# Alessandra Luati

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## Appointments

2016 - Professor of Statistics, University of Bologna, Department of Statistics

2017 - 2019 Adjunct Professor of Statistics, Johns Hopkins School of Advanced International Studies EU

2011 - 2015 Associate Professor of Statistics, University of Bologna, Department of Statistics

2014 Visiting Erskine Fellow, University of Canterbury, Christchurch, NZ

2001 - 2011 Lecturer of Statistics, University of Bologna, Department of Statistics

## Education

2000 Ph.D. in Statistics, University of Bologna. Thesis: Statistical inference for finite dimensional quantum systems. Supervisors: Paola Monari, Paolo Paruolo and Ole E. Barndorff-Nielsen (external).

1996 Degree in Statistics and Economics, University of Bologna. Thesis: La scomposizione QR di una matrice (The QR decomposition of a matrix). Supervisors: Laura Guidotti and Paolo Paruolo.

## Grants

2011 Principal Investigator (PI) for the local unit of Bologna for the three-year project “Forecasting economic and financial time series: understanding the complexity and modelling structural change", funded by the Italian Ministry of Research (PRIN 2010), national PI Tommaso Proietti.

## Honors

- Chair of COMPSTAT 2022 (University of Bologna, postponed from 2020)
- Chair of RCEA Time series workshop 2019 (Cyprus), 2021 (Milano Bicocca, virtual)
- Ambassador of the city of Bologna for Scientific merits (2020, video)
- Keynote speaker at COMPSTAT 2018 (University of IASI)
- CFE’18 winter course on Frequency domain methods in time series, Pisa

## Editorial activity

2021 - Associate Editor of *Econometrics*

2021 Guest Editor of *Econometrics, Special Issue on Time series econometrics*

2014 - 2019 Associate Editor of *Statistical Methods and Applications*, for the Applications section

2012 Guest Editor of *CSDA Annals of Computational and Financial Econometrics*

Referee for the following journals: *Annals of Statistics, Annals of the Institute of Statistical Mathematics, Journal of the Royal Statistical Society, Journal of Multivariate Analysis, Journal of Nonparametric statistics, International Statistical Review, Statistics and Computing, Computational Statistics and Data Analysis, Statistica, Statistical Methods and Applications, Communications in Statistics, Statistical Inference for Stochastic Processes, Journal of Time Series Analysis, Journal of Econometrics, Journal of Applied Econometrics, Econometrics Journal, Econometric Theory, Econometrics, Econometrics and Statistics, Economics Bulletin, Empirical Economics, Neural Computing and Applications, Quality & Quantity, IEEE Transactions on Information Theory, AIMS Mathematics, Computer Modeling in Engineering and Sciences, Linear Algebra and its Applications.* Reviewer for *Mathematical Reviews.*

## International societies

2018 - Chair of the Time series section of the Rimini Center for Time Series Analysis

2012 - 2020 Co-chair of the Ercim working group in Statistical signal extraction and filtering

Member of: Econometric Society, Italian Econometric Society, Italian Statistical Society

## Students supervision

Current Ph.D. students:

- Elisabetta Mensali, joint supervision with Leopoldo Catania (expected Ph.D. in 2023)
- Pierluigi Vallarino, joint supervision with Leopoldo Catania (expected Ph.D. in 2023)

Former Ph.D. students:

- Mirko Armillotta, Essays on discrete valued time series models (co-supervisor: Monia Lupparelli). Current position: Post-doc at the University of Cyprus
- Francesca Papagni, Frequency domain analysis of stationary time series (co-supervisor: Tommaso Proietti). Current position: Post-doc at the Free University of Bozen
- Christopher Sacha Aristide Lauria, On optimality of score driven models.
- Enzo D'Innocenzo, Essays in robust and nonlinear multivariate time series models (co-supervisor: Mario Mazzocchi). Current position: Post-doc at the Vrije University of Amsterdam
- Michela Eugenia Pasetto, Statistical inference for the Duffing process (co-supervisor, Dirk Husmeier). Current position: Data Scientist at OpenAnalytics, Antwerp Berchem, Flanders, Belgium
- Flavio Maria Emanuele Pons, Statistical analysis of a close von Kármán flow. Current position: researcher at the Laboratoire des Sciences du Climat et de l'Environement (LSCE), Univ. of Paris-Saclay
- Marco Novelli, Statistical inference in open quantum systems. Current position: Assistant professor of Statistics at the University of Bologna
- Maria Gentile, Local trigonometric regression for time series smoothing. Current position: Teacher

