Professor Carlos Maté
Curriculum Vitae
2023 June

A. Biographical Summary

Citizenship: Spanish Citizen
Languages: Spoken and Written - English, Spanish; Partial Fluency - French

Researcher numbers	Researcher ID	24758837200 (scopus)
	Orcid code	0000-0003-2840-2629

Ia. Academic Employment

Tenured Associate Professor in Data Analysis, Economics, Statistics, and Operations Research– Department of Industrial Organization (1997-April to 2023-February)
Associate Researcher - Institute for Research in Technology (1998-October to 2017-September)
http://www.iit.comillas.edu/people/cmate
Universidad Pontificia Comillas (Madrid)

Lecturer in Mathematics – Department of Applied Mathematics (1984-October to 1987-September)
Lecturer in Statistics – Department of Industrial Organization (1987-October to 1997-March)
Universidad Pontificia Comillas (Madrid)
http://www.comillas.edu/

Lecturer in Introduction to Business Statistics (1989-January to 1995-December)
Saint Louis University, Madrid
http://spain.slu.edu/

Mathematics Teacher (1980-October to 1987-September)
High School "Escuelas Profesionales Padre Piquer" (Madrid)
http://www.padrepiquer.com/

Ib. Visiting Positions and Other Academic Affiliations

Visiting Scholar (2007- September to 2007- December)
Department of Economics, University of California, Riverside

IIa. Education

PhD in Mathematics-Statistics and Operations Research. Universidad Complutense de Madrid, Spain. 1994.

Msc in Mathematics-Statistics and Operations Research. Universidad Complutense de Madrid, Spain. 1980

Bsc in Economics. Universidad Complutense de Madrid, Spain. 1984

IIb. Doctoral Dissertation

Title (in Spanish): Reliability Nonparametric Bayesian Models in Accelerated Life Testing
Advisor: Vicente Quesada, Ph.D. in Statistics and Operations Research
Full Professor
Department of Statistics and Operations Research
Universidad Complutense (Madrid)
Date: 1994-Nov, 4
https://eprints.ucm.es/id/eprint/3455/

IIb. Quality accreditation - National habilitation

Organization: ACAP (Agencia de Calidad, Acreditación y Prospectiva de las Universidades de Madrid)
Accreditation: Doctor Professor of Private University
Accreditation: Associate Professor
Date: 2005-June, 8

III. Areas of Expertise

Analytics. Artificial Intelligence. Bayesian Statistics. Big Data. Computer Science. Customer Satisfaction Measurement. Data Science. Data Mining. Econometrics. Economics. Financial Markets. Forecasting. Life Testing. Machine Learning. Marketing Research. Multivariate Analysis. Quality Management and Control. QoS. Reliability. Symbolic Data Analysis. Time Series Analysis

Expertise (UNESCO Codes):
1105 Methodology (1105.01)
1203 Computer Sciences (1203.04, 1203.10, 1203.23, 1203.26)
1206 Numerical Analysis (1206.01, 1206.07, 1206.08)
1207 Operations Research (1207.12, 1207.15)
1208 Probability (1208.04, 1208.06, 1208.08, 1208.09)
1209 Statistics (1209.01, 1209.02, 1209.03, 1209.06, 1209.08, 1209.09, 1209.11, 1209.11, 1209.13, 1209.14, 1209.15)
3306 Electrical technology and engineering (3306.03, 5302.04, 5302.05)
5302 Econometrics (5302.02, 5302.03, 5302.04, 5302.05)
5307 Economic theory (5307.06, 5307.07)
5308 General economics (5308.01, 5308.02, 5308.03)
5311 Organization and management of enterprises (5311.02, 5311.06, 5311.07)
5602 General theory and methods (5602.06)
5604 Legal organization (5604.03)
6114 Social psychology (6114.15)
6305 Mathematical sociology (6305.01,6305.03)

IV. Key Research Achievements

JCR articles in Q1 (Source WoS and Clarivate): 4
Granted Six-year Research Periods: 2
Latest Granted Six-year Research Period: 2011-2021
Thesis supervised: 1

V. Courses Taught

Ph.D. Courses:

- ✓ *Comillas Pontifical University*
    - o Advanced Data Analysis (in Spanish, 2000-2001, 2002-2003, 2004-2005, 2005-2006, 2007-2008, 2009-2010, 2010-2011, 2011-2012, 2012-2013)
    - o Intelligent Data Analysis (in English, 2013-2014, 2014-2015, 2015-2016)
    - o Stochastic Processes. Applications in Engineering (in Spanish, 1996-1997)

Undergraduate Courses:

- ✓ ***Comillas Pontifical University***
    - Economics and Business Management (in Spanish, 2013-2018)
    - Communication and Information Management-EXCEL (in Spanish, 2022-2023)
    - Quality Management and Control (in Spanish, 2011-2013)
    - Computational Data Analysis (in Spanish, 2000-2002)
    - Marketing Research (in Spanish, 2001-2003)
    - MATLAB Programming (in Spanish, 2016-2020)

- Operations Research (in Spanish, 1999-2001)
- Statistical Process Control and Reliability (in Spanish, 1998-2004)
- Statistics (in Spanish, 1987-2022)
- Statistics II (Machine Learning) (in Spanish, 2018-2022)
- Industrial Statistics: Time Series Analysis and Forecasting-Multivariate Analysis-Reliability (in Spanish, 1998-2012)
- Advanced Calculus (in Spanish, 1984-1987)

✓ ***Saint Louis University in Madrid***
- Introduction to Business Statistics (in Spanish, 1989-1995).

Professional Courses:

✓ ***VALEO EMBRAGUES***
- Probability distributions (models and statistical inference) in reliability engineering and quality control (in Spanish, 1996. 10 hours).

✓ ***Instituto Nacional de Meteorología – Centro de Formación Meteorológica***
- Applied Statistics course to Climatology (STATGRAPHICS) (in Spanish, 1993-Dic to 1994-Jan. 10 hours of a total of 50 hours).

