A.D. 1308
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UNIVERSITÀ DEGLI STUDI DI PERUGIA

1. Education

1995: Ph.D. in Applied Statistics at the Università degli Studi di Firenze . Title of the final dissertation "Graphical Gaussian Models with unobserved heterogeneity" (awarded by the Italian Statistical Society ex-equo 'Best Italian Doctoral Thesis in Statistics of the year). Supervisor: Prof. Giovanni Marchetti.

1991: M.Sc. Degree with honors in Economics at the Università degli Studi di Firenze.

1987: B.Sc. Degree with honors in Statistics at the Università degli Studi di Firenze.

2. Academic career

2005 (1 December): Full Professor in Statistics at the Dipartimento di Economia Finanza e Statistica, Università degli Studi di Perugia.

2001 (1 November): Associate Professor in Statistics at the Dipartimento di Economia Finanza e Statistica, Università degli Studi di Perugia.

1997 (8 April): Lecturer at the Dipartimento di Scienze Statistiche, Università degli Studi di Perugia.

1996 (1 September) - 1997 (31 March): Research Fellow at the Dipartimento di Statistica "G. Parenti", Università degli Studi di Firenze.

1994 (1 Nov) - 1996 (30 June): Research Fellow at the Department of Statistics, Open University, Milton Keynes, (U.K.).

3. International awards, recognitions and grants

2015-2019: Affiliated Professor at Umeå University, Sweden.

2011 – 2014: Member of the Umeå SIMSAM Lab network (simsam.org.umu.se): A register-based research program connecting childhood with lifelong health and welfare.

2011 – 2014: Recipient of a grant by the American Institute of Mathematics (AIM, Palo Alto, www.aimath.org) to develop a research on "Identification of Graphical Models with latent variables".

2010 to date: Elected Member of the International Statistical Institute (http://www.isi-web.org/).

2010 – 2012: Member of the Research Team for the Sustainable Investment Research Program (SIRP), granted by the Swedish Foundation MISTRA (www.sirp.se).

2007 (1 May - 19 October): Awarded a *Visiting Professorship* at the Center of Research in Statistical Methodology (CRISM) of the University of Warwick (U.K.).

1998 (October): *Jemolo Fellow* at Nuffield College, Oxford University (U.K.).

4. Research activities

Main research topics are in multivariate statistics, in particular: Graphical Markov Models, Structural Equation Models, Causal Inference, Item Response Models and Latent variables.

Main fields of application as follows:

- Sociology, Epidemiology and Medicine
- Forecasts of credit risk of small and medium enterprises; consumer *Credit Scoring*
- Socially Responsible Investments
- Classification of rural areas.

Invited talks and seminars (since 2004)

2018 (14-16 December): "Computational and Methodological Statistics (CMStatistics) Conference", Pisa.

2018 (7 June): Workshop on "Statistical Network Science", Brunel University. London (U.K.).

2017 (4-7 April): "Learning Graphical Models in High Dimensional Settings". Edinburgh.

2014 (17-18 November): Kyoto International Conference on Modern Statistics in the 21st Century. Kyoto ICC. Supported by the Japanese Statistical Society. Kioto (JP).

2013 (19-21 June): Session "Graphical Markov model representation of latent structures" of the Italian Statistical Society: "Advances in Latent Variables", Brescia (IT).

2012 (15 December) : Conference "Aree Interne e Coesione Territoriale" organized by the Italian Ministry for Territorial Cohesion (http://www.coesioneterritoriale.gov.it/le-aree-interne-e-la-coesione-territoriale/), Roma (IT).

2011 (19-21 September): Complex Data Modelling and Computational Intensive Statistical methods for Inference and Prediction. University of Padova, Padova (IT).

2011 (16-18 May): Humboldt Kolleg Conference on "Mathematics, statistics and computer science for interpreting structures" Gulmasstrand, (SE).

2010 (4-8 October): Workshop on "Parameter identification in graphical models" . American Institute of Mathematics (AIM), Palo Alto, California (USA).

2010 (6-7 April): WOGAS2 Workshop on Geometric and Algebraic Statistics 2, University of Warwick, Warwick (UK).

2009 (18-20 March): Workshop on Skew Symmetric Distributions: return to ab-normality. University of Benevento, Benevento (IT).

2008 (1-5 September): 7th International Conference on Social Science Methodology. University of Napoli, Napoli (IT).

2008 (29 July-2 August): Workshop on Longitudinal data and Graphical models. Chalmers/Gothenburg University, Gothenburg (SE).

