

ROSA ELVIRA LILLO

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PERSONAL DATA

Date of Birth: August 31, 1969

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EDUCATION

- **B. Sc. In Mathematics with Honors**, Universidad Complutense. June 1992.
- **Ph. D. in Mathematics**, Universidad Complutense de Madrid. April, 1996.

CURRENT POSITION

- **Professor of Statistics and Operations Research**. Department of Statistics. Universidad Carlos III de Madrid. Since June, 2010. .

PROFESSIONAL EXPERIENCE

- **Associate Professor of Statistics and Operations Research**. Department of Statistics. Universidad Carlos III de Madrid. From May, 2001 to June, 2010.
- **Visiting Professor**. Department of Statistics. Universidad Carlos III de Madrid. From October, 1997 to May, 2001.
- **Teaching Assistant**. Department of Statistics and Operations Research. Universidad Complutense. From October, 1992 to September, 1997.

RESEARCH

Peer Reviewed Journals

- Lillo, R. E. (1996), A G/M/1 queue with exponential retrial. *Top*, **4**, 1, 99-120.
- Lillo, R. E.; Martín, M. (1999), Characterization of Bayes estimators of the uniform scale parameter. *Statistics & Decisions*, **17**, 31-47.
- Lillo, R. E.; Neuts, M. F. (1999), Two service units with interference in the access to servers. *Journal of Applied Mathematics and Stochastic Analysis*, **12**, 357-370.
- Lillo, R. E. (2000), Note on relations between criteria for aging. *Reliability Engineering & System Safety*, **67**, 129-123.
- Lillo, R. E. (2000), Stability and irreducibility of queueing systems with finite capacity. *Queueing Systems*, **35**, 129-139.
- Lillo, R. E. (2000), On optimal exhaustive policies for the M/G/1 queue. *Operations Research Letters*, **27**, 39-46.
- Lillo, R. E. (2000), Optimal operating policies for an M/G/1 exhaustive server-vacation model. *Methodology and Computing in Applied Probability*, **2**, 153-1.
- Lillo, R. E. (2000), On the controllability of M/G/1 systems with the cycle criterion. *Systems & Control Letters*, **41**, 29-39.
- Lillo, R. E.; Martín, M. (2000), Bayesian approach to estimation of ordered uniform scale parameters. *Journal of Statistical Planning and Inference*, **87**, 105-118.
- Lillo, R. E.; Martín, M. (2000), Characterization and computation of optimal policies for an M/G/1 priority queue. *The Belgian Journal of Operations Research, Statistics and Computer Science*, **38**, 45-57.
- Lillo, R. E.; Neuts, M. F. (2000), Empirical optimization in a reliability problem. *Methodology and Computing in Applied Probability*, **2**, 413-424.
- Belzunce, F.; Lillo, R. E.; Ruiz, J. M.; Shaked, M. (2001), Stochastic comparisons of nonhomogeneous processes. *Probability in Engineering and Informational Sciences*, **15**, 199-224.
- Lillo, R. E.; Nanda, A. K.; Shaked, M. (2001), Preservation of some stochastic orders by order statistics. *Statistics & Probability Letters*, **51**, 111-119.
- Lillo, R. E. (2001), Optimal control of an M/G/1 queue with impatient priority customers. *Naval Research Logistics*, **48**, 200-209.
- Lillo, R. E.; Martín, M. (2001), Stability in queues with impatient customers. *Communications in Statistics-Stochastic Models*, **17**, 375-389.
- Lillo, R. E.; Martín, M. (2001), Characterizations involving conditional expectations based on a functional derivative approach. *Combinatorics, Probability and Computing*, **10**, 417-434.
- Lillo, R. E.; Martín, M. (2001), Stability condition for a general single server retrial queue. *Advances in Performance Analysis*, **3**, 137-151.
- Belzunce, F.; Lillo, R. E.; Pellerey, F.; Shaked, M. (2002), Preservation of association in multivariate shock and claim models. *Operations Research Letters*, **30**, 223-230.
- Ausín, M. C.; Lillo, R. E.; Ruggeri, F.; Wiper, M. P. (2003), Bayesian modelling of hospital bed occupancy times using a mixed generalized Erlang distribution. *Bayesian Statistics VII*, 443-452.

