

Fabio Spizzichino - Curriculum Vitae



Personal Details

Place and Date of Birth: Rome, Italy, 01.16.1948

Citizenship: Italian

Career

1975- 1979: Assistant Professor of Probability Theory, University of Siena, Italy.

1979-1983: Assistant Professor of Mathematical Statistics, University "La Sapienza", Rome, Italy.

1983-1990: Associate Professor of Mathematical Statistics, University "La Sapienza", Rome, Italy.

1990 - 2018: Professor of Probability Theory, University "La Sapienza", Rome, Italy.

Retired from University "La Sapienza", since November 1, 2018.

Education

1972 Laurea in Matematica, University "La Sapienza", Rome, Italy.

Main Research Interests

Probability theory and applications. Bayesian Statistics. Markov processes and point processes. Copulas, Dependence and stochastic orders. Non-negative random variables, order statistics and multivariate models for ordered statistical data. Reliability of complex systems, Survival analysis, Semi-copulas and notions of Ageing. Algebraic approach to systems' reliability, Multi-attribute utility functions, Insurance, and Risk Theory. Monotone (non-additive) set functions and fuzzy integrals. Stochastic filtering and optimal stopping. Occupancy and Urn Models. Paradoxes in Probability and Statistics. Non-transitive preferences and voting theory.

Work in progress

E. De Santis, F. Spizzichino. Existence and construction of voting situation concordant with ranking patterns. *Submitted*.

A list of publications on referred journals includes

E. De Santis, F. Spizzichino. Construction of aggregation paradoxes through Load-sharing models.. *Adv. Appl. Probab.*, to appear

R. Foschi, G. Nappo, F. Spizzichino (2021). Diagonal sections of copulas, multivariate conditional hazard rates and distributions of order statistics for minimally stable lifetimes. *Dependence Modeling*, <https://doi.org/10.1515/demo-2021-0119>

F. Buono, E. De Santis, M. Longobardi, F. Spizzichino (2021). Multivariate Reversed Hazard Rates and Inactivity Times of Systems. *Meth. Comp. Appl. Probab.* In print. Published on-line.

J. Navarro. T. Richlick, F. Spizzichino (2021). Conditions on marginals and copula of component lifetimes for signature representation of system lifetime. *Fuzzy Sets and Systems*, 415, 99–117.

T. Richlick, F. Spizzichino (2021). Load-sharing reliability models with different component sensibilities on other component working states. *Advances in Applied Probability*. 53(1), 107–132.

E. De Santis, Y. Malinosky, F. Spizzichino (2020). Stochastic Precedence and Minima among Dependent Variables. *Meth. Comp. Appl. Probab.*, 23(1), 187–205.

G. Nappo, F. Spizzichino (2020). Relations between ageing and dependence for exchangeable lifetimes with an extension for the IFRA/DFRA property. *Depend. Model.* 2020; 8:1–33.

J. Navarro, F. Spizzichino (2020). Aggregation and signature based comparisons of multi-state systems via decompositions of fuzzy measures. *Fuzzy Sets and Systems*, 396, 115-137.
<https://doi.org/10.1016/j.fss.2019.10.011>

F. Spizzichino (2019). On the probabilistic meaning of copula-based extensions of fuzzy measures. Applications to target-based utilities and multi-state reliability systems. *Fuzzy Sets and Systems*, 354, 1-19. doi.org/10.1016/j.fss.2018.01.011

F. Spizzichino (2019). Reliability, signature, and relative quality functions of systems under time-homogeneous load-sharing models. *Appl. Stochastic Models Bus. Ind.*, 35, 2, 158-176
<https://doi.org/10.1002/asmb.2397>

E. De Santis, F. Spizzichino (2016). Usual and stochastic tail orders between hitting times for two Markov chains. *Appl. Stochastic Models Bus. Ind.*, 32, 526-538.

F. Pellerey, F. Spizzichino (2016). Joint weak hazard rate order under non-symmetric copulas. *Dependence Modeling*, 190–204.