- Enrico Foscolo, Inference on copula-based correlation structures. Current position: Assistant Professor of Economic Statistics, Free University of Bozen, School of Economics and Management.

Other activities:

2019 Member of the evaluating committee for *Stats Under the Stars 5*, Bocconi University

2017 Senior advisor at *StartUp Research Meeting*, 25-27 June 2017,University of Siena, video

2016 - 2018 Member of the evaluating committee for the *Mortara Fellowship*, Bank of Italy

2016 Reviewer for a NSERC project, Natural Sciences and Engineering Research Council of Canada

2011 - Member of the committee or external reviewer for Ph.D. dissertations at the University of: Aarhus, Padova, Rome Tor Vergata, Salerno, Rome Sapienza and Scuola Normale Superiore di Pisa

### Institutional roles

2015 - 2021 Director of the Ph.D. in Statistics, University of Bologna

2011 - 2020 Organizer of the Statistics Seminars of the Department of Statistics, University of Bologna

2008 - Member of the Ph.D. scientific board for the Ph.D. in Statistics, University of Bologna

2006 - 2015 Department deputy at the International Relations of the University of Bologna

### Teaching experience, in English

*Undergraduate*

2018 - Time series (University of Bologna)

2014 Statistical inference (University of Canterbury, NZ)

2009 - 2017 Statistical models (University of Bologna)

*Postgraduate*

2019 - Advanced time series

2011 - Statistical Methods for Asset Management (Master in Quantitative Finance, University of Bologna)

2017 - 2019 Statistical Methods for Business and Economics, Johns Hopkins University SAIS

2016 - 2019 Stochastic processes and advanced time series

2015 Workshop in Quantitative Finance (University of Bologna)

*Ph.D.*

2107 - Frequency domain methods

2015 - 2016 Special functions in time series

2009 - 2014 Time series econometrics (University of Bologna)

2007 Likelihood ratio tests (Joint research center of the European Commission, Ispra)

## Visiting research periods

- Aarhus Business School, University of Aarhus (DK), November 2021, October 2021, July 2019
- School of Mathematics and Statistics, University of Glasgow (UK), August 2017
- CREATES, University of Aarhus (DK), October 2016
- Joint Research Centre of the European Commission, Ispra, February, June, October 2016
- Institute of Applied Mathematics, University of Heidelberg (DE), February 2014
- Department of Mathematics, University of St Andrews (UK), April 2013
- CREATES, University of Aarhus (DK), October 2012
- Department of Economics, University of Cambridge (UK), February 2012
- Imperial College Business School, London (UK), June 2011
- Joint Research Centre of the European Commission, Ispra, August 2010
- Aarhus University (DK), Department of Theoretical Statistics, MaPhySto, October 2001
- Eurandom Centre of Eindhoven University (NL), Department of Theoretical Statistics, June 1999
- Aarhus University (DK), Department of Theoretical Statistics, 1998-1999,

## Conferences

*President of the Scientific Committee*

- Chair of COMPSTAT 2022 that will be held in Bologna on 23-26 August 2022 (postponed from 2020)
- Chair of the 7th RCEA Time series workshop, Milano Bicocca, 25-26 June 2021 (postponed from 2020)
- Chair of the 6th RCEA Time series workshop, Larnaca 22-23 June 2019