- Ausín, M. C.; Wiper, M. P.; Lillo, R. E. (2004), Bayesian estimation for the M/G/1 queue using a phase type approximation. *Journal of Statistical Planning and Inference*, **118**, 83-101.
- Lillo, R. E, Semeraro, P. (2004), Stochastic bounds for discrete-time claim processes with correlated risk. *Scandinavian Actuarial Science*, **1**, 1-13.
- Lillo, R. E. (2004), On the characterizing property of the convex conditional mean function. *Statistics and Probability Letters*, **66**, 19-24.
- Lillo, R. E, Pellerey, F., Semeraro, P, Shaked, M. (2004), On the preservation of the supermodular order under multivariate claim models. *Richerche di Matematica* **52**, 73-81.
- Lillo, R. E. (2005), Ergodicity and analysis of the process describing the system state in polling systems with two queues. *European Journal of Operational Research*, **167(1)**, 144-162.
- Lillo, R. E. (2005), On the median residual lifetime and its aging properties: a characterization theorem and applications. *Naval Research Logistics*, **52**, 370-380.
- Lillo, R. E.; Martín, M. (2006), On the Bayesian estimation for the uniform scale parameter via a functional equation. *Communications in Statistics - Theory and Methods*, **35**, 1-14.
- Ausín, M. C., Lillo, R. E., Wiper, M. P., (2007), Bayesian control of the number of servers in a GI/M/c queueing system. *Journal of Statistical Planning and Inference*, **137**, 3043-3057.
- Ausín, M. C., Lillo, R. E., Wiper, M. P., (2008), Bayesian prediction of the transient behaviour and busy period in short and long tailed GI/G/1 queueing systems. *Computational Statistics and Data Analysis*, **52**, 1615-1557.
- Ramírez J., Lillo, R.E., Michael Wiper. (2008), Bayesian analysis of a queueing system with a long-tailed arrival process. *Communications in Statistics - Simulation and Computation*, **37(4)**, 697-712.
- Ausín, M. C., Lillo, R. E., Wiper, M. P., (2009), Bayesian estimation of finite ruin probabilities. *Applied Stochastic Models in Business and Industry*, **25**, 787-805.
- Torrado, N., Lillo, R.E, Wiper, M.P. (2010), On the conjecture of Kochar and Kowar. *Journal of Multivariate Analysis*, 101, 1274-1283.
- Franco-Pereira, A, Lillo, R. E., Romo, J., Shaked, M. (2010). Percentile residual Life orders. *Applied Stochastic Models in Business and Industry*, 27, 235-252.
- Ramírez J., Lillo, R.E., Wiper, M, Wilson, S. (2010). Bayesian inference for double Pareto lognormal queues. *Annals of Applied Statistics*, 4(3), 1533-1557.
- Ramírez-Cobo, J, Lillo R.E., Wiper, M (2010). "[Nonidentifiability of the two-state Markovian arrival process](#)". *Journal of Applied Probability*. 47, 630-649.
- Franco-Pereira, A, Lillo, R. E., Romo, J. (2011). The percentile residual life up time t_0 : ordering and ageing properties. *Journal of Statistical Planning and Inference*, 141, 3554-3563.
- Torrado, N., Lillo, R.E., Wiper, M.P. (2012), Sequential order statistics: ageing and stochastic orderings, *Methodology and Computing in Applied Probability*, 14 (3), 579-596. .
- Franco-Pereira, A, Lillo, R. E., Shaked, M. (2012), The decreasing percentile residual life aging notion. *Statistics*, 46 (5). 587-603.
- Franco-Pereira, A, Lillo, R. E., Romo, J. (2012). Comparing quantile residual life functions by confidence bands. *Lifetime Data Analysis*, 18 (2). 195-214.