F. Collet, F. Leisen, F. Spizzichino (2016). Merging exchangeable occupancy models: M(a)-models and relations with the maximum entropy principle. *Method. and Computing in Applied Probab.* 18, 4, 979-997.

E. De Santis, F. Spizzichino (2016). Some sufficient conditions for stochastic comparisons between hitting times for skip-free Markov chains. *Method. and Computing in Applied Probab.* 18, 4, 1021-1034.

P. Berti, L. Pratelli, P. Rigo, F. Spizzichino (2015). Equivalent or absolutely continuous probability measures with given marginals. *Dependence Modeling*. 2015, 3, 47-58.

E. De Santis, F. Fantozzi, F. Spizzichino (2015). Relations between stochastic orderings and generalized stochastic precedence. *Probability in the Engin. and Inform. Sciences*, 29, 329-343.

F. Fantozzi, F. Spizzichino (2015). Multi-attribute target-based utilities and extensions of fuzzy measures. *Fuzzy Sets and Systems*, 259, 29–43.

J.-L. Marichal, P. Mathonet, F. Spizzichino (2015). On modular decompositions of system signatures. *Journal Multivariate Analysis*, 134, 19-32.

P. E. Klement, R. Mesiar F. Spizzichino, A. Stupňanová (2014). Universal integrals based on copulas. *Fuzzy Optimization and Decision Making*. Volume 13, Issue 3, 273-286.

- F. Collet, F. Leisen, F. Spizzichino, F. Suter (2013). Exchangeable Occupancy Models and Discrete Processes with the Generalized Uniform Order Statistics Property. *Probability in the Engin. and Inform. Sciences*, 27, 533-552.
- R. Cerqueti, F. Spizzichino (2013). Extension of dependence properties to semi-copulas and applications to the mean–variance model. *Fuzzy Sets and Systems*, 220, 99-108.
- I. Gertsbakh, Y. Shpungin, F. Spizzichino (2012). Two-dimensional signatures. *J. Appl. Probab.*, 49, 416-429.
- R. Foschi, F. Spizzichino (2012). Ageing and risk aspects in predictive inference based on proportional hazard models. *Journal of Reliability and Statistical Studies*. Vol. 5, Special Issue, 63-82.
- R. Foschi, F. Spizzichino (2012). Interactions between Ageing and Risk properties in the analysis of burn-in problems. *Decision Analysis*. 9, 103-118.
- E. De Santis, F. Spizzichino (2012). Random sequences of letters: first occurrence of a word among the elements of a finite dictionary. *Electronic Journal of Probability*, 17. <http://ejp.ejpecp.org/>
- I. Gertsbakh, Y. Shpungin, F. Spizzichino (2011). Signatures of coherent systems built with separate modules. *J. Appl. Probab.*, 48, 843-855.
- J. Navarro, F. Spizzichino (2010). Comparisons of series and parallel systems with components sharing the same copula. *Appl. Stochastic Models Bus. Ind.*, 26, 775-791.
- J. Navarro, F. Spizzichino, A.N. Balakrishnan (2010). The Role of Average and Projected Systems in the Study of Coherent Systems. *J. Multivariate Analysis*, 101, 1471-1482.
- J. Navarro, F. Spizzichino (2010). On the relationships between copulas of order statistics and marginal distributions. *Statistics and Probability Letters*, 80, 473-479.
- F. Durante, R. Foschi, F. Spizzichino (2010). Ageing functions and multivariate notions of NBU and IFR. *Probability in the Engineering and Information Science*, 24 (2), 263-278.
- F. Durante, F. Spizzichino (2010). Semi-copulas, capacities and level sets. *Fuzzy Sets and Systems*, 161, 269-276.
- R. Cerqueti, R. Foschi, F. Spizzichino (2009). A spatial Mixed Poisson Framework for Combination of Excess Loss and Proportional Reinsurance Contract. *Insurance: Mathematics and Economics*, 45, 59-64.
- G. Nappo, F. Spizzichino (2009). Relations between Kendall Distributions and level sets in bivariate exchangeable survival models. *Information Sciences*. 179, 2878-2890.
- F. Belzunce, J. A. Mercader, J. M. Ruiz and F. Spizzichino (2009). Stochastic Comparisons for Multivariate Mixture Models. *J. Multivariate Analysis*, 100, 1657-1669.