*Member of the Scientific Committee*

- Data research camp, San Servolo, Venice, 12-15 July 2022
- IWEEE 2022, Rimini, 20-21 January 2022
- ICEEE 2021, Cagliari, 21-23 January 2021
- EC2 Conference, Paris, December 11-12, 2020
- Data research camp, San Servolo, Venice, 2-5 July 2019
- CMS'17 16-18 December 2017, Senate House, University of London
- A conference to celebrate Antonella Capitanio 6 November 2017, University of Bologna
- Forecasting Economic and Financial Time Series, 12-13 September 2016, Rome;
- SIS 2016, Salerno, 8-10 June 2016
- Prin Workshop, Bologna, 12-13 November 2015
- ERCIM'13 14-16 December 2013, Senate House, University of London
- ERCIM'12 1-3 December 2012, Oviedo
- ERCIM'11 17-19 December 2011, Senate House, University of London, UK
- Evolutionary computation and time series 13-14 June 2011, Monte Porzio Catone, Rome
- ERCIM'10 10-12 December 2010, Senate House, University of London, UK
- CFE'09 29-31 October 2009, Limassol, Cyprus
- Computational and Financial Econometrics, 19-21 June 2008, Neuchâtel, Switzerland
- Parametric estimation and forecasting of time series, 14-16 June 2007, Monte Porzio Catone, Italy
- CFE'07, 20-22 April 2007 Geneva, Switzerland
- Statistical Inference on the dynamics of time series, 9-11 June 2005 Bressanone, Italy
- CMS-CFE'04, 2-5 April 2004, Neuchâtel, Switzerland
- Linear and non linear dynamics in time series, 6-7 June 2003, Monte Porzio Catone, Rome, Italy

*Keynote talks*

- Keynote speaker at COMPSTAT 2018, Iasi, 28-31 August 2018

*Invited relations*

- Waseda International Symposium on Topological Data Science, Causality, Analysis of Variance and Time Series, 7-9 March 2022, Waseda University, Tokyo
- Otsu International Seminar, 10-12 March 2022, Otsu, Japan
- Workshop on Large Data, Econometrics and Forecasting, 17-18 September 2021, Rome La Sapienza
- ECB Workshop on Vulnerable Growth in the Euro Area, 17 October 2019, European Central Bank
- CMStatistics 2019, London, 14-16 December 2021
- Econometrics in the Arena, 12-13 September 2019, University of Verona
- NBER-NSF Time series conference, 14-15 August 2019, The Chinese University in Hong Kong
- Recent advances on computational statistics and econometrics, 11 April 2019, Cyprus
- Kinosaki Seminar on Data Science and Causality, 28 February - 2 March 2019, Kinosaki, Japan
- Waseda International Symposium on General Causality, 25-27 February 2019, Waseda U., Tokyo
- CFE'18 Winter course on Frequency domain methods in time series, 11 December 2018, Pisa
- Quantitative Analysis of Spatial Developments, 30 November 2017, University of Bologna
- High dimensional statistical analysis, 27 February-1 March 2017, Waseda University, Tokyo
- Statistical analysis for high dimensional, circular or time series data, 2-3 March 2017, Keio U., Tokyo
- CMStatistics 2016, 9-11 December 2016, Oviedo
- High dimensional statistical analysis for quantile analysis, 5-7 March 2017, Ise-Shima
- ISNPS'16, 11-15 June 2016, Avignon, France
- CMStatistics 2015, London, 12-14 December 2021
- Non-likelihood Based Statistical Modelling, 7-9 September 2015, Warwick, UK
- Aarhus Conference on Probability, Statistics and their Applications, Celebrating the Scientific Achievements of Ole Barndorff-Nielsen, 15–19 June 2015 Aarhus
- ISNPS'14, 11-16 June 2014, Cadiz, Spain
- Statistics and Econometric Workshop, 3 April 2013, University of St Andrews, UK
- COMPSTAT 2012, 27-31 August 2012, Limassol, Cyprus
- ISNPS'12, 15-19 June 2012, Halkidiki, Greece
- Two Days of Numerical Linear Algebra, Bologna, 06-07 March 2008
- Workshop on Time Series Analysis and Signal Extraction Methods, 16 September 2004, Udine

