A Bayesian spatio-temporal statistical analysis of Out-of-Hospital Cardiac Arrests,* Biometrical Journal*, Volume 62, Issue 4, pp. 1105-1119, 2020*

11. *F. Bianchi, F. Bartolucci, S. Peluso, A. Mira, Longitudinal networks of dyadic relationships using latent trajectories: evidence from the European interbank market,* Journal of the Royal Statistical Society C*, vol. 69, Issue 4, pp. 711-739, 2020*

12. *A. Varghese, C. Drovandi, K. Mengersen, A. Mira, Estimating a novel stochastic model for within-field disease dynamics of banana bunchy top virus via approximate Bayesian computation,* PLoS Computational Biology*, 16(5): e1007878, 2020*

13. *F. Bartolucci, F. Pennoni, A. Mira, Univariate and multivariate statistical models for time series of count data with application to COVID-19,* Statistica e società *, Vol. IX, pp. 1-2, 2020*

14. *A. Auricchio, S. Peluso, M. L. Caputo, J. Reinhold, C. Benvenuti, R. Burkart, R. Cianella, C. Klersy, E. Baldi, A. Mira, Spatio-temporal prediction model of out-of-hospital cardiac arrest: designation of medical priorities and estimation of human resources requirement,* PLoS one*, 15(8): e0238067, 2020*

15. *M. Allegra, E. Facco, F. Denti, A. Laio, A. Mira, Data segmentation based on the local intrinsic dimension,* Nature Scientific Reports*, 10, 16449, 2020*

16. *D.J. Warne, A. Ebert, C. Drovandi, A. Mira, K. Mengersen, Hindsight is 2020 vision: Characterization of the global response to the COVID-19 pandemic,* BMC Public Health*, 20, Article number: 1868, 2020*

17. *A. Agresti, F. Bartolucci, A. Mira, Reflections on Murray Aitkin's contributions to nonparametric mixture models and Bayes factors,* Statistical modelling*, 1471082X20981312, 33-45, 2021*

18. *A. Mira, E. Wit, The Capstone in Everyone's Delivery Room: Placing "Practice" at the Center of Data Science Education,* Harvard Data Science Review*, 3(1), 2021*

19. *F. Bartolucci, F. Pennoni. A. Mira, A multivariate statistical approach to predict COVID-19 count data with epidemiological interpretation and uncertainty quantification,* Statistics in Medicine*, Vol. 40:24, pp. 5351-5372, 2021*

20. *R. Dutta, M. Schoengens, L. Pacchiardi, A. Ummadisingu, N. Widmer, JP Onnela, A. Mira, ABCpy: A High-Performance Computing Perspective to Approximate Bayesian Computation,* Journal of Statistical Software*, Vol. 100, Issue 7, pp. 1-38, 2021*

21. *A. Ebert, R. Dutta, K. Mengersen, A. Mira, F. Ruggeri, P. Wu, Likelihood-free parameter estimation for dynamic queueing networks: case study of passenger flow in an international airport terminal,* Journal of the Royal Statistical Society C*, Vol. 70:3, 770-792, 2021*

22. *N. Donelli, A. Mira, S. Peluso, A Bayesian Semiparametric Vector Multiplicative Error Model* Computational Statistics and Data Analysis*, vol. 161, p. 107242, 2021*

23. *S. Allenspach, P. Puphal, J. Link, I. Heinmaa, E. Pomjakushina, C. Krellner, J. Lass, G. S. Tucker, C. Niedermayer, S. Imajo, Y. Kohama, K. Kindo, S. Krämer, M. Horvati, M. Jaime, A. Madsen, A. Mira, N. Laflorencie, F. Mila, B. Normand, C. Ruegg, R. Stern, and F. Weickert, Revealing three-dimensional quantum criticality by Sr-substitution in Han Purple,* Physics Review Research*, 3, 023177, 2021*

24. *C. Ghiringhelli, F. Bartolucci, A. Mira, G. Arbia, Modelling Nonstationary Spatial Lag Model with Hidden Markov Random Fields,* Spatial Statistics*, Vol. 44, 100522, 2021*

25. *F. Denti, F. Camerlenghi, M. Guindani, A. Mira, A common atom model for the Bayesian nonparametric analysis of nested data,* Journal of the American Statistical Association*, 1-12, 2021*

26. *L. Raynal, S. Chen, A. Mira, JP Onnela, Scalable Approximate Bayesian Computation for Growing Network Models via Extrapolated and Sampled Summaries,* Bayesian analysis*, Vol. 17, Issue 1, pp. 165-192, 2021*

27. *B. Buonaguidi, A. Mira, H. Bucheli, V. Vitanis, Bayesian quickest detection of credit card fraud,* Bayesian Analysis*, Vol. 17, Issue 1, pp. 261-290, 2021*