✓ ***University of Castilla-La Mancha in Ciudad Real. Master in Business Administration and Organization Engineering (MBAE)***
- Introduction to decision methods and models (in Spanish, 2003. 6 hours).

✓ ***University of Castilla-La Mancha in Albacete***
- STATGRAPHICS for users. Introduction and perfection in the handling of the system (in Spanish, 1991. 12 hours).

Vb. Teaching quality perception in Professional Courses and Projects

- 2002Feb14; Letter supporting the satisfaction, quality of didactic materials, and precision of content of the course entitled *Estadística Industrial. Aplicaciones en Minitab* delivered to 3M España. Signed by Pedro M. Moreno (Seis Sigma B.B. Mercados de Consumo y Oficina en Europa).
- 1996May10; Letter supporting the quality and precision of content of the course about *Probability distributions* delivered to VALEO EMBRAGUES. Signed by Carlos López-Pérez (R&D Director) and Angel Torres Gómez (HR Director).
- 1995Dec19; Letter supporting the quality of the six years period as a teacher at SAINT LOUIS UNIVERSITY in MADRID. Signed by Rick L. Chaney, Vice-President, and Academic Dean.

Vc. Teaching quality perception in Linkedin (39 recommendations, some of which are shown below)

- 2023February9; Nicolás Gabilondo (Estudiante 4º Ing. Industrial ICAI). "*It has been an honor for me to have been able to receive Statistics classes from Carlos Maté. During his long teaching career, he has shown a passion for the subject and a commitment to teaching that made the assimilation of complex concepts much easier. Also, his great sense of humor made the lessons very enjoyable and bearable. will certainly be missed by students and fellow professionals."* (Original in Spanish)
- 2018September4; Beatriz Marín Alcalá (Senior Associate at Strategy &). *"I was a student of Carlos Maté in the subject of Economics and Business Management at the ETSI ICAI. Excellent teacher, an expert in the field, whose rigor and discipline I would highlight; as well as his willingness to help any student who needs it."* (Original in Spanish)
- 2014December3; Victor López Garay (Founding partner at Stellar Capital). "*From the academic perspective to the personal and human standpoint, having Carlos as professor while studying at ICAI has definitely helped me grow and lay the foundations for my current professional development. Through his excellent job in teaching statistics, Carlos always encouraged us to pay special attention to the accuracy, methodology & quality of results for any given task in life. I would definitely recommend Carlos, not only as professor and researcher but also as someone to collaborate and work with".*
- 2012January7; Miguel Angel Gallego-Preciado (BBVA Global Finance Office). "*Brilliant professor and researcher always focus on applying the state of the art statistical techniques to financial issues. Easygoing, hard worker and team builder person that assumes and develope the leading role of the project. For me, it has been a pleasure to share with him different financial issues where he had provided me very useful advised.*
- 2011December5; Pedro Tobarra (Data Scientist & Machine Learning Engineer@BASF). "*Carlos is an excellent professional and an excellent person. Twelve years after being one of his students I do still appreciate his Operative Research lessons and the passion he demonstrated to us and to his job. If I ever needed again any collaboration in Operative Research or Statistics studies at academic or professional level I would take him into account for sure."*
- 2011September5; Pascual Diego (CFA, Managing Director, Global Head of Strategy, Credit Markets at BBVA Corporate and Investment Banking). *"Carlos was my Professor of Statistics and Probability at ICAI - Universidad Pontificia Comillas. He was one of the professors I have the best memories about: He was clear, solid, a lover*

of detail and an excellent communicator. He combined being highly demanding and rigorous with being caring, supportive and willing to go the extra mile in providing examples and real-life applications of statistics models. His teachings provided a very solid grounding on statistics-related subjects that was fundamental for later success both in an academic (CFA) and professional environment (Oliver Wyman and McKinsey). I can say without hesitation that having Carlos as a professor has greatly contributed to my career development, and provided a great reference model of what an excellent university professor should be. I wholeheartedly recommend his work, and am happy to discuss my experience with Carlos in greater detail with anybody interested."

- 2011June16; Maite Peña-Álcaraz (Associate Partner at Mckinsey & Company). *"I first met Carlos Mate five years ago. He taught the Statistic course in the third year of my degree. That year he was my supervisor for a research project about principal components too. Last year, I took other PhD course on Advanced Statistics imparted by Carlos. These courses provide me with a very solid fundamentals grounding in statistics. After that I have been able to take several advanced statistic courses at the Complutense University in Madrid (School of Mathematics) and at MIT (Massachusetts Institute of Technology). I have to say that Carlo´s courses are very well organized. He has prepared some class notes that cover all the material. He is very clear in his explanations and he encourages his students to learn advanced topics and its applications to actual problems."*

Vd. Research quality perception in Linkedin (3 recommendations are shown below)

- 2016March17; Robert Fildes (Director, Lancaster Centre for Marketing Analytics and Forecasting. Lancaster University). *"Carlos has excellent econometric and data analytical skills."*
- 2015March2; Andrea Vašeková (Java developer). *"Carlos Maté was my supervisor during my internship at the Institute for Research in Technology (IIT). I consider him an expert in multiple areas related to time series forecasting and interval analysis, and he is also open to the challenges and opportunities provided by Big Data. During the time I worked with him I found him demanding, but friendly and always helpful. I highly value his opinion and his insightful comments have significantly contributed to my advancement."*
- 2011 November 15; Paulo Rodrigues (Adviser Researcher at Banco de Portugal). *"The analysis of interval time series is of growing interest in Economics and Finance and Carlos Maté has made several important contributions which I recommend to any researcher interested in the field. His papers present new developments in the Modelling and Forecasting of this type of series breaking new grounds in current research."*