*Presentations and sessions organisation*

**2021**: quantum@UNIBO, University of Bologna; **2020**: ESWC, Milano Bocconi; (video); ICEEE, Venice **2019**: SIS, Milan; Score-driven time series models, Cambridge. **2018**: CFE-ERCIM, Pisa; NBER, San Diego (poster); SIS, Palermo; ISNPS, Salerno; **2017**: CMS, London; EC2 Conference on Time Varying Parameter Models, Amsterdam; UPF Summer forum, Barcelona; ICEEE, Messina. **2016**: Forecasting Economic and Financial Time Series, Rome **2015**: IFCS, Bologna; ICEEE, Salerno; RCEA, Rimini. **2014**: PRIN, Rome; MAF, Vietri sul Mare; SIS, Cagliari **2013**: SIS, Brescia; CFE-ERCIM, London; EMS, Budapest; RCEA, Rimini; ICEEE 2013, Genova; **2012**: ERCIM, Oviedo; Conference in Honor of Andrew Harvey, Oxford; SIS, Rome; **2011**: SIS, Bologna; CFE-ERCIM, London; ECTS, Rome; IIF Workshop on Flash Indicators, Verbier; ICEEE, Pisa; **2010**: CFE- ERCIM, London; Eurostat Colloqiuum on Business Cycle Analysis, Luxembourg; SIS 2010, Padova; SER2010, Ravello; **2009**: CFE, Limassol; EEA-ESEM 2009, Barcelona; Econometrics

Analysis of Interdependence, stabilization and contagion in real and financial markets, Bologna; Conference in honor of Manfred Deistler, Vienna; ICEEE, Ancona; **2008**: NBER-NSF, Aarhus; COMPSTAT, Oporto; CFE, Neuchatel; SER, Venice; **2007**: ISI, Lisbon; SIS, Venice; CFE, Geneve; **2006**: Knowledge Extraction and Modeling, Capri; Matrix Computation and Statistics, Salerno; COMPSTAT, Rome; SIS, Torino; SER, Rome; **2005**: Statistical inference on the dynamics of time series, Bressanone **2004**: Statistical inference on the Dynamic of Time Series, Parma; JSM, Toronto; SIS, Bari; CMS, Neuchatel; **2003**: CLADAG 2003, Heidelberg; Workshop on Quantum Measurements and Quantum Stochastics, Aarhus; Linear and Non Linear Dynamics in Time Series, Bressanone; Stochastic Models and Simulation Methods for Dependent Data, Campobasso; CMS-CFE, Limassol; **2002**: Workshop on Matrices and Statistics, Lyngby; CLADAG, Mannheim; SIS, Milan; Workshop on Matrices and Statistics, Voorburg; **2001**: Selection Criteria for Time Series Models, Arrabida; **2000**: ISI, Lisbon; **1999**:Workshop on Stochastics and Quantum Physics, Aarhus.

*Invited seminars*

University of Cambridge (November 2020, video), Giessen-Margburg University (February 2020), CREST, Paris (January 2020), Exeter Business School, (November 2019), Cardiff Business School (November 2019), Free University of Amsterdam, Tinbergen Institute (May 2019), EIEF, Rome (April 2019), University of Aarhus (October 2018), University of Salento (May 2018), University of Glasgow (August 2017), University of Verona (May 2017), Bocconi University, Milano (March 2017), University of Padova (March 2016), Paris 6 Jussieu and Paris 7 Diderot (November 2015), ETH Zurich (October 2015), University of Canterbury (September 2014; August 2014), University of Heidelberg (February 2014), University of Torino, Collegio Carlo Alberto (November 2012), CREATES, University of Aarhus (October 2012), University of Salerno (May 2011), University of Padova (March 2011), University of Brescia (December 2010), Joint Research Center of the European Commission, Ispra (August 2010), University of Insubria (September 2007), University of Pavia (December 2003).

