

## Curriculum Vitae – JULIA MORTERA

Professor of Statistics

Università degli Studi Roma Tre

**Born:** 2 October, 1952 in Rome    **Nationality:** Italian

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### Employment

**2001 – present** Professor of Statistics, Università Roma Tre.

**1993 – 2001** Associate Professor of Statistics, Università Roma Tre.

**1992 – 1993** Associate Professor of Statistics, Università degli Studi di Trento.

**1982 – 1992** Assistant professor, Department of Statistics, Probability and Applied Statistics, Università di Roma “La Sapienza”.

**1979 – 1982** Researcher at IRPEM, National Research Council (CNR), Ancona.

### Honours and awards

**2016** The Simons Foundation visiting fellow at the Isaac Newton Institute, University of Cambridge, from 29 August 2016 to 21 December 2016, for the scientific programme on *Probability and Statistics in Forensic Science*.

**2017** Honorary Academic Status, University of Bristol.

### Qualifications

**1975** Degree in Mathematics with 110/110 cum laude, Università di Roma “La Sapienza”. Supervisor: Prof. Bruno de Finetti.

**1976 – 1978** PostDoc scholarship at the Accademia Nazionale dei Lincei “Centro Interdisciplinare di Scienze Matematiche e loro Applicazioni” (Interdisciplinary Center for Mathematical Science and its Applications). Supervisor: Prof. Bruno de Finetti.

### Further academic positions

- 2004 – 2015** Director of the Ph.D. programme “Statistical Methodology for Economics and Business”, Università Roma Tre.
- 2010 – 2015** Chairman of the Ph.D. School in “Economics and Quantative Methods”, Università Roma Tre.

### Professional societies

- 2019–present** Royal Statistical Society Discussion Meetings Committee
- 2015 – 2019** Committee member of the Royal Statistical Society Statistics and Law Section
- 2013 – 2015** Member of the Royal Statistical Society Statistics and Law Working Group

### Further professional activities

- 2017 – present** Member of the Publications Network of Advisors, Royal Statistical Society.
- 2016 – 2018** Member of the selection committee for the *Abilitazione Scientifica Nazionale* evaluating all full professors and associate professors in Statistics in Italy.
- 2015 – present** Technical Advisory Committee, Center for Statistics and Applications in Forensic Evidence, Iowa State University, Carnegie Mellon University, University of California Irvine and University of Virginia.
- 2008 – 2019** Associate editor of “Bayesian Analysis”.
- 2019 – present** Editor of “Law, Probability and Risk”, Oxford University Press.
- 2010** Member of the selection committee for the DeGroot Prize “awarded to the author or authors of a published book in Statistical Science”.
- 2008** External Assessor for forensic statistics papers for the UK Research Assessment Exercise.
- 2006** Member of the Lindley Prize selection committee awarded for innovative research in Bayesian Statistics.
- 2005** Publications Committee for the International Society for Bayesian Analysis (ISBA)

### Visiting positions

The Simons Foundation Visiting Fellow, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, August – December 2016.

Visiting Professor, Department of Statistics, University of Oxford in September 2009, October 2010, December 2011

Visiting Professor, Newton Research Foundation, Cambridge, November 2006

Visiting Professor, Department of Statistics, University College London

Visiting Professor, Department of Mathematics, Aalborg University, November 2002

Visiting Professor, Gatsby Center Neuroscience, University College London, December 2001

Visiting Professor, Department of Statistics, Hebrew University, Jerusalem, Israel (October-November 1998)

Visiting Scholar, Department of Statistics, Duke University, Durham, N.C., USA, October 1997;

Visiting Scholar, Department of Statistics, Purdue University, W. Lafayette, USA, October 1995

Visiting Scholar, Department of Statistics and Social Science, University of Haifa, Israel, January 1995

### **Conference organization**

Scientific Organizer of the Workshop on "Probabilistic Expert Systems for Forensic Genetics" (PESFoG), Università Roma Tre, October 2012.

Principal Scientific Organizer of the "Fifth International Conference on Forensic Statistics", Venice, August 2002.