VIa Institutional Responsabilities

✓ *Comillas Pontifical University*

- Member of Faculty/University Staff (1994-Sep to 2023-Feb)
- Coordinator of the Statistics area of the Department of Industrial Organization (1999-Oct to 2008-Sep)
- Manager seeking the end-of-degree projects for the major Industrial Organization (1994-Jan to 1997-Sep).
- Manager developing students' travel to visit companies (1993-Jan to 1997-Sep). One-day travels in Comunidad de Madrid and five-day travels in Catalonia were managed.
- Manager coordinating practical tasks for the matters of the Department of Industrial Organization (1994-Jan to 1997-Sep).
- Secretary of the Department of Industrial Organization (1998-June to 1999-June)
- Industrial Engineering Degree Tutor (1998-Oct to 2000-Oct)
- Coordinator of the Statistics and Operations Research area of the Department of Industrial Organization (1998-June to 1999-Sep)
- Industrial Organization Engineering Degree Tutor (2000-Oct to 2001-Oct)
- Editor of the booklet "Profesorado y Programas de las Asignaturas del Departmento de Organización Industrial ETSII-UPCO" (1993-Sep to 1994-Feb)

VIb. Customer quality perception as the organizer of students' travels at ICAI

- 1996 May; Acknowledgement letter of the classroom of the 4th course of Industrial Engineering about preparing, organizing, supporting, and developing the student's travel during the last week of April 1996 to industrial areas of Zaragoza and Barcelona, including visits to NISSAN, SEAT, and other companies. Signed by Enrique Fernández Puertas (Class delegate).

VII. Society and Association Participation and Membership

European Economic Association (previously, not now)
International Institute of Forecasters (previously 2000-2011, 2020-2021)

B. Publications

I. Papers in Journals indexed in 'Journal Citation Reports (JCR)'

- Maté, C.G. (2022). Forecasting in FOREX the spot price interval of tomorrow with the same information of today. An analysis of the seven majors using a linear regression model based on interval arithmetic. *Knowledge-Based Systems*. 258, 109923. https://doi.org/10.1016/j.knosys.2022.109923

  JCR: **8.139 Q1** (2021)**;** CATEGORY: COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 24/144 - **SJR: 2.192 Q1** (2021); **H-INDEX 135** (2021); CIRC: A+.

- Maté, C. & Jiménez, L. (2021). Forecasting exchange rates with the iMLP: New empirical insight on one multi-layer perceptron for interval time series (ITS). *Engineering Applications of Artificial Intelligence*, *104*, 104358.

  JCR: **9.511 Q1** (2021)**;** CATEGORY: ENGINEERING, MULTIDISCIPLINARY 5/92; JCR: **8.93 Q1** (2021)**;** CATEGORY: ENGINEERING, ELECTRICAL & ELECTRONIC **30/276;** JCR: **8.846 Q1** (2021)**;** CATEGORY: AUTOMATION & CONTROL SYSTEMS 8/65; JCR: **8.16 Q1** (2021)**;** CATEGORY: COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE 27/144 **- SJR: 1.734 Q1** (2021); **H-INDEX 114** (2021). CIRC: A+.

- Maté, C. G. (2021). Combining Interval Time Series Forecasts. A First Step in a Long Way (Research Agenda). *Revista Colombiana de Estadística*, *44*(1), 123-157.
  SJR: 0.208 Q4 (2021); **H-INDEX 17** (2021). CIRC: D.

- Albu, LL., Maté, C. and Simionescu, M. (2015). The assessment of some macroeconomic forecasts for Spain using aggregated accuracy indicators, *Romanian Journal of Economic Forecasting*. vol. XVIII, no. 2, pp. 30-47.
  JCR: 0.348 Q4 CATEGORY: ECONOMICS, **(2015); 0.963 Q4 (2021)- SJR: 0.236 Q3 (2021); H-INDEX 18** (2021).CIRC:B.

- Arroyo, J.; González-Rivera, G.; Maté, C. and Muñoz-San Roque, A. (2011). Smoothing Methods for Histogram-valued Time Series. An Application to Value-at-Risk. *Statistical Analysis and Data Mining*. Volume 4, Issue 2: 216-228.
  JCR: 1.396 Q2 (2019) - SJR: 0.27 Q3-Computer Science Applications (2011); 0.753 Q1 (2019)

- Maté, C. (2011). A multivariate analysis approach to forecasts combination. Application to Foreign Exchange (FX) markets. *Revista Colombiana de Estadística*. vol. 34, no. 2, pp. 347-275. ", Special Issue on "Estadística en Aplicaciones en la Industria y Estadística Industrial".
  JCR: 0.059 (2011); - SJR: Q4 (2011); SJR: 0.208 Q4 (2021); H-INDEX 17 (2021). CIRC: D.

- Arroyo, J.; Espínola, R. and Maté, C. (2011). Different approaches to forecast interval time series: a comparison in finance. *Computational Economics*. 37: 169-191.
  JCR: 0.514 Q3 (2011); 1.317 Q3 (2019) - SJR: Q2 (2011); 0.349 Q2 (2019). CIRC: A.

- García-Ascanio, C. and Maté, C. (2010). Electric power demand forecasting using interval time series: A comparison between VAR and iMLP. *Energy Policy*. vol. 38, no. 2, pp. 715-725,
  JCR: 2.629 Q1-Economics, (2010); 5.042 Q1 (2019) - SJR: 2.168 Q1 (2019).
  CIRC: A+.

- Arroyo, J., and Maté, C. (2009). Forecasting histogram time series with k-nearest neighbours methods, *International Journal of Forecasting,* vol. 25, no. 1, 192-207.
  JCR: 1.064 Q1-Economics, (2009); 2.825 Q1 (2019) - SJR: 1.753 Q1 (2019). CIRC: A+.