- Ramírez-Cobo, P, Lillo, R.E. (2012). “New results about weakly equivalent MAP2 and MAP3 processes”. *Methodology and Computing in Applied Probability*, 14 (3), 421-444
- Laniado, H, Lillo, R. E., Pellerey, F., Romo, J. (2012). Portfolio selection through an extremality stochastic order. *Insurance: Mathematics and Economics*, 51, 1-9.
- Torrado, N., Lillo, R.E. (2013). Likelihood ratio order of spacing form two heterogeneous samples. *Journal of Multivariate Analysis*, 114, 338-348.
- Ramírez-Cobo, J, Lillo R.E ., Wiper, M (2013). “Identifiability of the MAP2/G/1 queueing system”. To appear in TOP. DOI 10.1007/s11750-012-0254-8
- Martín-Barragán, B., Lillo, R. E., Romo, J. (2013). Interpretable Support Vector Machines for Functional Data. To appear in *European Journal of Operational Research*.
- Torrado, N., Wiper, M.P., Lillo, R.E (2013). Software reliability modeling with software metrics data via Gaussian processes. To appear in *Transactions on Software Engineering*.

Research projects

- *Inferencia Estadística de datos censurados*. Universidad Complutense de Madrid. Leading Researcher: Miguel Martín Díaz. (1990-1992).
- *Análisis de datos doblemente censurados*. Universidad Complutense de Madrid. Leading Researcher: Domingo Morales. (1995-1996).
- *Regresión no paramétrica: su uso en la validación de modelos paramétricos*. Universidad Complutense de Madrid. Leading Researcher: Manuel del Río Bueno. (1996-1997).
- *Caracterización sísmica de emplazamientos de la Península Ibérica y evaluación del daño potencial en estructuras*. Universidad Politécnica de Madrid. Leading Researcher: Belén Benito Oterino. (1997-1998)
- *Diseño y formalización de leyes de aprendizaje en controladores adaptativos neuronales para sistemas dinámicos de elevada complejidad aplicación en robótica*. Ministerio de Educación y Cultura. Leading Researcher: Pedro José Zufiria Zatarain. (1998-2000)
- *Análisis estadístico de grandes bases de datos económicos y empresariales con estructura compleja*. Ministerio de Ciencia y Tecnología. Leading Researcher: Daniel Peña Sánchez de Rivera. (2000-2003).
- *Diseño de Encuesta de Satisfacción de clientes internos Corporate Renault*. FASA-Renault España, S. A. Leading Researcher: Jaime Alfonso Bonache Pérez. (2003).
- *Estudio cualitativo y cuantitativo de la información recibida por los pacientes oncológicos en los centros hospitalarios de la Comunidad de Madrid*. Comunidad Autónoma de Madrid. Leading Researcher: Miguel Ángel Ramiro Avilés. (2004).
- *Selección de modelos estadísticos para bancos de datos empresariales de alta dimensión*. Ministerio de Educación y Ciencia. Dir. Gral. Investigación. Leading Researcher: Daniel Peña Sánchez de Rivera. (2004-2008).
- *Técnicas no paramétricas para datos económicos*. Comunidad Autónoma de Madrid. Leading Researcher: Juan José Romo Urroz. (2005).