Scientific Programme committees for: 6th to 11th International Conference on Forensic Statistics", Lund University (2020), Michigan State University (2017), Leiden University (2014), University of Seattle (2011), University of Lausanne (2008), Arizona State University (2005).

**2007** PRIN07 Conference on "Dependence analysis in problems with partial information structure", Università of Roma Tre.

**2000** HSSS workshop on "Probabilistic Expert Systems in forensics and genetics", S. Vigilio di Marebbe.

### **Research grants**

- 2015 – 2020** Pangea Formazione research grant on “Sviluppo di sistemi esperti probabilistici come supporto a decisioni in problemi aziendali” (Development of probabilistic expert systems for decision support in business applications).
- 2012 – 2015** Principal Investigator research project “Probabilistic Expert Systems for Forensic Genetics”, Università Roma Tre.
- 2009 – 2011** MIUR (Italian Ministry for University and Research) research project PRIN07 “Dependence analysis in problems with partial information structure”.
- 2006 – 2008** MIUR PRIN05 research project “Probabilistic expert systems for complex problems in forensic identification”.
- 2003 – 2005** MIUR PRIN03 research project “Bayesian Networks: theory and applications”.
- 2001 – 2005** Leverhume Trust Research Interchange Grant “Bayesian Networks for Forensic for forensic inference from genetic markers” (Italian coordinator). Joint project with University College London, Oxford University, Università Roma Tre, Aalborg University, University of Gothenburg, University of Leicester (<http://www.staff.city.ac.uk/rgc/leverhulme>).
- 2001 – 2002** European Commission Grant “Grotius” - II Programme of the European Commission.

### **Research supervision and teaching experience**

- Supervision of post-doctoral students:  
Marco Perone Pacifico, Paola Vicard, Marina Andrade, Caterina Conigliani, Alessandra Nardi, Flaminia Musella, Sara Merigioli.
- Supervision of Ph.D. students:  
Gianluca Mastrantonio (2013–2016); Federico Aluigi (2010–2013); Ugo Guarnera (2009–2011); Sara Merigioli (2005–2008); Rossana Moroni (2004–2007); Maria Felice Arezzo (1997–2001).
- Since 1982 I have been teaching statistics for 100 – 140 hours/year at all levels from undergraduate, graduate to post-graduate students at the Università di Roma “La Sapienza”, at the Università di Trento and at the Università di Roma Tre. Topics taught: exploratory and descriptive statistics, statistical inference, mathematical statistics, probability, intermediate statistical inference, statistics for management, statistical modelling, linear models, generalized linear models, multivariate statistics, Bayesian

methods, probabilistic expert systems, graphical models, Bayesian networks, decision theory. I have been delivering short lecture courses for Ph.D. students and researchers on Bayesian networks and forensic statistics at several Italian and foreign universities and at the Italian Statistical Institute (ISTAT).

- In January 2019 I gave a lecture course on Statistical Inference for Masters Students at the African Institute for Mathematical Science (AIMS) Cameroon.
- External examiner for a Ph.D. theses in Statistics: Chalmers University of Technology and University of Gothenburg (2017), Leiden University (2017), University of Lausanne (2016), Department of Statistics, University of Oxford (2010), Abö Academy, University of Turku, Finland (2011), Department of Mathematics, Aalborg University (2004) and numerous Universities in Italy.

#### **Invited speaker at conferences and workshops**

- Keynote speaker at the Workshop on Advanced Statistical Methods for Complex Data 28-31 January 2020, University of Cape Town.
- Keynote speaker at the 10th International Conference on Forensic Inference and Statistics, Minneapolis, USA, September 2017.
- Probability and Statistics in Forensic Science Workshop (FOS2) on Bayesian networks and argumentation in evidence analysis, Isaac Newton Institute for Mathematical Sciences, University of Cambridge, September 2016.
- ISBA World Meeting, Sardinia, June 2016.
- SCO2013, Politecnico di Milano, September 2013.
- PRIN07 Meeting, Università Vita Salute, Milan, January 2011.
- ISBA Meeting, Istanbul, June 2011.
- 8th International Conference on Forensic Inference and Statistics, Seattle, July 2011.
- Bayesian Networks, Politecnico di Torino, December 2010.
- The Netherlands Statistics and O.R. Annual Meeting, April 2010.
- 2nd Greco-Italian Meeting on Statistics, Sardinia, June 2010.
- Statistics Laboratory, University of Cambridge, UK, 2009.