- Muñoz, A., Maté, C., Arroyo, J. and Sarabia, A. (2007). iMLP: Applying Multi-Layer Perceptrons to Interval-Valued Data, *Neural Processing Letters*, vol. 25, no.2, 157-169.
  JCR: 0.580 Q3-Computer Science, 69/93 (2007); 2.891 Q2 (2019) - SJR: 0.589 Q2 (2019)

- Maté, C., and Calderón, R. (2000). Exploring the Characteristics of Rotating Electric Machines with Factor Analysis, *Journal of Applied Statistics*, vol. 27, no.8, 991-1006.
  JCR: 0.206 Q4-Statistics & Probability, 60/69 (2000); 1.031 Q3 (2019) - SJR: 0.528 Q3 (2019). CIRC: A.

II. Other Articles

- Maté, C. (2022). The Relative Strength Index (RSI) to Monitor GDP Variations. Comparing Regions or Countries from a New Perspective. *Trends in Mathematical, Information and Data Sciences: A Tribute to Leandro Pardo*, 83-91.

- Maté, C., and Redondo, J. (2016). Forecasting financial time big data using interval time series, in 22nd International Conference on Computational Statistics - COMPSTAT 2016, pág. 303-314, International Association for Statistical Computing; International Statistical Institute, Oviedo, 2016. ISBN: 978-90-73592-36-0.

- Maté, C. (2014). Big data. Un nuevo paradigma de análisis de datos, *Anales de Mecánica y Electricidad*. vol. XCI, no. VI, pp. 10-16.

- Maté,C. (2012). El análisis de intervalos. Aplicaciones en ingeniería. *Anales de Mecánica y Electricidad*. vol. LXXXIX, no. III, pp. 20-27.

- Lumbreras, S., and Maté, C. (2011). El mercado de divisas y la gestión del riesgo de los tipos de cambio, *Anales de Mecánica y Electricidad*. vol. LXXXVIII, no. V, pp. 14-19.

- Maté, C., and Fernández-Butragueño, L. (2008). El cambio de ciclo económico actual. Una aproximación desde las relaciones gráficas de volatilidad en los mercados. *Anales de Mecánica y Electricidad*, vol. LXXXV, no. VI, 56-59.

- Maté, C., and Labernia, J. M. (2005). Sistema automatizado para la mejora del rendimiento en pruebas objetivas. Implicaciones en la selección de recursos humanos. *Anales de Mecánica y Electricidad*, vol. LXXXII, no. V, 30-36

- Maté, C., and Oliva, A. (2003). La predicción en los mercados de derivados financieros. Una introducción al MEFF y los modelos ARCH. (II), *Anales de Mecánica y Electricidad (2003)*, vol. LXXX, no. I, 56-64.

- Maté, C., & Ruiz Falcó, A. (2003). Design for maintainability. A methodology using statistical methods. In **Maintenance management and optimisation.** *European Commission, Luxemburgo, Luxemburgo.* **ISBN:** 92-894-5836-4.

- Maté, C., and Oliva, A. (2002). La predicción en los mercados de derivados financieros. Una introducción al MEFF y los modelos ARCH. (I), *Anales de Mecánica y Electricidad (2002)*, vol. LXXIX, no. IV, 46-51.

- Maté, C., Fernandez, M. and Campos, J. A. (2001). La medición de la satisfacción del cliente de hotel: estado del arte y nuevas perspectivas sobre su medición., *Revista Estudios Turísticos,* Vol. 147, 23-55.

III. Chapters in Books

- Arroyo, J.; González-Rivera, G.; and Maté, C. (2010). Forecasting with interval and histogram data. Some financial applications. 247-279. Chapter in *Handbook of Empirical Economics and Finance*. Chapman & Hall/CRC.

IV. Books

- Maté, C. (2006). Bayesian Data Analysis. Asociación Española para la Calidad. (In Spanish)

- Maté, C. (1995). General Course on STATGRAPHICS. Procedures. Statistical methods. Applications. Solved exercises. A three-volume book with 1450 pages. Universidad Pontificia Comillas. (In Spanish)
- Sarabia, A. and Maté, C. (1993). Problems of Probability and Statistics. Theoretical Elements. Issues. Applications with STATGRAPHICS. CLAGSA. (In Spanish)

V. Book reviews

- Maté, C. G. (2011). Introduction to Interval Analysis. Ramon E. Moore, Ralph B. Kearfott, and Michael J Cloud. SIAM (2009), ISBN: 978-0-898716-69-6 (hardcover), $72 USA, 223 pages. ***Fuzzy Sets and Systems***, Volume 177, Issue 1, 95-97.
  JCR: 1.759 Q1 (2011); 3.305 Q1 (2019) - SJR: Q1 (2011); 1.062 Q1 (2019)
- Maté, C. (2009). Bayesian methods in finance. ***International Journal of Forecasting****,* vol. 25, no. 3, 632-634.
  JCR: 1.064 (2009); 2.825 Q1 (2019) - SJR: 1.753 Q1 (2019)
- Maté, C. (2007). Bayesian statistics and marketing**. *Interfaces****,* vol. 37, no. 3, 302-303.
  JCR: 0.575 (2007); 0.775 Q4 (2019) - SJR: 0.609 Q2 (2019)

VI. Work in Progress

- Maté, C. (2023a). **The iBoxplot: a visual tool based on lows and highs to support decision-making and acquire knowledge.** Submitted a revised version.

- Maté, C. (2023b). **Forecasting lows and highs of stocks price with the kNN machine learning algorithm. The case of some IBEX35 assets in the banks' crisis of 2023.** To be submitted.

- Maté, C.; Zamora, J.L. (2023c). **Optimizing the parameters of the relative strength index (RSI). A previous clustering of the stocks is it worth it?** To be submitted.

- Maté, C.; Zamora, J.L. (2023d). **Stock market dynamic identification by clustering techniques. Applications to Russell 3000 companies.** To be submitted.

- Maté, C.; Zamora, J.L. (2023e). **Forecasting price bands using one multi-layer perceptron for intervals (iMLP). A comparison with Bollinger bands.** To be submitted.

- Lima Neto, E and Maté, C. (2022a). **Linear Regression for Interval-Valued Data: An overview.** Chapter of the handbook/monograph on interval-valued data. Editor: Carlos Maté.