- *Técnicas no paramétricas y de computación intensiva en Estadística*. Comunidad de Madrid- Universidad Carlos III de Madrid. Leading Researcher: Juan José Romo Urroz. (2006)
- *Modelización estadística y análisis de datos*. Comunidad de Madrid- Universidad Carlos de Madrid. Leading Researcher: Daniel Peña Sánchez de Rivera. (2006-2007).
- *Base de datos sobre violencia de género*. Ministerio de Trabajo y Asuntos Sociales. Leading Researcher: Juan Romo. (2007).
- *Selección de modelos estadísticos en condiciones de heterogeneidad*. Comunidad de Madrid-Universidad Carlos III de Madrid. Leading Researcher: Daniel Peña Sánchez de Rivera. (2007-2008)
- *Métodos estadísticos de decisión basados en conocimiento*. Ministerio de Educación y Ciencia. Dir. Gral. Investigación. Leading Researcher: Daniel Peña Sánchez de Rivera. (2007-2012).
- *Técnicas estadísticas para la estimación y clasificación en modelos complejos*. Comunidad de Madrid-Universidad Carlos III de Madrid. Leading Researcher: Rosa Elvira Lillo Rodríguez (2008).
- *INNOGROUP-CM Orientación emprendedora e innovación: información, flexibilidad y mercados*. Subgrupo: MECUANGESIEM-UC3M *Modelización estocástica y análisis de datos*. Dirección General de Universidades de la Comunidad de Madrid. Leading Researcher: Daniel Peña Sánchez de Rivera (2008-2011).
- *Modelos estocásticos para el tratamiento estadístico de datos complejos y medidas de riesgo*. Comunidad de Madrid-Universidad Carlos III de Madrid. Leading Researcher: Rosa Elvira Lillo Rodríguez (2009).
- *Procedimientos estadísticos basados en datos funcionales y datos en alta dimensión con aplicaciones en finanzas y bioestadística*. Comunidad de Madrid-Universidad Carlos III de Madrid. Leading Researcher: Rosa Elvira Lillo Rodríguez (2011).
- *Métodos estadísticos avanzados para datos complejos*. Ministerio de Economía y Competitividad. Plan Nacional I+D+I. Investigación. Leading Researcher: Daniel Peña Sánchez de Rivera. (2013-2015).
- *Predicción del número óptimo de vendedores en tiendas Telyco*. Teleinformática y Comunicaciones, S.A. Leading Researcher: Rosa Elvira Lillo Rodríguez y Nora Rita Lado.
- STATMOS, Research network for Statistical Methods for Atmospheric and Oceanic Sciences. Leading Researcher: Montserrat Fuentes.

Chapters of books

- Lillo, R. E., Nanda, A., Shaked, M. (2000). *Some shifted stochastic orders* en “Recent advances in Reliability Theory: methodology, practice and inference”. Ed. Birkäuser. Colección Statistics for Industry and Technology.
- Belzunce, F, Lillo, R.E., Ruíz, J.M., Shaked, M. (2007). *Stochastic ordering of record and inter-record values* en “Recent developments in ordered random variables”. Ed. Nova Science Publishers, INC.

- Franco-Pereira, A., Uña J, Lillo, R.E., Shaked, M. (2013). *The decreasing percentile residual life aging notion: properties and estimation in* in Stochastic Orders in Reliability and Risk, pp. 137-145, edited by Haijun Li and Xiaohu Li, Springer. ISBN: 978-1-4614-6891-2.
- Torrado, N., Lillo, R.E (2013). *On stochastic properties of spacing with applications in multiple-outlier models*, in Stochastic Orders in Reliability and Risk(2013), pp. 103-123, edited by Haijun Li and Xiaohu Li, Springer. ISBN: 978-1-4614-6891-2.

Other publications

- “*Discriminación y VIH/SIDA 2005. Estudio FIPSA sobre discriminación arbitraria de las personas que viven con VIH o SIDA*” Instituto de Derechos Humanos Bartolomé de las Casas de la Universidad Carlos III de Madrid, 2006.

“*Elige lo que quieres ser: Estadística, una profesión con pasado, presente y gran camino por delante*”, J de J Editores 2007.

Other research works

- *Modelos de colas G/M/1 con reintento constante. Master Thesis.* Doctorado del Departamento de Estadística e Investigación Operativa. (UCM). 1994.
- *Optimización y ergodicidad en modelos de colas.* Ph. D. dissertation. Universidad Complutense de Madrid.