- Statistics for Innovation, University of Oslo, 2009.
- 7th International Conference on Forensic Inference and Statistics, University of Lausanne, 2008.
- 9th World Conference of the International Society for Bayesian Analysis (ISBA), Hamilton Is., Australia, 2008.
- International Workshop "Evidence in the Human Sciences", Bologna, 2007.
- 20th Congress of the International Society for Forensic Genetics, Padova 2007 (keynote speaker).
- International conference of the Royal Statistical Society, RSS 2006, Belfast.
- 21st Congress of the International Society for Forensic Genetics, 2005.
- Sixth International Conference for Forensic Statistics, Center for Law, Science, Technology, Arizona State University, 2005.
- Workshop on Bayesian networks: theory and applications, Genova, 2005.
- Closing Workshop on Probabilistic Expert Systems for Forensic Inference, Leverhume Research Group, Buxton, UK, 2004.
- Workshop on Probabilistic Expert Systems for Forensic Inference, Buxton, UK, 2004.
- XLII Riunione Scientifica della SIS (Italian Statistical Society), Bari, 2004.
- Workshop on Bayesian networks for Forensic Identification, Trani, Italy, 2003.
- gR2003 Workshop, Aalborg University, Denmark, 2003.
- The Second Joseph Bell Workshop on the Evaluation of Evidence, University of Edinburgh, UK, 2003. (Keynote speaker).
- Fifth International Workshop on Objective Bayes Methodology, Aussois, France, 2003.
- CLADAG2003 International Conference, Bologna, 2003.
- Workshop on Probabilistic Expert Systems for Forensic Inference, Skagen, Denmark, 2001.
- 18th Conference of Forensic Haematologists, Fiuggi, Italy, 2001: (Keynote speaker).
- International Conference on "Objective Bayesian Methodology", Univ. de Valencia, 1999.

- Sixth Valencia International Meeting on Bayesian Statistics, 1998 (invited discussant).
- HSSS Workshop “Models and Inference: recent developments and perspectives”, Luminy, France, 2000.
- 51st Meeting of the International Statistical Institute (ISI), Istanbul, 1997.
- International Society for Bayesian Analysis Conference, Cape Town, S. Africa, 1996.
- 4th World Conference of the Bernoulli Society, Vienna, 1996.
- Basel–Amsterdam Riverboat Conference on Bayesian Statistics and Econometrics 1994.
- Fifth Symposium on Statistical Decision Theory and Related Topics, Purdue, USA. 1993.
- Bayesian Meeting on Robustness, Milan 1992.

### **Research interests**

- Probabilistic expert systems for forensic identification using genetic markers
- Models for inference from DNA mixtures
- Models for kinship analysis
- Analysis of evidence
- Estimation of mutation rates
- Object-oriented Bayesian networks and their applications
- Opinion pooling and prediction markets
- Bayesian networks for decision theory and game theory
- Bayesian statistics, model choice, the interface between classical and Bayesian statistics