- E. Alvoni, P. Papini, F. Spizzichino (2009). On a Class of Transformations of Copulas and Quasi-copulas. *Fuzzy Sets and Systems*, 160, 334-343.
- F. Spizzichino (2009). A Concept of Duality for Multivariate Exchangeable Survival Models. *Fuzzy Sets and Systems*, 160, 325-333.
- F. Durante, R. Foschi, F. Spizzichino (2008). Threshold copulas and positive dependence. *Statistics and Probability: Letters*, 78, 2902-2909.
- R. Foschi, F. Spizzichino (2008). Semigroups of semi-copulas and evolution of dependence at increase of age. *Mathware & Soft Computing XXV*, 1, 95-111.
- B. Bassan, F. Spizzichino (2005). Bivariate Survival Models with Clayton aging functions. *Insurance: Mathematics and Economics*, 37, 6-12.
- B. Bassan, F. Spizzichino (2005). Relations among univariate ageing, bivariate aging and dependence for exchangeable lifetimes. *J. Multiv. Analysis*, 93, 313-339.
- E. De Santis, F. Spizzichino (2005). Change point models and conditionally pure birth processes : an inequality on the stochastic intensity. *J. Appl. Probab.*, 41, 939-952.
- M. Shaked, F. Spizzichino, F. Suter (2004). The Uniform Order Statistics Property and l-infinity Spherical Models. *Prob. Eng. Infor. Sc.*, 18, 275-297.
- B. Bassan, S. Kochar, F. Spizzichino (2002). Some bivariate notions of IFR and DMRL and related properties. *J. Appl. Probab.*, 39, 1-12.
- M. Shaked, F. Spizzichino, F. Suter (2002). Nonhomogeneous birth processes and l-spherical densities, with application in reliability theory. *Prob. Eng. Infor. Sc.*, 16, 271-288.
- W. Runggaldier, F. Spizzichino (2001). Sufficient conditions for finite dimensionality of filters in discrete time: a Laplace transform-based approach. *Bernoulli*, 7, 211-221.
- F. Spizzichino, G. Torrisi (2001). Multivariate negative aging in an exchangeable model of heterogeneity, *Statist. and Probab. Letters*, 55, 71-82.
- Gerardi, F. Spizzichino, B. Torti (2000). Filtering equations for the conditional law of residual lifetimes from a heterogeneous population. *J. Appl. Probab.* 37, no. 3, 823-834.
- Gerardi, F. Spizzichino, B. Torti (2000). Exchangeable mixture models for lifetimes: the role of "occupation numbers". *Stat. Probab. Letters*, 49, 365-375.
- M. Berg, F. Spizzichino (2000). Time-lagged Point Processes with the Order-Statistics property. *Math. Methods Oper. Res.* 51, no. 2, 301-314.
- B. Bassan, F. Spizzichino (1999). Stochastic comparison for residual lifetimes and bayesian notions of multivariate ageing. *Adv. in Appl. Probab.* 31, no. 4, 1078-1094.