2008 (11-13 June): First joint meeting of the Société Francophone de Classification and of CLADAG research group. University of Naples, Caserta (IT).

2007 (6-8 September): Workshop on 'Issues in the estimation of the interregional tourism expenditure in Italy'. University of Venezia, Venezia (IT).

2006 (9-11 November): Workshop on "Large Graphical Models and Random Matrices" organized by SAMSI (Statistical and Applied Mathematical Sciences Institute), Chapel Hill, North Carolina (USA).

2006 (13 June): Workshop on Statistics for Firms and Industry, within the XLIII Meeting of

the Italian Statistical Society, Torino (IT).

2005 (7 –10 September): Workshop on Multivariate Systems with Independence Structures. Chalmers/Gothenburg University. Gothenburg/Smoegen (SE).

2004 (16-20 August): Sixth International Conference on Social Science Methodology. Recent Developments and Applications in Social Research Methodology, Amsterdam (NL).

2004 (16-18 June): International Conference on Distribution Theory, Order Statistics and Inference in Honor of Barry C. Arnold, Santander (ES).

2004 (9-11 June): Discussant at the Session "Graphical Models and Causal Inference", XLII Meeting of the Italian Statistical Society, Bari (IT).

5. Publications

Papers on peer-reviewed scientific international journals

1) RAGGI M., STANGHELLINI E., DORETTI M. (2021). "Path Analysis for Binary Random Variables". *Sociological Methods and Research*. Forthcoming.

2) DORETTI M., RAGGI M., STANGHELLINI E. (2021) "Exact parametric causal mediation with a binary otucone with a binary mediator". *Statistical Methods and its Application*. Forthcoming. https://arxiv.org/pdf/1811.00439.pdf

3) STANGHELLINI E., DORETTI M. (2019). "On marginal and conditional parameters in logistic regression models". *Biometrika*, Vol. 106(3), pp. 732-739, https://doi.org/10.1093/biomet/asz019.

1) DORETTI M., GENELETTI S., STANGHELLINI E. (2018). "Missing Data: A Unified Taxonomy Guided by Conditional Independence". *International Statistical Review,* Vol. 86, pp. 189-204. http://dx.doi.org/10.1111/insr.12242.

4) GENBÄCK, M., NG. N., STANGHELLINI E., DE LUNA X. (2017). "Predictors of decline in self-reported health: addressing non-ignorable dropout in longitudinal studies of aging. *European Journal of Ageing*, https://doi.org/10.1007/s10433-017-0448-x.

5) MEALLI F., PACINI B., STANGHELLINI E. (2016). "Identification of principal causal effects using secondary outcomes in concentration graphs". *Journal of Educational and Behavioural Statistics*, Vol. 41, pp. 463-480, doi:10.3102/1076998616646199.

6) DORETTI M., GENELETTI S., STANGHELLINI E. (2016). "Tackling non.ignorable dropout in the presence of time varying confounding". *Journal of the Royal Statistical Society, Series C,*. Vol. 65, pp. 775-795, doi: 10.1111/rssc.12154.

7) PIERRI F., STANGHELLINI E., BISTONI N. (2016). "Risk analysis and retrospective unbalanced data". *REVSTAT*, 14, Vol. 2, pp. 157-169.

8) ALLMAN E.S., RHODES J. A., STANGHELLINI E., VALTORTA M. (2014). "Parameter identifiability of Discrete Bayesian Networks with Hidden Variables*". Journal of Causal Inference*, doi: 10.1515/jci-2014-0021. Electronic Journal.

9) STANGHELLINI E., PAKPAHAN E. (2014). "Identification of Causal Effects in Linear Models: beyond Instrumental Variables". *TEST*, 24, Vol. 3, pp.489-509, doi: 10.1007/s11749-014-0421-3.

10) GENBÄCK, M., STANGHELLINI E., DE LUNA X. (2014). "Uncertainty Intervals for regression parameters with non-ignorable missingness in the outcome. *Statistical Papers*, 56, Vol. 3, pp. 829-847, doi: 10.1007/s00362-014-0610-x.

11) NICOLOSI M., GRASSI S., STANGHELLINI E. (2014). "Item Response Models to Measure Corporate Social Responsibility". *Applied Financial Economics*, 24, Vol. 22, pp.1449-1464, doi: 10.1080/09603107.2014.925070.

12) PIERRI F., BURCHI A., STANGHELLINI E. (2013). "La capacità predittiva degli indicatori di bilancio: un metodo per le PMI". *Piccola Impresa/Small Business*, Vol 1, pp. 85-108 (in Italian).