## Publications

1. Mortera J. (2020) DNA Mixtures in Forensic Investigations: The Statistical State of the Art, *Annual Review of Statistics and Its Application* **7**, (to appear).
2. Dawid A. P., Mortera J. (2020) Bayesian networks in forensic science (ed. Banks D., Kafadar K., Kaye D.) In *Handbooks of Modern Statistical Applications series*, Chapman & Hall/CRC (to appear).
3. Dotto F., Mortera J., Baldassarri L., Pascali V. (2019) Analysis of a DNA mixture involving Romani reference populations. *Forensic Science International: Genetics* **44**, 1–8.
4. Dawid A. P., Mortera J. (2019) Resolving some contradictions in the theory of linear opinion pools *Theory and Decision* <https://doi.org/10.1007/s11238-019-09729-0>.
5. Graverson T., Mortera J., Lago G. (2019) The Yara Gambirasio case: Combining evidence in a complex DNA mixture case. *Forensic Science International: Genetics*, **40**, 52–63. <https://doi.org/10.1016/j.fsigen.2018.12.010>.
6. Dawid A. P., Mortera J. (2018) Graphical Models for Forensic Analysis In *Handbook of Graphical Models* (ed. Drton M., Lauritzen S.L., Maathuis M., Wainwright M.) Chapman & Hall/CRC Handbooks of Modern Statistical Methods series.
7. Green P. J. and Mortera J. (2017) Paternity testing and other inference about relationships from DNA mixtures, *Forensic Sci Int: Genet.* **28**, 128 – 137, doi: <http://dx.doi.org/10.1016/j.fsigen.2017.02.001>.
8. Mortera J. (2016) Statistical evaluation of forensic DNA mixtures from multiple traces. In *Topics on Methodological and Applied Statistical Inference* (edited by Di Battista, T. Moreno E. and Racugno W.), Springer International Publishing. doi: [10.1007/978-3-319-44093-4\\_16](https://doi.org/10.1007/978-3-319-44093-4_16).
9. Mortera J., Vecchiotti C., Zoppis S., Merigioli S. (2016) Paternity testing that involves a DNA mixture. *Forensic Sci Int: Genet.* **23**, 50–54, doi:10.1016/j.fsigen.2016.02.014.
10. Mortera, J. and Dawid, A. P (2015) Forensic identification then and now. *Statistica Applicata-Italian Journal of Applied Statistics*, **27** (2), 145–172.
11. R. G. Cowell, T. Graverson, S. Lauritzen, and J. Mortera (2015). Analysis of DNA mixtures with artefacts. *Journal of the Royal Statistical Society Series C*. (with discussion), **64**, 1—48. Read before the Royal Statistical Society on 11 June 2014.



12. Mortera J., Vicard P., Vergari C. (2013). Object-Oriented Bayesian Networks for a Decision Support System for Antitrust Enforcement. *THE ANNALS OF APPLIED STATISTICS*, **7**, 714-738.
13. Cowell R. G., Lauritzen S. L., Mortera J. (2011). Probabilistic expert systems for handling artifacts in complex DNA mixtures. *Forensic Science International: Genetics*, **5**, 202-209, doi: 10.1016/j.fsigen.2010.03.008
14. Dawid A. P., Mortera J., Vicard P. (2010). Paternity testing allowing for uncertain mutation rates. In: A. O'Hagan And M. West Eds. *Handbook Of Applied Bayesian Analysis*, 188-215, Oxford: Oxford University Press, ISBN/ISSN: 978-0-19-954890-3
15. Green P., Mortera J. (2009). Sensitivity of inferences in forensic genetics to assumptions about founding genes. *The Annals of Applied Statistics*, **3**, 731-763, doi: 10.1214/09-A0AS235
16. Vicard P., Dawid A. P., Mortera J., Lauritzen S. L. (2008). Estimation of mutation rates from paternity cases using Bayesian networks. *Forensic Science International: Genetics*, **2**, 9-18, doi: 10.1016/j.fsigen.2007.07.002
17. Mortera J., Dawid A. P. (2008). Probability and Evidence. In *Handbook Of Probability Theory With Applications In The Social, Behavioral And Educational Sciences, Business, Management And Law*, Ed. T. Rudas, 403-422, Thousand Oaks, CA: Sage Handbook
18. Cowell R. G., Lauritzen, S.L. and Mortera J. (2008) Probabilistic modelling for DNA mixture analysis. *Forensic Science International: Genetics*, **1**, 640-642.
19. Cowell R. G., Lauritzen, S.L. and Mortera J. (2007). Identification and Separation of DNA Mixtures using Peak Area Information. *Forensic Science International*, **166**, 28-34.
20. Dawid A. P., Mortera J. and Vicard P. (2007) Object-Oriented Bayesian Networks for Complex Forensic DNA Profiling Problems, *Forensic Science International*, **169**, 195-205.
21. Cowell R. G., Lauritzen, S.L. and Mortera J. (2007). A Gamma Bayesian Network for DNA Mixture Analyses, *Bayesian Analysis*, **2**, 333-348.
22. Cowell, R. G., Lauritzen, S. L. and Mortera, J. (2006). *MAIES: A Tool for DNA Mixture Analysis*. Proceedings of the 22nd Conference on Uncertainty in Artificial Intelligence, (UAI 2006), (ed. R. Dechter and T. Richardson). 90-97.
23. Dawid, A. P., Mortera, J. and Vicard, P. (2006). Representing and solving complex DNA identification cases using Bayesian networks. In *Progress in Forensic Genetics11*