- Maté, C. and Sun, Y. (2022b). **Random intervals. Statistical Inference for Interval-Valued Data.** Chapter of the handbook/monograph on interval-valued data. Editor: Carlos Maté.

- Maté, C. (2022c). **Descriptive Statistics and Exploratory Analysis for Interval-Valued Data.** Chapter of the handbook/monograph of interval-valued data. Editor: Carlos Maté.

C. Other Activities

I. Referee Services

Journals: (27 papers in 22 journals since 2006)

Advances in Data Analysis and Classification, Big Data, Computational Economics, Cuadernos de Economía (a journal of Universidad Nacional de Colombia), Econometric Reviews, Energies, Energy Policy, Engineering Applications of Artificial Intelligence, European Journal of Operational Research (3 papers), IEEE Transactions on Neural Networks, IEEE Transactions on Power Systems, International Journal of Systems Science, Journal of Applied Statistics (2 papers), Interfaces, International Journal of Forecasting (4 papers), Knowledge-Based Systems, Neural Computing and Applications, Revista Colombiana de Estadística (a journal of Universidad Nacional de Colombia), Operations Research Forum, Statistical Methods & Applications, Statistics and Computing, TOP (International journal of Operations Research).

Handbooks:

Principles of Forecasting: A Handbook for Researchers and Practitioners. 2001.
Handbook of Empirical Economics and Finance. 2010.

Granting Agencies:

Acting as an expert, external reviewer for the Spanish National Research Agency.

- *3 evaluation reports on research projects on Forecasting. 2006-2008.*
- *6 evaluation reports on research projects of Economics. 2012-2015.*
- *5 evaluation reports on research projects in Big Data. 2016-2019.*
- *1 evaluation report on research projects of Economics. 2021.*

II. Conferences (where papers presented and/or sessions chaired)

✓ ***International Institute of Forecasters Annual Conference***: Lisbon, 2000; Atlanta, 2001; Dublin, 2002; Mérida, 2003; Santander, 2006 (1 session chaired); New York, 2007 (2 papers); Nice, 2008; Hong Kong, 2009 (3 papers and 1 session chaired). San Diego, 2010 (2 papers and 1 session on “Symbolic data” chaired). Prague, 2011. Virtual, 2020.

✓ **COMPSTAT 2006**: 17th Conference of International Association for Statistical Computing and Federation of Classification Societies: Data Science and Classification; Rome, August 2006. (2 papers)

✓ **SDA2012**: Third Workshop in Symbolic Data Analysis; Madrid, November 2012. (2 papers)

✓ **FFM 2015**: 22nd International Conference Forecasting Financial Markets: Advances for Exchange Rates, Interest Rates and Asset Management; Rennes, May 2015. (1 paper)

✓ **COMPSTAT 2016**: 22nd Conference of International Association for Statistical Computing and Federation of Classification Societies: Data Science and Classification; Paper title: Forecasting financial time big data using interval time series. (Joint work with J. Redondo.). Proceedings. Oviedo, August 2016.

✓ **III Jornadas de Redes de Investigación en Docencia Universitaria – Vicerrectorado de Calidad y Armonización Europea de la Universidad de Alicante.** Communication title: Sistema automatizado de auto evaluación del aprendizaje basado en pruebas tipo test. (Joint work with J. M. Labernia). **2005-June.** Conference. Alicante.

- ✓ **e-Forum Summit: Paving the way to 2010 – Tissat S.A.** Paper title: Developing Advanced Systems of Citizenship participation by e-opinion. Implications for robust decision-making in council management. **2003-Sep**. Conference. Valencia.

- ✓ **31st Internacional Symposium "Engineer of the 21st Century" - IGIP** (International Society for Engineering Education). Paper title: Marketing Research for Engineering students: key issues. (Joint work with J. Benítez.). Proceedings, 180-186. **2002-Sep**. Conference. Saint Petersburg.

- ✓ 22nd ESReDA Seminar on Maintenance Management & Optimization**.** Paper title: Design for Maintainability: A Methodology using Statistical Methods. (Joint work with A. Ruiz-Falcó.). European Safety, Reliability & Data Association. **2002-May**. Madrid.

- ✓ **TURITEC 2001**: Turismo y Tecnologías de la Información y las Comunicaciones. Paper title: Incorporación de las Tecnologías de la Información a la medición de la calidad de los servicios turísticos. (Joint work with L. González and J.A. Campos.) Proceedings, 155-174. **2001.** Madrid.

- ✓ **Second International Conference on Mathematical Methods in Reliability (MMR'2000).** International Statistical Institute Committee on Statistics in Business and Industry (SBI). Bordeaux.

- ✓ **Teaching Mathematics for Industry - SEFI (European Society for Engineering Education). 1994**. Prague.

- ✓ **Fifth Annual International Conference on Technology in Collegiate Mathematics (ICTCM) -** Paper title: Reliability Theory: An opportunity to approach High Mathematics School to Industry. Proceedings, 52-61. The Addison-Wesley Publishing Company. **1992. Chicago.**

- ✓ **20th Int Symposium 'IngenieurpMagogik 91 '-** Paper title: Mathematics with the computer. Some practical examples (Joint work with A. Sarabia and A. de la Villa). Proceedings, 797-800. Edited by Heinze, C D. Lehmann, G, and Melezinek. A. **1991-Sep. Dresden.**

- ✓ **East-West Congress on Engineering Education -** Paper title: The challenge of the year 2000: Towards an experimental mathematics. (Joint work with A. Sarabia and A. de la Villa) Proceedings, 426-428. Edited by Zenon J. Pudlowsky. **1991-Sep. Cracow.**

- ✓ **Sixth European SEFI Seminar on Mathematics in Engineering Education –** Paper title: Integrating the computer in a Statistics course for Engineering Students. (Joint work with A. Sarabia). **1991-April. Budapest-Balatonfured**.