- M. Scarsini, F. Spizzichino (1999). Simpson-type paradoxes, dependence and ageing. *J. Appl. Probab.*, 36, 119-131.
- M. Shaked, F. Spizzichino (1998). Positive dependence properties of conditionally independent random lifetimes. *Math. Op. Res.*, 23, No 4.,
- G. Nappo, F. Spizzichino (1998). Ordering properties of the TTT-Plot of lifetimes with schur joint densities. *Stat. Probab. Lett.*, 39, 195-203.
- N. Ebrahimi, F. Spizzichino (1997). Some results on normalized Total Time on Test and spacings. *Stat. Probab. Lett.*, 36, 231-237.
- C. Costantini, F. Spizzichino (1997). Explicit solution of an optimal stopping problem: the Burn-in of conditionally exponential components. *J. Appl. Probab*, 34, 267-282.
- L. Caramellino, F. Spizzichino (1996). WBF property and stochastic monotonicity of the Markov Process associated to Schur-constant survival functions. *J. Multiv. Anal*, 56, 153-163.
- L. Caramellino, F. Spizzichino (1994). Dependence and aging properties of lifetimes with Schur-constant survival functions. *Prob. Eng. and Inform. Sc.*, 4, 103-111.
- M.G. Iovino, F. Spizzichino (1993). A Probabilistic Analysis for an Optimal Screening Problem. *J. Ital. Statist. Soc.*, 3, 309-335.
- R.E. Barlow, F. Spizzichino (1993). Schur-concave survival functions and survival analysis. *Journal of Computational and Applied Mathematics* 46, 437-447.
- F. Spizzichino (1991). Sequential Burn-in Procedures. *J. Stat. Plan. Inf.* 29, 187-197.
- F. Spizzichino (1991). Bayesian analysis for two-components systems and a conjugate family of bivariate densities. *Statistics and Probab. Letters* 11, 17-25.
- C.A. Clarotti, F. Spizzichino (1990). Bayesian burn-in decision procedures. *Prob. Eng. and Inform. Sc.*, 437-445.
- C.A. Clarotti, G. Koch, F. Spizzichino (1989). A Filtering Model for Bayesian Analysis of Failure Data Contaminated by Maintenance. *Statistics and Probab. Letters* 7, 145-150.
- C.A. Clarotti, F. Spizzichino (1989). The Bayes Predictive Approach in Reliability. *IEEE Trans. on Rel.*, 38, 3, 379-382.
- C.A. Clarotti, A.V. Solonnikov, F. Spizzichino (1987). Reliability Equations for Non-exponential Systems with Repairable Components. *Boll. U.M.I. 1-B*, 979-998.
- C.A. Clarotti, G. Koch, F. Spizzichino (1985). Bayes inference from failure data contaminated due to maintenance. *IEEE Trans on Rel*, R34, 377-381.

W. Runggaldier, F. Spizzichino (1982). Approximations and bounds for a generalized optimal stopping. *Z. Op. Res.*, 26, 143-155.

I. Capuzzo Dolcetta, M. Lorenzani, F. Spizzichino (1980). A degenerate complementarity system and applications to the optimal stopping of Markov chains. *Boll. Un. Mat. Ital. B ()* 17 (2), 692–703.

A list of articles in Edited Books and Conference Proceedings includes

R. Cerqueti, F. Spizzichino (2015). *Signatures of Systems with non-exchangeable Lifetimes: Some Implications in the Analysis of Financial Risk*. In Theory and Practice of Risk Assessment. Springer Proceedings in Mathematics & Statistics Volume 136, 361-375

E. De Santis, F. Spizzichino (2013). *Random evolution of degradation and occurrences of words in random sequences of letters*. In "Applied Reliability Engineering and Risk Analysis. Probabilistic Models and Statistical Inference. Dedicated to the Centennial of the birth of Boris Gnedenko". I. Frenkel, A. Karagrigoriou, A. Lisnianski, A. Kleyner Editors. Wiley.

R. Foschi, F. Spizzichino (2012). *Reversing conditional orderings*. In "Stochastic Orders in Reliability and Risk: In honor of Professor Moshe Shaked". Lecture Notes in Statistics.

F. Spizzichino, J. Navarro (2012). *Signatures and symmetry properties of coherent systems*. Chapter 3 in Recent Advances in System Reliability, Signatures, Multistate Systems and Statistical Inference. Lisniansky A. and Frenkel I. (Eds). Springer Series in Reliability Engineering. Springer Verlag.

R. Foschi, F. Spizzichino (2010). *Dynamics of Dependence Properties for Lifetimes Influenced by Unobservable Environmental Factors*. In Mathematical and Statistical Methods in Reliability, V.V. Rykov, N. Balakrishnan, M.S. Nykulin, Eds. 101-112. Springer.