Ph. D. dissertations advising

- *Extremality in Multivariate Statistics.* Henry Laniado Rodas. Doctorado en Ingeniería Matemática. December, 2012. Apto Cum Laudem por unanimidad. Tesis con mención Internacional. Advisors: Rosa E. Lillo y Juan Romo..
- *Statistical Classification of Images.* Nombre del Andrea Giuliodori. Programa de Doctorado en Economía de la empresa y Métodos cuantitativos. November, 2011. Calificación: Sobresaliente cum laude por unanimidad. Tesis con mención Europea. Advisors: Rosa E. Lillo y Daniel Peña.
- *Stochastic Comparisons and Bayesian Inference in Software Reliability.* Nuria Torrado Robles. Doctorado en Ingeniería Matemática. May, 2011. Apto Cum Laudem por unanimidad. Tesis con mención Europea. Advisors: Rosa E. Lillo y Michael Wiper.

- *Stochastic orderings and aging notions based on percentile residual life functions.* Alba Franco Pereira. Co-Advisors: Juan Romo Urroz. Doctorado en Métodos Cuantitativos y Administración de Empresas, UC3M. November, 2009. Calificación: Apto Cum Laudem por unanimidad. Tesis con mención Europea. Premio Extraordinario de Doctorado.
- *Bayesian Modelling of stochastic processes in teletraffic and finance.* Josefa Ramírez Cobo. Co-advisor: Michael P. Wiper. Doctorado en Métodos Cuantitativos y Administración de Empresas, UC3M. January, 2009. Apto Cum Laudem por unanimidad. Premio Extraordinario de Doctorado.
- *Inferencia Bayesiana en Modelos de Colas.* María Concepción Ausín. Co-Advisor: Michael P. Wiper. Doctorado en Ingeniería Matemática, UC3M. February, 2004. Calificación: Apto Cum Laudem por unanimidad.

Current Ph. D. dissertation advising

- *Dependencia para datos complejos.* Dalia Jazmín Valencia García. Co-Advisor: Juan Romo Urroz. Doctorado en Ingeniería Matemática, UC3M.
- *The outlier detection problem in functional data analysis.* Carlo Sguera. Co-Advisor: Pedro Galeano. Doctorado en Métodos Cuantitativos y Administración de Empresas, UC3M.
- *(Bath) Markovian arrival process: limitations, extensions and open questions.* Joanna Rodríguez. Co-Advisor: Pepa Ramírez Cobo. Doctorado en Ingeniería Matemática, UC3M.
- *Functional linear regression models.* Nicola Mingotti. Co-Advisor: Juan Romo. Doctorado en Ingeniería Matemática, UC3M.
- *Distancias para datos funcionales.* Joseph Esdras . Co-Advisor: Pedro Galeano. Doctorado en Ingeniería Matemática, UC3M.

Scientific meetings (2007-2012)

- Lillo, R.E, Martín, B, Romo J. “Boxplots for functions based on halfgraph orders” Computation and Statistics, ERCIM, Oviedo 1-3 Diciembre 2012. Invited talk.
- Lillo, R.E, Martín, B, Romo J. “Ordering curves: boxplots for functional data” International Society for nonparametric Statistics, Greece, June 2012. Invited talk.
- Sguera Carlo, Galeano Pedro, Lillo Rosa. “Robust classification for functional data via spatial depth-based methods”. “20th International Conference on

COMPUTATIONAL STATISTICS (COMPSTAT 2012)” Lymassol Chipre. 27-31 Agosto 2012.