- (Proceedings of the 21st International ISFG Congress), International Congress Series, Vol. 1288. Elsevier Science, Amsterdam.
24. Mortera J. (2003). Analysis of DNA Mixtures Using Bayesian Networks. In *Highly Structured Stochastic Systems*, Editor P. J. Green and N. L. Hjort and S. Richardson, Oxford University Press.
  25. Mortera J., Dawid A. P., Lauritzen S. L. (2003) “Probabilistic Expert Systems for DNA Mixture Profiling”, *Theoretical Population Biology*, **63**, 191–205.
  26. Lauritzen, S. L., and Mortera, J. (2002). “Bounding the number of contributors to mixed DNA stains”. *Forensic Science International*, **130**, 125–126.
  27. Dawid, A. P., Mortera J., Pascali V. and van Boxel D. (2002). “Probabilistic Expert Systems for Forensic Inference from Genetic Markers”. *Scandinavian J. of Statistics*, **29**, 577-595.
  28. Dawid A. P., Mortera J. and Pascali V. P. (2001) “Non-fatherhood or mutation? A probabilistic approach to paternal exclusion in paternity testing” *Forensic Science International*, **31**, 1-7.
  29. De Santis, F., Mortera J., and Nardi A. (2001). “Jeffreys’ Priors for Survival Models with Censored Data”. *Journal of Statistical Planning and Inference*. **99**, 193–209.
  30. Berger, J. O. and Mortera, J. (1999). “Default Bayes Factors for Nonnested Hypothesis Testing”. *J. Amer. Statist. Ass.*, **94**, 542–554.
  31. Dawid, A. P., and Mortera, J. (1998). “Forensic identification with imperfect evidence”. *Biometrika*, **85**, 835–849.
  32. Dawid, A. P. and Mortera, J. (1996). “Coherent analysis of forensic identification evidence”. *J. Roy. Statist. Soc. B*, **58**, 425–443.
  33. DeGroot, M. H., Dawid, A. P., and Mortera, J. (1995). “Coherent Combination of Experts’ Opinions” (with Discussion). *Test*, **4**, 263–314.
  34. Berger, J. O. and Mortera, J. (1994). “Robust Bayesian Hypothesis Testing in the Presence of Nuisance Parameters”. *Journal of Statistical Planning and Inference*, **40**, 357–373.
  35. Berger, J. O. and Mortera, J. (1991). “Interpreting the stars in precise hypothesis testing”. *International Statistical Review*, **59**, 337–353.
  36. Berger, J. O. and Mortera, J. (1991). “Bayesian Analysis with Limited Communication”. *Journal of Statistical Planning and Inference*, **28**, 1–24.