F. Spizzichino (2010). *Semi-copulas and Interpretations of Coincidences between Stochastic Dependence and Ageing*. Chapter 11 in Copula Theory and Its Applications. Jaworski P.; Durante, F.; Härdle, W.; Rychlik, T. (Eds.). 198 Lecture Notes in Statistics. Springer Verlag.

R. Foschi, F. Spizzichino (2008). *The Role of Order Statistics Property in Mixed Spatial Poisson Processes*. In Proceedings of the International Workshop on Applied Probability 2008.

F. Spizzichino (2008). *The role of signature and symmetrization for systems with non-exchangeable components*. In Mathematical Modeling for Reliability (T. Bedford, J. Quigley, L. Walls, B. Alkali, A. Daneshkhah and G. Hardman, Eds.), IOS Press

F. Spizzichino, F. Suter (2008). Dependence and Ageing Properties for Generalized Marshall-Olkin Models. In Mathematical Modeling for Reliability (T. Bedford, J. Quigley, L. Walls, B. Alkali, A. Daneshkhah and G. Hardman), Eds. IOS Press

F. Spizzichino (2007). *Ageing and Positive Dependence*. In Encyclopedia of Statistics for Quality and Reliability (F. Ruggeri, R. Kennett, and F. W. Faltin, Eds). & Son Limited, Chichester, UK, pp 82-95.

- F. Spizzichino (2007). *Multivariate Mixtures Models. Related Ageing and Dependence Properties*. In Encyclopedia of Statistics for Quality and Reliability (F. Ruggeri, R. Kennett, and F. W. Faltin, Eds). Wiley & Son Limited, Chichester, UK, pp 1112-1116.
- F. Spizzichino (2004). *Aspects of multivariate ageing in exchangeable frailty models*. In Parametric and semi-parametric models with applications to reliability, survival analysis, and quality of life. Birkhauser, Boston.
- U. Jensen, F. Spizzichino (2003). *The Burn-in problem. A discussion of sequential stop and go strategies*. In Mathematical Reliability: an Expository Perspective (T.A. Mazzuchi, N. D. Singpurwalla and R. Soyer, Eds.), Kluwer.
- B. Bassan , F. Spizzichino (2003). *On some properties of dependence and aging for residual lifetimes in the exchangeable case*. In Mathematical and Statistical Methods in Reliability. (K.A. Doksum, B. Lindqvist Eds.) World Scientific.
- M. Shaked, F. Spizzichino (2001). *Mixtures and monotonicity of failure rate functions*. In Handbook of Statistics, Vol. 20 (N. Balakrishnan, C.R. Rao Eds.). Elsevier Science, 185-198.
- B. Bassan, F. Spizzichino (2001). *Dependence and multivariate aging: the role of level sets of the survival function*. In System and Bayesian Reliability, World Sci. Publishing, River Edge, NJ.
- F. Spizzichino (1993). *A Unifying Approach to optimal Design of Life-testing and Burn-in'*. In Reliability and Decision Making, (R. E. Barlow, C. A. Clarotti, F. Spizzichino Eds.) Chapman & Hall (London).
- F. Spizzichino (1992). *Reliability Decision Problems under Conditions of Ageing*. In Bayesian Statistic 4 (J.Bernardo, J. Berger, A.P. Dawid, A.F.M. Smith Eds) Clarendon Press (Oxford), 803-811.
- C. Costantini, F. Spizzichino (1992). *Optimal Stopping for Life testing: Use of Stochastic Orderings in the Case of Conditionally Exponential Lifetimes*. In "Stochastic Orders and Decision under Risk" (K. Mosler, M. Scarsini Eds.).
- F. Spizzichino (1990). *Finite-dimensional Stochastic Filtering in Discrete-Time: The Role of Convolution Semigroups*. In Analysis and Optimization of Systems (A. Bensoussan, P.L. Lions Eds.), Springer Verlag, 238-247.
- F.Spizzichino (1988). *Symmetry Conditions on Opinion Assessment Leading to Time-Transformed Exponential Models*. In Accelerated Life Testing and Experts' Opinions in Reliability (C.A. Clarotti, D. V. Lindley Eds.), North Holland.
- R.E. Barlow, S. Wechsler, F. Spizzichino (1988). *de Finetti's Approach to Group Decision Making*. In Bayesian Statistic 3 (J.Bernardo, M.H. De Groot, D.V. Lindley, A.F.M. Smith Eds.), Oxford University Press, 1-15.
- W. J. Runggaldier, F. Spizzichino (1987) *Finite-dimensionality in discrete-time non-linear filtering from a Bayesian statistics viewpoint*. In Stochastically Modeling and Filtering (A. Germani Ed.), Lecture Notes in Control and Information Sciences, 91.