## Publications (selected)

*Journals*

Gasperoni, F., Luati, A., Paci, L., D'Innocenzo, E. (2021), Score driven modeling of spatio-temporal data, **Journal of the American Statistical Association**, forthcoming

Ranciati, S., Roverato, A., Luati, A. (2021), Fused graphical lasso for brain networks with symmetries, **Journal of the Royal Statistical Society, Series C**, 70, 1, 1299–1322.

Luati, A., Novelli, M. (2021), Explicit-duration hidden Markov models for quantum state estimation, **Computational Statistics and Data Analysis**, 158, 107183.

Catania, L., Luati, A. (2021), Quasi Maximum Likelihood Estimation of Value at Risk and Expected Shortfall, **Econometrics and Statistics**, special issue, *ERCIM 20 year anniversary*, forthcoming

Catania, L. and Luati, A. (2020), Robust Estimation of a Location Parameter with the Integrated Hogg Function, **Statistics and Probability Letters**, vol. 164, 108812.

Luati, A., Novelli, M. (2020), The Hammersley-Chapman-Robbins inequality for repeatedly monitored quantum system, **Statistics and Probability Letters**, vol. 165, 108852.

Proietti, T. and Luati, A. (2019), Generalised Linear Cepstral Models for the Spectrum of a Time Series, **Statistica Sinica**, 29, 1561–1583.

Gasperoni, F. and Luati, A., (2018), Discussion of the paper Bayesian Spatiotemporal Modeling Using Hierarchical Spatial Priors, with Applications to Functional Magnetic Resonance Imaging, **Bayesian Analysis** (Discussion), 13, 4, 1309–1310

Caivano, M., Harvey, A. and Luati, A. (2016), Robust time series models with trend and seasonal components, **SERIEs**, 7, 99–120.

Proietti, T. and Luati, A. (2015), The Generalised Autocovariance Function, **Journal of Econometrics**, 186, 245–257.

Donatelli, M., Luati, A., Martinelli, M. (2015), Spectral filtering for trend estimation, **Linear Algebra and its Applications**, 473, 217–235.

Harvey, A.C. and Luati, A. (2014), Filtering with Heavy Tails, **Journal of the American Statistical Association**, 109, 1112–1122.

Luati, A., Proietti, T. and Reale, M. (2012), The Variance Profile, **Journal of the American Statistical Association**, 107, 498, 607–621.

Proietti, T. and Luati, A. (2011), Low-Pass Filter Design using Locally Weighted Polynomial Regression and Discrete Prolate Spheroidal Sequences, **Journal of Statistical Planning and Inference**, 141, 831–845.

Luati, A. (2011), An Approximate Quantum Cramér-Rao Bound Based on Skew Information, **Bernoulli**, 17, 2, 628–642.

Luati, A. and Proietti, T. (2011), On the equivalence of the weighted least squares and the generalized least squares estimators, with applications to kernel smoothing, **Annals of the Institute of Statistical Mathematics**, 63, 4, 851–871.

Luati, A. and Proietti, T. (2010), Hyper-spherical and Elliptical Stochastic Cycles, **Journal of Time Series Analysis**, 31, 169–181.

Luati, A. and Proietti, T. (2010), On the spectral properties of matrices associated with trend filters, **Econometric Theory**, 26, 1247–1261.

Luati, A. (2010), Quantum information and statistical inference, **Electronic Journal of Theoretical Physics**, special issue on *New Trends in Quantum Information*, I. Licata, A. Sakaji, J. Singh and Felloni S. (ed.), 125-154.

Dagum, E.B. and Luati, A. (2009), A cascade linear filter to reduce revisions and turning points for real time trend-cycle estimation, **Econometric Reviews**, vol. 28, 1-3, 40-59.