- ✓ **XIX Congreso Nacional de Estadística, Investigación Operativa e Informática.** Paper title: El software STATGRAPHICS en un curso de Estadística Básica. **– 1991-March. Segovia**.

III. Invited Keynote Speaker and Seminars

- ***"Technical analysis in financial markets. A new perspective using interval-valued information"***
  SIDM 2019 The Fourth International Symposium on Interval Data Modelling, Academy of Mathematics and Systems Science, Chinese Academy of Sciences (AMSS, CAS), and the Wang Yanan Institute for Studies in Economics, Xiamen University (WISE, XMU). Beijing, **June 2019**.
- ***"Big data analytics through interval data methods"***
  SIDM 2017 The Third International Symposium on Interval Data Modelling, Academy of Mathematics and Systems Science, Chinese Academy of Sciences (AMSS, CAS), and the Wang Yanan Institute for Studies in Economics, Xiamen University (WISE, XMU). Beijing, **June 2017**.
- "**Bayesian nonparametrics for interval data. An agenda for future research*"***
  SIDM 2016 The 2nd *International Symposium on Interval Data Modelling, Academy of Mathematics and Systems Science, Chinese Academy of Sciences (AMSS, CAS), and the Wang Yanan Institute for Studies in Economics, Xiamen University (WISE, XMU). Xiamen,* **July 2016**.

- "***Combining Interval Time Series Forecasts: An Agenda for Future Research"***
  SIDM 2015 The First International Symposium on Interval Data Modelling, Academy of Mathematics and Systems Science, Chinese Academy of Sciences (AMSS, CAS), and the Wang Yanan Institute for Studies in Economics, Xiamen University (WISE, XMU). Beijing, **July 2015**.
- **"*Exchange rates forecasting: past, present and future*".** Exploratory Workshop on Business Forecasting. *Colegio Universitario de Estudios Fiscales (CUNEF); Universidad de Castilla-La Mancha*. Madrid (Spain). **April 2014.**
- "***The Bayesian Approaches to Combining Forecasts. Some Comments for Inflation Forecasting***"
  Department of Mathematics and Statistics, Department of Management Science, Lancaster University. **February 2009**.
- "***Forecasting Methods for Symbolic Data - Some Comments for Bayesian Developments***"
  Department of Statistics, University of California, Los Angeles. **December, 2007.**
- ***"Forecasting Histogram-Valued Time Series (HTS) in Financial Markets. Applications to Stock Indices"***
  Department of Economics, University of California, Riverside. **November, 2007.**

IV. Graduate Student Advising

Ph.D. Advising - Statistics and Machine Learning

- Universidad Pontificia Comillas
  Javier Arroyo
  Title: **Forecasting methods for interval and histogram time series** (in Spanish)
  (November 2008)

EXTERNAL expert reviewer to the "PhD programme regulated by R.D. 99/2011"

- Universidad Complutense de Madrid. Facultad de Estudios Estadísticos
  Luis Lorenzo Alvarez. **Técnicas de clustering particional aplicadas al análisis y a la gestión de carteras del mercado de criptomonedas** (in Spanish)
  (June 2023)

Committee Member PhD programmes – Statistics and Machine Learning

- Universidad Complutense de Madrid
  Juana María Alonso Revenga. **Análisis inferencial basado en medidas de Fi-divergencia para modelos loglineales con muestreo Multinomial y sobredispersión** (in Spanish)
  (September 2017)
- Universidad Complutense de Madrid
  Rodrigo Naranjo. **Modelado de sistemas de inversión mediante lógica borrosa como soporte a la toma de decisiones en mercados bursátiles** (in Spanish).
  (July 2017)
- Universidad Complutense de Madrid
  Raquel Mata. **Inferencia estadística basada en medidas de divergencia para modelos loglineales con restricciones de desigualdad: aplicación en ensayos clínicos** (in Spanish) (November 2014)
- Universidad Pontificia Comillas
  Javier Tapia. **A method to define an information system for intangible assets based on the fuzzyfication of the Delphi method. The art of the engineering** (in Spanish)
  (September 2008)

M.A. Advising - Engineering

- Universidad Pontificia Comillas
  Carolina García de Ascanio
  Title: **Electric Power Demand Forecasting using Interval Time Series Methods**

Date: 2011-June.

- Universidad Pontificia Comillas
  Javier Arroyo Gallardo
  Title: **Econometrics forecasting techniques: evolution and current situation.**
  (in Spanish).
  Date: 2004-July.

V. Final Engineering Project Advising (over 50 projects, only the most outstanding, grade A or higher, are shown)

Va. Awarded Projects

- Alejandro Oliva. 2002. **Development of implicit volatility forecasts in the Ibex-35 options in the Madrid stock market (MEFF)** (in Spanish). **Prize to the best project** in 2001-2002 (Grant Amount. € 3000).
- Javier Rexach. 2011. **Bayesian forecasting system to predict extreme financial events. Application to FOREX and stock markets**. (in Spanish). **Prize to the best project** in 2010-2011 (Grant Amount. € 3000).
- Luis Miguel Nogales. 2011. **Business cycle forecasting system based on interval data** (in Spanish). **Prize to the second-best project** in 2010-2011 (Grant Amount. € 1.500).

Vb. Outstanding Projects

- García-Bernalt Uría, M. (2022). **Pattern recognition and forecasting of over 100 candlestick charts in financial markets. The use of statistical methods and machine learning algorithms.** (in English). TFG. Universidad Pontificia Comillas.

- Acin Coelho de Portugal, C. (2022). **Granger causality when analysing and forecasting crisp, interval, and histogram time series. Applications to financial markets** (in Spanish). TFG. Universidad Pontificia Comillas.

- García-Lorenzana, S. (2022). **Advanced forecasting system in financial markets. The efficient combination of neural networks and regression models** (in Spanish). TFG. Universidad Pontificia Comillas.

- Domingo-Gorriz, T. (2021). **Regime switching in regression models under interval-valued databases. Applications in financial markets** (in Spanish). TFG. Universidad Pontificia Comillas.