C.A. Clarotti, F. Spizzichino (1984). *Markov Processes in partially ordered spaces, NBU property for the exit times from increasing sets*. In Theory of Reliability, (R.E. Barlow, A. Serra Eds.), Elsevier.

F. Spizzichino (1982). *Extendibility of symmetric probability measures and related bounds*. In Exchangeability in Probability and Statistics (G. Koch, F. Spizzichino Eds), North Holland.

Book

F. Spizzichino (2001). *Subjective probability models for lifetimes*. Chapman and Hall/CRC. Boca Raton, Fl.

A list of discussion papers and other papers of expository or historical character includes

F. Spizzichino (2015). Some remarks on multivariate conditional hazard rates and dependence modeling. *Lecture Notes of Seminario Interdisciplinare di Matematica*, 12, 255 – 271.

C. Macci, F. Spizzichino (2015). What about the Posterior Distribution when the Model is Non-Dominated? In *Interdisciplinary Bayesian Statistics*. Springer.

F. Spizzichino (2014) Aging and Positive Dependence, in Wiley StatsRef: Statistics Reference Online, American Cancer Society. DOI 10.1002/9781118445112.stat03944

E. De Santis, F. Spizzichino (2011). Waiting for ABRACADABRA. Occurrences of Words and Leading Numbers. In *Mathematics and Culture IX*. M. Emmer Ed.. Springer Italia.

E. Regazzini, F. Spizzichino (2011). Bruno de Finetti's encounter with martingales. *Journ@l Electronique d'Histoire des Probabilités et de la Statistique*. 7, n°1.

F. Spizzichino (2009). Coincidences and some misunderstandings about rare events. In *Mathematics and Culture VI*. M. Emmer. Ed. Springer.

F. Spizzichino (1993). Il concetto probabilistico di stato di informazione associato ad una partizione ed alcune nozioni connesse. *Induzioni*, 6, 31-44.

Active participation in numerous international conferences, workshops, and schools.

Invited talks and seminars have been given in several Universities and Research Centers.

Refereeing Activities

Has served as a referee for a variety of journals including:

Annals of Statistics, Annals of the Institute of Statistical Mathematics, Applied Stochastic Models in Business and Industry, Biometrical Journal, Communication in Statistics, European Actuarial Journal, Fuzzy Sets and Systems, Information Sciences, J. American Statistical Association, IEEE Trans. on Reliability, Insurance: Mathematics and Economics, J. Applied Probability, J. Multivariate Analysis, J. Non-Parametric Statistics, Kybernetika, Mediterranean J. of Mathematics, Methodology and Computation in Applied Probability, Metrika, Naval Research Logistic, Operations Research, Probab. in Eng.. Inform. Sciences., Reliability Engineering and System Safety, Sankhya, Scandinavian J. Statistics, Soft Computing, Statistics, Statistics and Computing, Statistics and Probability Letters, Stochastic Processes and Applications, TEST.

Further Editorial Activity

Has served as a referee for a variety of Edited Volumes and Conferences' Proceedings.

Acted as a Co-Editor of the following Volumes

1. Volume of *Rendiconti di Matematica*, Proceedings of the Symposium “De Finetti’s Legacy in Probability today”, Rome, 2006. In collaboration with G. Nappo and M. Piccioni.
2. *Reliability and Decision Making* (R.E. Barlow, C.A. Clarotti, and F. Spizzichino, Eds). Chapman and Hall, 1993
3. *Exchangeability in Probability and Statistics* (G. Koch and F. Spizzichino, Eds). North Holland, 1982