37. DeGroot, M. H. and Mortera, J. (1991). “Optimal Linear Opinion Pools”. *Management Science*, **7**, 546–558.
38. Mortera, J. (1990). “Aggregazione delle opinioni: una panoramica”. *Rassegna di Metodi Statistici ed Applicazioni*, **7**, ed. Pitagora, Bologna.
39. Mortera, J., and San Martini, A. (1989). “Comparison of Proportions with Asymmetric Prior Information”. *Communications in Statistics-Theory and Methods*, **19**, 337–353.
40. West, M. and Mortera, J. (1987). “Bayesian Models and Methods for Binary Time Series”. In *Probability and Bayesian Statistics*, R. Viertl ed., Plenum Press, 487–495.
41. Mortera, J. (1986). “Bayesian Forecasting”. *Metron*, **XLIV**, 277–295.
42. Bottini G., Mortera, J. et al. (1980). “The relationship between G-6-PD deficiency, thalassemia and malaria”. *Esperientia*, **36**.
43. Bottini G., Mortera, J. et al. (1979). “The genetic component of quantitative perinatal variables. An analysis of relationships between erythrocyte acid phosphatase and birth weight, gestational age and serum bilirubin level in the first days of life”. *J. Perinatal Medicine*, **8**.
44. Bottini G., Mortera, J. et al. (1977). “Erythrocyte acid phosphatase: an analysis of relationships with some neonatal variables”. *Pediatric Research*, **14**.
45. Bottini G., Mortera, J. et al. (1976). “Neonatal jaundice and erythrocyte acid phosphatase phenotype”. *The Lancet*, **24**.

#### **Discussion Contributions**

46. Egeland T., Dawid A. P, Mortera J., Tillmar A. (2011). Response to: DNA identification by pedigree likelihood ratio accommodating population substructure and mutations. *Investigative Genetics*, **2:7**, doi: 10.1186/2041-2223-2-7
47. Mortera, J. and Vicard, P.(2008) Invited discussion of “Statistical Analysis of an Archeological Find”, *Annals of Applied Statistics*, **1**, 91-96.
48. Mortera, J. (1998). Discussion of “Hierarchical Models for DNA Profiling using Heterogeneous Databases”. (by Dawid A.P. and Puechel J.) *Bayesian Statistics 6*, 201–204, eds. J. M., Bernardo et al., London, Oxford University Press.

49. Mortera, J. (1997). Discussion of “Accurate and Stable Bayesian Model Selection: the Median Bayes Factor”. (by Berger J. and Pericchi L. R.) *Proceedings of the Workshop on Model Selection*, ed. Pitagora, Bologna.
50. Dawid, A. P. and Mortera, J. (1995). Discussion of “Inference in Forensic Identification”. (by Balding D. J. and Donnelly P.) *J. Roy. Statist. Soc. A*, **158**, 21-53.
51. Berger, J. O. and Mortera, J. (1995). Discussion of “Fractional Bayes Factors for Model Comparison”. (by A. O’Hagan) *J. Roy. Statist. Soc. B*, **57**, 99–138.
52. Mortera, J. and Dawid, A. P. (1994). Discussion of “Bayesian Statistics and the Law ”. (by Fienberg S. and Finkelstein M. O.) In *Bayesian Statistics 5*, eds. J. M., Bernardo et al., London, Oxford University Press
53. Mortera, J. (1994). Discussion of “Posterior robustness with more than one sampling model”. (by Pericchi L. R. and M. Perez) *Journal of Statistical Planning and Inference*, **40**, 121–141.
54. Mortera, J. (1993). Discussion of “Who knows what Alternative Lurks in the Heart of Significance Tests”. (by J. Hodges) *Bayesian Statistics 4*, eds. J. M., Bernardo et al., London, Oxford University Press.

**Articles unpublished or in review:**

55. Mortera J., Dawid A. P. (2019) Probability Forecasts and Prediction Markets Working Paper 250, Università Roma Tre.
56. Mortera, J. (1985). “Studio di fattibilità per un sistema di rilevazione campionaria delle statistiche di pesca”. *Quaderni IRPEM*, **V**, n. 1.
57. Bazigos, G., Levi, D., and Mortera, J. (1983). “Progress report on the PESTAT programme: A sample survey system for the quality check of fisheries statistics”. *Quaderni IRPEM IV*, n. 1.
58. Levi, D. and Mortera, J. (1981). “Sampling problems, methods of extraction, storage, preparation, mounting of bony part and reading techniques in fish age determination”. *FAO Fisheries*, **257**, Part I.
59. Levi, D. and Mortera, J. (1981). “Bias in age reading and consequences on age/length key, growth curve in virtual population analysis”. *FAO Fisheries*, **257**, Part II.