- De Diego, A.A. (2021). **Forecasting interval time series (ITS) and candlestick charts. Comparing different regression approaches with kernel smoothing in financial and energy markets** (in English). TFG. Universidad Pontificia Comillas.

- Martínez-Esteban, M. (2021). **Investment strategies based on neural networks for intervals** (in Spanish). Master´s thesis. Universidad Pontificia Comillas.

- De los Santos, C. (2021). **Forecasting of price intervals in stock markets. The comparison between crisp and interval-valued data paradigms** (in Spanish). TFG. Universidad Pontificia Comillas.

- Bayona, A. (2021). **Analysing and forecasting daily low-high prices using intraday patterns. Applications to NASDAQ stocks** (in Spanish). TFG. Universidad Pontificia Comillas.

- Gil de Antuñano, D. (2020). **Development of an investment system in assets based on the creation of portfolios. Technical and news analysis for its efficient management** (in Spanish). Master´s thesis. Universidad Pontificia Comillas.

- Jiménez, L. (2020). **Neural networks for crisp and interval-valued data. Application to forecasting financial markets** (in English). TFG. Universidad Pontificia Comillas.
- San Millán, A. (2020). **Price forecasting in financial markets using news information through statistical methods** (in Spanish). TFG. Universidad Pontificia Comillas.
- Alvarez, H. (2019). **Regression models averaging under interval-valued databases. Applications in financial markets**. (in English). TFG. Universidad Pontificia Comillas.
- Caicoya, G. (2019). **Visual trading system based on technical analisis with interval-valued data**. (in Spanish). TFG. Universidad Pontificia Comillas.
- Cosin, A. (2019). **Basic portfolio management based on beta values using interval-valued information**. (in English). TFG. Universidad Pontificia Comillas.
- Hernando, P. (2019). **Analytics system for clustering interval time series. Applications in Finance** (in Spanish). TFG. Universidad Pontificia Comillas.
- Lostao, E. (2019). **Gestión básica de una cartera utilizando intervalos de valores sobre retornos**. TFG. Universidad Pontificia Comillas.
- Rodicio, M. I. (2019). **Visual trading based on moving averages**. TFG. Universidad Pontificia Comillas.
- Romero, F. (2019). **Visual trading system based on technical indicators**. TFG. Universidad Pontificia Comillas.
- Maceda, P. (2018). **Analytics system with interval-valued data** (in English). Master´s thesis. Universidad Pontificia Comillas.
- Diez de Rivera, R. (2018). **Analytics system for reducing dimensionality in interval-valued databases** (in Spanish). Universidad Pontificia Comillas.
- Cebral, P. (2018). **Forecasting system based on analytics of interval-valued databases**. (in English). TFG. Universidad Pontificia Comillas
- Llorente, L. E. (2014). **Sistema de predicción de la demanda de electricidad. Un enfoque basado en el análisis de intervalos** (in Spanish). TFG. Universidad Pontificia Comillas
- Redondo, J. (2013). **Interval Time Series Analysis and Forecasting** (in English). PFC. Universidad Pontificia Comillas
- Díaz-García, V. (2012). **Financial forecasting system based on Bayesian modeling** (in English). PFC. Universidad Pontificia Comillas
- Morell, L. (2012). **Combining forecasts system based on multivariate analysis. Application to interval data in financial markets** (in English). PFC. Universidad Pontificia Comillas
- Llamas, A. (2012). **Financial Forecasting system based on Bayesian averaging of linear and non-linear models** (in English). Universidad Pontificia Comillas
- Balduz, C. (2011). **Forecasting system based on Bayesian model averaging. Applications in Finance** (in English). Universidad Pontificia Comillas
- Fondo, C. (2008). **Volatility forecasting system for financial markets based on Bayesian model averaging** (in Spanish). Universidad Pontificia Comillas

- Fernandez-Butragueño, L. (2008). **Univariate and multivariate volatility forecasting system for financial markets** (in Spanish). Universidad Pontificia Comillas

- Salgado, R. (2007). **Bayesian Regression System for Interval-Valued Data. Application to the Spanish Continuous Stock Market** (in English). Universidad Pontificia Comillas

- Ortiz, S. (2005). **Software for Brand Positioning, Customer Segmentation, and Market Engineering under S-PLUS and JAVA** (in English). Universidad Pontificia Comillas

- Labernia, J.M. Title: **Advanced support system to prepare quiz exams** (in Spanish). Universidad Pontificia Comillas

- Arroyo, J. (2002). **Methodology to carry out automatic marketing research by Internet. One application to ex-students of ETSI(ICAI) from UPCO-Madrid**. (in Spanish). Universidad Pontificia Comillas

- García-Alcalde, A. (1999). **Methodology tool development for analyzing and forecasting the information related to the Spanish electricity generation daily market**. (in Spanish). Universidad Pontificia Comillas

Vc. Projects and Master´s thesis in progress (2023-2024)

- *New approaches to basic stock portfolio management based on rankings and risk. The use of interval-valued information. Author: Teresa Domingo*

VI. Grant Seeking Activity (Funded)

VIa. Main Researcher

2005-2009, "Forecasting Models for Symbolic Data (PRESIM project)", in Spanish. Team: 4 researchers. Developed for: **Universidad Pontificia Comillas**. Grant Amount € 29,000. http://www.upcomillas.es/eng/presim/pres_pres.aspx

2006, "Analysis, characterization and validation of the quality of service measurement system for Internet Access Providers", in Spanish. Team: 4 researchers. Developed for: **MINISTERIO DE INDUSTRIA TURISMO Y COMERCIO**. Grant Amount € 12,000.

2000-2004, "Development of a statistical model of exploratory character to find the competitive positioning of brands and customers segmentation", in Spanish. Team: 5 researchers. Developed for: **SIGMA-DOS**. Grant Amount € 17,923.