13) STANGHELLINI E., VANTAGGI B. (2013). "On the identification of discrete concentration graph models with one hidden binary variable". *Bernoulli*, 19, Number 5A, 1920-1937, doi: 10.3150/12-BEJ435.

14) STANGHELLINI E. (2012). Contribution to the Discussion to the paper of Wermuth N. and Sadeghi K. "Sequences of regressions and their independences", *TEST*, vol. 21, p. 265-267, doi: 10.1007/s11749-012-0287-1.

15) STINGO F.C., STANGHELLINI E., CAPOBIANCO R. (2011). "On the estimation of a binary response model in a selected population". *Journal of Statistical Planning and Inference*, 141, pp. 3293-3303, doi:10.1016/j.jspi.2011.04.014.

16) HUTTON J.L., STANGHELLINI E. (2011). "Modelling bounded health scores with censored skew-normal distributions". *Statistics in Medicine*, 30, pp. 368–376, doi: 10.1002/sim.4104.

17) FORCINA A., GIOVAGNOLI A., STANGHELLINI E. (2011). "Non-compliance in surgical patients with herniated lumbar discs: an application of an extended latent class model as a selection model", *Statistical Modelling*, 11(4), pp. 311-324, doi: 10.1177/1471082X1001100402.

18) FALOCCI N., PANICCIA' R., STANGHELLINI E. (2009). "Regression modelling of the flows in an input-output table with accounting constraints", *Statistical Papers*, 50, pp. 373-382.

19) GIORGI ROSSI. P., MANTOVANI J., FERRONI J., FORCINA A., STANGHELLINI E., CURTALE F., BORGIA P. (2009). "Bacterial meningitis surveillance in Lazio, Italy: a system integrating laboratory specificity to hospitalization database sensitivity", *BMC Infectious Diseases,* 9.

20) MARCHETTI G.M., STANGHELLINI E. (2008). "A note on distortions induced by truncation, with application to linear regression systems*, Statistics & Probability Letters*, 78, pp. 824-829.

21) WERMUTH N., STANGHELLINI E. (2006). Contribution to the Discussion to the paper of Castelo R. e Roverato. A. "A robust procedure for Gaussian graphical model search from microarray data with *p* lager than *n*", *Statistica*, 66, pp. 366-368.

22) STANGHELLINI E. (2006). "On Statistical Issues raised by the New Capital Accord". *Statistica Applicata*, 18, 2, pp. 389-405.

23) STANGHELLINI E., WERMUTH N. (2005). "On the identification of path analysis models with one hidden variable", *Biometrika,* 92, 2, pp. 337-350.

24) STANGHELLINI E., VAN DER HEIJDEN P.G.M. (2004). "A multiple-record systems estimation method that takes observed and unobserved heterogeneity into account". *Biometrics*, 60, pp. 510-516.

25) STANGHELLINI E. (2004). "Instrumental variables in Gaussian directed acyclic graph models with an unobserved confounder", *Environmetrics,* 15, pp. 463-469*.*

26) CAPITANIO A., AZZALINI A., STANGHELLINI E. (2003). " Graphical Models for skew-normal variates", *Scandinavian Journal of Statistics*, 30, pp. 129-144.

27) STANGHELLINI E. (2003). "Monitoring the behaviour of credit card holders with graphical chain models", *Journal of Business, Finance and Accounting,* 30 (9-10), pp. 1423-1435.

28) GIUDICI P., STANGHELLINI E. (2001). "Bayesian Inference for Graphical Factor

Analysis Models", *Psychometrika,* 66, 4, pp. 577-592.

29) BIGGERI A.,STANGHELLINI E. RUGGERI M. (2001). "Regression analysis of multiple outcomes", *Strumenti e metodi,* 25, pp. 83-89.

30) STANGHELLINI E., McCONWAY K.J., HAND D.J. (1999). "A discrete variable chain graph for applicants for credit", *Journal of the Royal Statistical Society*, serie C, 48, Part 2, pp. 239-251.

31) BIGGERI A., STANGHELLINI E., MERLETTI F., MARCHI M. (1999). "Latent class models for varying catchability and correlation among sources in Capture-Recapture estimation of the size of a human population", *Statistica Applicata*, 11, 4, pp. 563-576.

32) STANGHELLINI E. (1997). "Identification of a single-factor model using graphical Gaussian rules", *Biometrika*, 84, pp. 241-244.

33) HAND D.J., McCONWAY K.J., STANGHELLINI E. (1997). "Graphical Models of Applicants for Credit", *Journal of Mathematics Applied in Business and Industry*, 8, pp. 143-155.