- Sguera Carlo, Galeano Pedro, Lillo Rosa. “Spatial depth-based classification for functional data”. “Research workshop: High dimensional and dependent functional data” Bristol Reino Unido. 10-12 Septiembre 2012.
- Laniado H, Lillo RE, Pellerey, F, Romo, J. "Optimal Portfolio Selection through Rotations". "Congreso Nacional de Estadística e Investigación Operativa (SEIO)" Madrid Spain. 17-20 April, 2012.
- Laniado H, Lillo, R. E., Pellerey F, Romo, J. "Extremality Stochastic Order and its Applications". "International Workshop on Applied Probability (IWAP)" Jerusalem Israel. 11-14 June, 2012.
- Laniado H, Lillo, R.E, Pellerey F., Romo, J . "Portfolio Selection for Elliptically Distributed Assets". "8th World Congress in Probability and Statistics" Istanbul Turkey. 9-14 July, 2012.
- Laniado H, Lillo R, Romo, J. "Portfolio Selection through an Extremality Order". "International Conference on Computational Statistics (COMPSTAT)" Limassol Cyprus. 27-31 August, 2012.
- Valencia D, Lillo RE, Romo J. "Independence test for functional data". "Congreso Nacional de Estadística e Investigación Operativa (SEIO)" Madrid Spain. 17-20 April, 2012.
- Valencia, D., Lillo, R.E., Romo, J. "Dependence Measures for Functional Observations". "Joint Statistical Meetings(JSM)" San Diego Estados Unidos. July 28-August 2, 2012.
- Torrado, N. Lillo, R. “Some results on ordering of spacings from two samples”. “XXXIII Congreso Nacional de Estadística e Investigación Operativa”, Madrid (Spain). April 17-20, 2012.
- Torrado N, Lillo, R.E., Wiper, M. “Several ageing notions of sequential order statistics”. "X International Conference on Ordered Statistical Data and their Applications", Murcia (Spain). May, 23- 25, 2012.
- Rodríguez J, Lillo, R.E., Ramírez-Cobo, P. “Sobre la identificabilidad del proceso de llegadas Markoviano en grupos con dos estados”. “XXXIII Congreso Nacional de Estadística e Investigación Operativa” Madrid, España. April, 17- 20, 2012.
- Rodríguez J, Lillo, R.E., Ramírez-Cobo, P. . “On the identifiability of the two-state Batch Markovian arrival process”. “6th International Workshop on Applied Probability” Jerusalem, Israel. June, 11-14, 2012..

- Measuring the extremality of a curve, (with Rosa E. Lillo and Juan Romo). Contributed session, 8th World Congress in Probability and Statistics, Istanbul (Turkey) 2012

OTHER MERITS

- Premio Extraordinario de Licenciatura (an award to the best undergraduate academic record). Universidad Complutense de Madrid. Faculty of Mathematics. 1991-92.
- Scholarship: Introduction to Research. (Consejo Superior de Investigaciones Científicas CSIC). 1991-1992.
- Fulbright Program's Ruth Lee Kennedy Scholarship. 1997.
- Grant for the mobility of young Doctors. (1998, 1999). Carlos III Foundation and Research Vice-rectorate of Universidad Carlos III de Madrid.
- Postdoctoral Scholarship: Government Program for the development of Doctors abroad (Ministry of Education and Culture). 1998.
- Grant for young researchers. Instituto Flores de Lemus. 2002.
- Award to individual academic and research achievements for faculty members belonging to the Department of Statistics who are 40 years old or younger. Universidad Carlos III de Madrid. Years: 2004, 2006, 2007 and 2009.
- Acknowledgement of scientific Publications for faculty members of Universidad Carlos III de Madrid. 2009.
- 2012 Young Investigator Award for Research Excellence (UC3M).
- Research Stays: Department of Statistics in The University of California (Berkeley) where I worked with Professor Peter Hall (4 months). Department of system and industrial engineering in The University of Arizona, Tucson, (two years) where I worked with Professor Marcel Neuts and Professor Moshe Shaked.

UNIVERSITY MANAGEMENT

Vice-dean for Bachelor in Statistics. 2005-