28. *E. Santos-Fernandez, F. Denti, K. Mengersen, A. Mira, The role of intrinsic dimension in high-resolution player tracking data - Insights in basketball,* The Annals of Applied Statistics*, 16(1): 326-348, 2022*

29. *R. Dutta, K. Z. Boudjeltia, C. Kotsalos, A. Rousseau, D. Ribeiro de Sousa, JM. Desmet, A. Van Meerhaeghe, A. Mira, B. Chopard, Personalized pathology test for Cardiovascular disease: Approximate Bayesian computation with discriminative summary statistics learning* PLOS Computational Biology*, Vol. 18:3, e1009910, 2022*

30. *TM Le, L. Raynal, O. Talbot, H. Hambridge, C. Drovandi, A. Mira, K. Mengersen, JP Onnela, Framework for assessing and easing global COVID-19 travel restrictions,* Nature Scientific Reports*, Vol. 22:1, 2022*

31. *C. Albert, S. Ulzega, F. Ozdemir, F. Perez-Cruz, A. Mira, Learning Summary Statistics for Bayesian Inference with Autoencoders,* SciPost *Physics, Core 5, 043, 2022*

32. *F. Denti, D. Doimo, A. Laio, A. Mira, The generalized ratios intrinsic dimension estimator,* Nature Scientific Reports*, 12: 20005, 2022*

33. *L. South, C. Drovandi, C. Oates, A. Mira, Regularized Zero-Variance Control Variates,* Bayesian Analysis*, 18 (3), 865-888, 2023*

34. *S. Maskell, Y. Zhou, A. Mira, Control Variates for Constrained Variables,* IEEE Signal Processing Letters*, vol. 29, pp. 2333-2337, 2022*

35. *C. Ghiringhelli, G. Piras, G. Arbia, A. Mira, Recursive Estimation of the Spatial Error Model,* Geographical analysis*, 90-106, 2022*

36. *F. Denti, S. Peluso, M. Guindani. A. Mira, Multiple hypothesis screening using mixtures of non-local distributions with applications to genomic studies,* Statistics in Medicine*, 42(12): 1931– 1945, 2023*

37. *S. Allenspach, A. Madsen, A. Biffin, M. Bartkowiak, O. Prokhnenko, A. Gazizulina, X. Liu, R. Wahle, S. Gerischer, S. Kempfer, P. Heller, P. Smeibidl, A. Mira, N. Laflorencie, F. Mila, B. Normand, C. Rüegg, Investigating field-induced magnetic order in Han Purple by neutron scattering up to 25.9 T,* Physical Review B*, 106, 104418, 2023*

38. *G. Colelli, L. Barzaghi, M. Paoletti, M. Monforte, N. Bergsland, G. Manco, X. Deligianni, F. Santini, E. Ricci, G. Tasca, A. Mira, S. Figini, A. Pichiecchio, Radiomics and machine learning applied to STIR sequence for prediction of quantitative parameters in facioscapulohumeral disease,* Frontiers in Neurology*, V. 14, 2023*

39. *F. Bartolucci, P. Li Donni, A. Mira, Temporal analysis of hospital network data by hierarchical Bayesian p2 models with covariates* Journal of the Royal Statistical Society: Series A*, Vol. 186: 3, pp. 422–440, 2023*

40. *A. Varghese, E. Santos-Fernandez, F. Denti, A. Mira, K. Mengersen, A global perspective on the intrinsic dimensionality of COVID-19 data,* Nature Scientific Reports*, 13, 9761, 2023*

41. *A. Andreella, A. Mira, S. Balafas, E. Wit, F. Ruggeri, G. Nattino, G. Ghilardi, G. Bertolini, A predictive model for planning emergency events rescue during COVID-19 in Lombardy, Italy,* Statistical Methods and Applications*, 2024 to appear*

42. *C. Rossi, M Paganuzzi, G. Nattino, G.I. Ghilardi, G. Costantino, F. Cortellaro, R. Cosentini, S. Paglia, M. Migliori, A. Mira, G. Bertolini, Assessing the heterogeneity of the impact of COVID-19 incidence on all-cause excess mortality among healthcare districts in Lombardy, Italy, to evaluate the local response to the pandemic: an ecological study,* BMJ Open*, 2024 to appear*

Books and Book/Encyclopedia contributions

1. *A. Mira, La Scienza dei Dati: una nuova sfida multidisciplinare (Data science: a new multidisciplinary challenge). Chapter in* Rendiconti dell'Istituto Lombardo Accademia di Scienze e Lettere - Classe di Lettere e Scienze Morali e Storiche *(in Italian), Vol.150, 2019*