34) STANGHELLINI E. (1996). Contribute to the discussion of the paper "Statistics and the theory of measurement" by D.J. Hand, *Journal of the Royal Statistical Society, Series A,* p. 485.

Books or chapters in books

1) STANGHELLINI E. (2018). "Strategie della ricerca. Una introduzione". In Cimmino L., Fanò L. Petrillo C., Santambrogio A. Stanghellini E. Veronesi F. (a cura di) Fare Scienza oggi, Vol. 2 Atti dei Convegni Interdipartimentali Università degli Studi di Perugia, Morlacchi Editore U.P. ISBN: 788860749581.

2) STANGHELLINI E., RANALLI M.G. (2016) "Population size estimation using a categorical latent variable". In Boehning D., Bunge J., van der Heijden P.G. *Capture-Recapture Methods for the Social and Medical and Sciences*. Chapmand and Hall. ISBN: 9781498745314.

3) MEALLI F., PACINI B., STANGHELLINI E. (2014). "Identification of principal causal effects using secondary outcomes". In Carpita M., Brentari e. Qannari E. *Advances in Latent Variables. Studies in Theoretical and Applied Statistics*. Springer-Verlag, doi: 10.1007/10104_2014_15.

4) GOTTARD A., STANGHELLINI E., CAPOBIANCO R. (2013). "Semicontinuous regression models with Skew distributions". In: Grigoletto M., Lisi F., Petrone S.. *Complex Models and Computational Methods in Statistics* . Springer Verlag, ISBN: 9788847028708, doi: 10.1007/978-88-470-2871-5-12.

5) STANGHELLINI E. (2009). *Introduzione ai metodi statistici per il Credit Scoring*. Springer-Italia. ISBN 9788847010802 (in Italian).

6) FORCINA A. STANGHELLINI E. (2005*). Elementi di Statistica per economia, Morlacchi Editore, Perugia*.

7) GIUDICI P., STANGHELLINI E. (1998). "Graphical Factor Analysis Models: Specification and Model Comparison", in Rizzi A., Vichi M., Bock H.H., (Eds.)*. Advances in Data Science and Classification*, Springer, pp. 363-368.

Working papers

1) CALABRESE D., KALANTARI K., SANTUCCI F.M., STANGHELLINI E. (2008). *Environmental Policy and Strategic Communication in Iran*, World Bank Working

Paper n. 132, Washington. ISBN 978-0-8213-7421-4, doi: 10.1596/978-0-8213-7421-4.

2) FALOCCI N., PANICCIA' R., STANGHELLINI E. (2005). "Un modello per la stima e la previsione dei flussi regionali delle *presenze turistiche* registrate". IRPET, Working Paper, Firenze.*Working papers.*

Conference Proceedings/Poster

1) LANZILAO L. MARINIELLO A. POLENZANI B. NAZERIAN P. GRIFONI S. PROTA A. TONIETTI B. NERI C. TURCO L. FANELLI A STANGHELLINI E. (2021). A Computational Approach In The Diagnostic Process of COVID-19. Synergy Between The Laboratory And Emergency Department. IFCC GLOBAL CONFERENCE ON COVID-19, February 15-17. Poster.

2) STANGHELLINI E., VANTAGGI B. (2010). "On the identification of discrete graphical models with hidden nodes". Atti del convegno Joint meeting GfKl – Cladag, Firenze, Settembre 8-10, pp. 347-348.

3) CAPOBIANCO R., HUTTON J.L., STANGHELLINI E. (2010). "Modelling censored data with the skew-normal distribution". *Proceedings of XXV International Workshop on Statistical Modeling (IWSM), Glasgow (UK).*

4) STANGHELLINI E. (2008). "On reject inference for binary response models", in *Book of Short Papers of the First joint meeting of the Société Francophone de Classification and of CLADAG*, Caserta, 11-13 Giugno, EUM-Edizioni, pp. 133-136, ISBN 978-88-495-1656-2.

5) FALOCCI N., PANICCIA' R., STANGHELLINI E. (2007). "Issues in the estimation of the interregional tourism expenditure in Italy", in *Book of Short Papers S.Co.2007 Fifth Conference "Complex models and computational intensive methods for estimation and prediction"*. Edited by: Mantovan P., Pastore A, Tonellato S., Padova CLEUP, pp. 193-198, ISBN 978-88-6129-114-0.