Dagum, E.B. and Luati, A. (2009), A note on the statistical properties of nonparametric trend estimators by means of smoothing matrices, **Journal of Nonparametric Statistics**, vol. 21, n. 2, 193-205

Proietti, T., Luati, A. (2008), Real Time Estimation in Local Polynomial Regression, with an Application to Trend-Cycle Analysis. **Annals of Applied Statistics**, 2, 1523-1553.

Luati, A. (2008), A note on Fisher-Helstrom information inequality in pure state models, **Sankhyā**, vol. 70-A, Part I, 25-37.

Manfrini, O., Bazzocchi, G., Luati, A., Borghi, A., Monari, P., Bugiardini, R. (2006), Coronary spasm reflects inputs from adjacent esophageal system, **American Journal of Physiology, Heart and Circulatory Physiology**, 290, H2085-H2091.

Luati, A. and Tassinari, G. (2005), Intervention analysis to identify the significant exposures in pulsing advertising campaigns: an operative procedure, **Computational Management Science**, vol. 4, n. 4, 295-308.

Luati, A. (2004), Maximum Fisher information in mixed state quantum systems, **Annals of Statistics**, vol. 32, n. 4, 1770-1779.

Dagum, E.B. and Luati, A. (2004), A linear transformation and its properties with special applications in time series filtering, **Linear Algebra and its Applications**, n. 338 107-117

Dagum, E.B. and Luati, A. (2004), Relationship between local and global nonparametric estimators measures of fitting and smoothing, **Studies in Nonlinear Dynamics and Econometrics**, vol 8, n. 2, art. 17.

Dagum, E.B. and Luati, A. (2003), Global and local statistical properties of fixed-length nonparametric smoothers, **Statistical Methods and Applications**, vol. 11, n. 3, 313-333.

Luati, A. (2003), A real formula for transition probabilities, **Statistica**, anno LXIII, n. 1, 71-77.

Luati, A. and Paruolo, P. (2002), Sulla distribuzione di una base di norma unitaria del complemento ortogonale di un vettore gaussiano: il caso bidimensionale, **Statistica**, anno LXII, n. 1, 33-38.

*Book Chapters*

Armillotta M., Lupparelli, M. and Luati, A. (2021), An overview of ARMA-like models for count and binary data, *Trends and Challenges in Categorical Data Analysis*, Kateri, M., Moustaki I., Editors, pp. 40, Springer.

Gasperoni F. and Luati, A. (2018), Robust methods for detecting spontaneous activations in fMRI data, *Studies in Neural Data Science*, Canale A., Durante D., Paci L., Scarpa B. Editors, 91–110, Springer.

Luati, A. and Proietti, T. (2016), Generalised Partial Autocorrelations and the Mutual Information between Past and Future, in Podolskij, M., Stelzer, R., Thorbjornsen, S., Veraart A. (ed), *The fascination of probability, statistics and applications: In honour of Ole E. Barndorff-Nielsen*, 303–316, Springer.

Proietti, T. and Luati, A. (2015), Generalised Linear Spectral Models, in Shephard, N. and Koopman, S.J. (ed.), *Unobserved Components and Time Series Econometrics*, 331–347, Oxford University Press.

Proietti T., Luati, A. (2013), Maximum likelihood estimation of time series models: the Kalman filter and beyond. In Nigar Hashimzade and Michael Thornton (ed.), *Handbook of Research Methods and Applications on Empirical Macroeconomics*, Edward Elgar Publishing, 334-362.

Dagum E.B., Luati, A. (2012), Asymmetric linear filters for trend-cycle estimation. In William R. Bell, Scott H. Holan and Tucker S. McElroy (ed.) *Economic Time Series: Modeling and Seasonality*, Chapman&Hall, 213–230.

Proietti T., Luati, A. (2007), Least squares regression: graduation and filters. In M. Boumans (ed.) *Measurement in Economics: A Handbook*, Academic Press, Elsevier, 377-411.