2. *A. Mira, The language of big data (in italian). Chapter in* Rendiconti dell'Istituto Lombardo Accademia di Scienze e Lettere - Classe di Lettere e Scienze Morali e Storiche *(in Italian), 2020*

3. *A. Massarenti and A. Mira,* La pandemia dei dati. Ecco il Vaccino *(The data pandemic. Here is the vaccine, in Italian). Book, published by Mondadori education (in Italian). Winner of the Italian national prize for science popularization (for the STEM area). Winner of the 6th edition of The Amerigo Four Freedoms Award, 2020*

4. *E. Boncinelli and A. Mira, Uncertainty is a beast that cannot be eliminated, but can be tamed. Chapter in the Catalogue of the National Exhibit on* Uncertainty. Interpreting the present, predicting the future*. Palazzo delle esposizioni, Roma, 12.9.21-17.2.2022 (in Italian)*

5. *A. Mira, Contribution to the discussion on "School and individual and social behaviour", in* Quaderno dell'Istituto Lombardo Accademia di Scienze e Lettere*, 2022 (in Italian)*

6. *A. Mira and M. Guindani, scientific collaborators to the translation of* Ten great ideas about chance*, by P. Diaconis and B. Skyrms (Princeton University Press, 2018), Mondadori Education, to appear*

Proceedings

1. *F. Denti, F. Camerlenghi, M. Guindani and A. Mira, Clustering artists based on the energy distributions of their songs on Spotify via the Common Atoms Model,* Book of Short Papers Italian Statistical Society*, 2022*

2. *F. Denti and A. Mira, A tool to validate the assumptions on ratios of nearest neighbor distances: the Consecutive Ratio Paths,* Book of Short Papers Italian Statistical Society*, 2022*

3. *D. Raffo and A. Mira, Optimization of Delayed Rejection Adaptive Metropolis,* Book of Short Papers Italian Statistical Society*, 2022*

4. *A. Di Noia, F. Denti, A, Mira, A tool for assessing weak identifiability of statistical models* Book of Short Papers Italian Statistical Society*, 2023*

5. *F. Denti, A. Di Noia, A, Mira, Bayesian nonparametric estimation of heterogeneous intrinsic dimension via product partition models* Book of Short Papers Italian Statistical Society*, 2023*

6. *F. Ravenda, A. Raballo, A. Mira, F. Crestani, Incremental Mixture of Normalizing Flows for Dynamic Topic Modelling,* Proceedings of the 13th Italian Information Retrieval Workshop *, Pisa, 2023*

7. *G Ranalli, F Pennoni, F Bartolucci, A Mira, When nonresponse makes estimates from a census a small area estimation problem: The case of the survey on graduates' employment status in Italy,* CLADAG 2023 Book of Abstract and Short Papers*, 14th Scientific Meeting of the Classification and DataAnalysis Group, 2023*

Technical reports

1. *D. Warne, A. Mira, K. Mengersen, Bayesian uncertainty quantification to identify population level vaccine hesitancy behaviours, BMC Public Heath, revise and resubmit*

2. *F. Ravenda, M. Cesarini, S. Peluso, A. Mira, A Spatio-Temporal Probabilistic Neural Network to Forecast COVID-19 Counts,* International Journal of Data Science and Analytics*, revision submitted*

3. *A. Chib, A. Mira, S. Peluso, A Bayesian Change-Point Analysis of Vector Autoregressive Processes, submitted*

4. *W. Zhang, A. Mira, E. Wit, Bayesian Poisson Regression Tensor Train Decomposition Model for Learning Mortality Pattern Changes during COVID-19 Pandemic, submitted*
5. *L. Piancastelli, N. Friel, J. Vercelloni, K. Mengersen, A. Mira, A Bayesian model for clustering spatially distributed compositions with application to species abundances in the Great Barrier Reef, submitted*
6. *F. Ravenda, S. Peluso, A. Squizzato, ML Caputo, C. Benvenuti, A. Mira, A. Auricchio, Spatio-temporal distribution, prediction and relationship of three major acute cardiovascular events: out-of-hospital cardiac arrest, ST-elevation myocardial infarction and stroke*
7. *I. Macocco, A. Mira, A. Laio, Intrinsic Dimension as a multi-scale summary statistics in ABC network parameter inference*
8. *A. Bassi, A. Mira, M. Höge, F. Fenicia, C. Albert, Learning Catchment Features With Autoencoders*
9. *A. Di Noia, F. Balabdaoui, A. Mira Asymptotic tests for k-monotonicity of a probability mass function*
10. *C. Salvagnin, A. Glielmo, M. E. De Giuli, A. Mira, Investigating the price determinants of the European Carbon Trading System: a non-parametric approach*

Bibliometrics (updated on 1.1.2024)

Citations: 2705
H-Index: 18
Source: Scopus

Citations: 5044
H-Index: 29
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