6) STANGHELLINI, E. (2004). "Modelli grafici e sistemi esperti nel behavioural scoring", in *Il rischio di credito e le implicazioni di Basilea 2* (Atti del convegno, Siena, 8 e 9 marzo 2002), Giuffrè, pp. 199-210.

7) STANGHELLINI E., VAN DER HEIJDEN P.G.M. (2000). "A capture-recapture method that takes observed and unobserved heterogeneity into account", *Proceedings of the 15th International Workshop on Statistical Modelling*, Springer, pp. 260-265.

8) STANGHELLINI E. (1999). "The use of graphical models in consumer credit scoring", Invited Paper, *Proceedings of the 52nd Session of the International Statistical Institute*, 10-18 agosto 1999, Helsinki, Finlandia, pp. 279-282.

9) STANGHELLINI E., WHITTAKER J. (1999). "Analysis of multivariate time series via a hidden graphical model", *Proceedings of the Seventh International Workshop on Artificial Intelligence and Statistics*, Morgan Kaufmann, pp. 250-254.

10) BARTOLUCCI F., FORCINA A., STANGHELLINI E. (1998). "A comparison of recent EM accelerators within Item-Response theory", Full paper, *Proceedings in Computational Statistics*, COMPSTAT98, Physica-Verlag, pp. 173-178.

11) BIGGERI A., STANGHELLINI E. (1998). "Uso di modelli grafici per l'analisi della relazione tra inquinamento atmosferico e disturbi respiratori nell'infanzia*",* Relazione Invitata, *Atti della XXXIX Riunione Scientifica della Società Italiana di Statistica*, pp. 215-223.

12) MARCHETTI G.M., STANGHELLINI E. (1996). "Identifiability of the quadratic exponential binary distribution with one latent variable", *Proceedings of the 11th International Workshop on Statistical Modelling*, pp. 430-433 .

13) MARCHETTI G.M., STANGHELLINI E. (1996). "Alcune osservazioni sui modelli grafici in presenza di variabili latenti", *Atti della XXXVIII Riunione Scientifica della Società Italiana di Statistica*, Vol. 2, pp. 497-504.

14) GALLO G.M., STANGHELLINI E. (1993). "Small sample properties of MIMIC model estimators", *Bullettin of the International Statistical Institute*, Contributed Papers, pp. 471-472.

6. Teaching activities

Introductory course on Statistics (undergraduate level); Linear regression and Multivariate Statistics (undergraduate level); Credit Scoring (master level); Graphical Markov Models (doctoral level).

7. Other information

- Member of the Program Committee of UAI2021. International Conference on Uncertainty and Artificial Intelligence, July 27-30 2021.

- From April 2020 to October 2020: Member of the Advisory Board of the Italian Bureaux of Statistics (ISTAT) for the design and implementation of sample surveys to measure and monitor epidemiological parameters of COVID-19 pandemic.

- From May 2020 to October 2020: Member of the research group "Inpresa" for the analysis and forecasting of COVID19 pandemic, granted by the Lombardia region.

- January 2020: Guest researcher at the Institut für Statistik und Wirtschaftsmathematik University of Aachen.

- From February 2014 to November 2019: Deputy Rector of the University of Perugia for International Relations.

- From 2012 to 2016: Director of the Ph.D. program in "Mathematical and Statistical Methods for the Economic and Social Sciences".

- From 2010 to 2016: External supervisor of the doctoral student Minna Genbäck at the Department of Statistics, Umeå University, (SE).

- 2008: Consultant to the Ministero del Tesoro Italiano, Unità di Valutazione, for the project Rural-Urban Mapping of the Italian municipalities via statistical classification methods.

- From 2007 to date: Member of the Editorial Board of the scientific journal Statistical Papers, Springer.

- From 1996 to date: Member of the Italian Statistical Society (SIS - Società Italiana di Statistica).

- 2006: Consultant to the Istituto Regionale Programmazione Economica Toscana (I.R.P.E.T.) for the project: Building an inter-regional model for tourism flows in Italy.

- 2004 (1 January-30 June): Consultant to the World Bank as Statistical Analysis Advisor to the Project Environmental knowledge and behavior of Tehran residents. Assignments: Provide remote support and guidance in the design of surveys, review sampling and data analysis procedures.

- Referee of the international journals: *Biometrika, Bernoulli, Biometrics, Annals of Statistics, Annals of Applied Statistics, Statistical Modelling, Journal of Agricultural, Biological and Environmental Statistics, Statistica Sinica*.

8. Languages

Italian: mother language.

English: fluent.

French: very good comprehension, good speaking and basic writing.