2001Nov-2002Feb, "Industrial Statistics. Applications under MINITAB", in Spanish. Team: 2 researchers. Developed for: **3M ESPAÑA**.

1997-2000, "Factor analysis methods applied to electric machines", in Spanish. Team: 2 researchers. Developed for: **ETSI(ICAI)**.

VIb. Researcher

2010, "Analysis and identification of possible strategies to improve the human-based recognition process in free-flow toll highways" (in Spanish). Developed for: **INDRA**. Grant Amount € 25,237.

2004, "Report on differences between data supplied by the AIMC organization about the newspaper ABC sales and audience" (in Spanish). Developed for: **VOCENTO**. Grant Amount € 5,000.

1999, "Analysis, study and design of bidding strategies in the electric generation sector" (in Spanish). Researcher. Developed for: **IBERDROLA**. Grant Amount € 270,000.

1998, “Framework for generation bidding strategies in the day-ahead electricity spot market” (in Spanish). Developed for: **IBERDROLA**. Grant Amount € 330,000.

VII. Worldwide influence

VIIa. Citations and h Index, according to Google Scholar

	Total	Desde 2018
Citas	1894	748
Índice h	14	11
Índice i10	17	13

More details in

https://scholar.google.es/citations?user=A1qCt8oAAAAJ&hl=es&oi=ao

VIIIb. IDEAS/REPEC/EconPapers

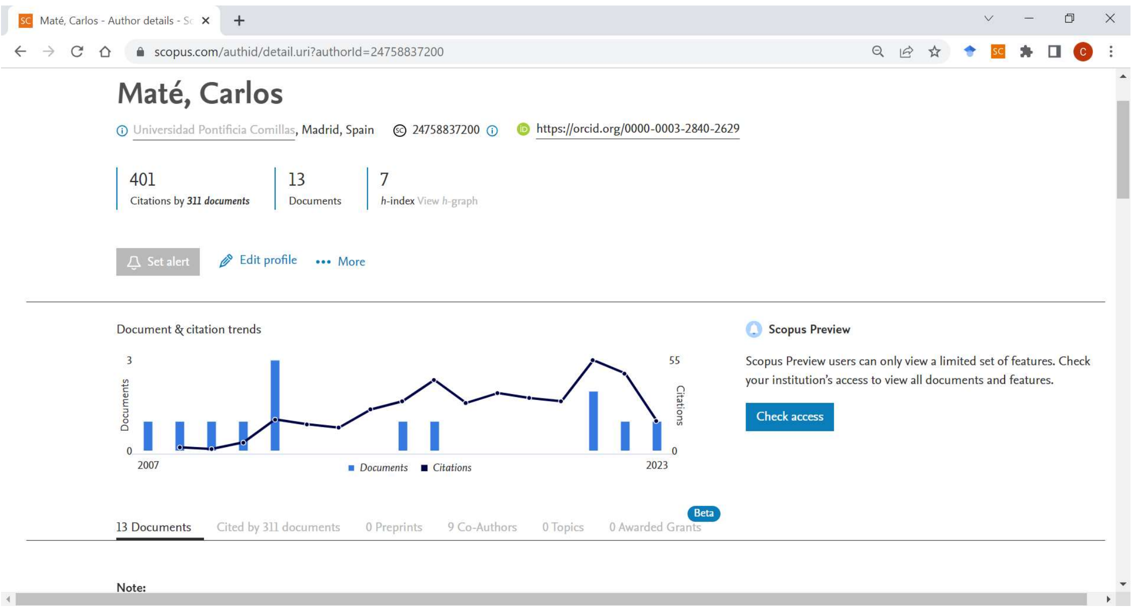
These statistics are based on data from 65077 authors.

Method	**Your rank**	**Percentile in RePEc (top x%)**	**Your score**
Average Rank Score	34155	53	32376.97
Number of Works	38494	60	8
Number of Distinct Works	35082	54	8
Average Rank Score (Last 10 Years)	48846	76	44994.60

VIIc. SCOPUS

Citations and h Index, according to Scopus

Citations	**401**
h Index	**7**



https://www.scopus.com/authid/detail.uri?authorId=24758837200

VIId. Doctoral dissertation

- During the period 2008-2014, 1913 downloads of my doctoral thesis (Document in Spanish) from 37 countries, as it can be seen in http://eprints.ucm.es/3455/. In the last year (2021-Sep to 2022-Dec) a total of 246 downloads. During the six first months of 2023, a total of 58 downloads.

VIII. Some Quantitative and Text Processing Software skills

VIIIa. Very deep knowledge (written books and/or courses taught)

- EXCEL (since 1996)
- STATGRAPHICS (since 1989)
- MATLAB (since 2000)
- MINITAB (since 2000)
- SPSS (since 1995)

VIIIb. Advanced user

- R (since 2005)
- SPLUS (since 2002)
- LATEX (since 2008)

VIIIc. User

- BLOOMBERG
- DERIVE
- GAMS
- GPSS
- MAPLE
- MATHEMATICA
- PYTHON
- SAS

IX. Press articles

Maté, C. (1993). Estadística: hoy y mañana. La Voz del Valle. Saint Louis University. Nº 3. Año 7.

X. Translations

- ✓ Estadística y Quimiometría para Química Analítica. Miller and Miller. (Joint work with R. Izquierdo). Pearson Educación. ISBN 84-205-3514-1. 2002.
- ✓ Estadística para Química Analítica. Miller and Miller. (Joint work with R. Izquierdo). Addison-Wesley Iberoamericana. ISBN 0-201-60140-0 .1993

XI. Blogs Creation

- *http://carlosmateicaie.blogspot.com.es/ (Economics_Business_Management_Big_Data in English)*
- http://carlosmatebigdata.blogspot.com.es/ (*Big Data in English*)
- *https://carlosmatebigadata.blogspot.com.es/ (Big_Data_Analytics_Architecture in English)*
- *http://carlosmateicai.blogspot.com.es/ (Economía_Gestión_Empresas_Big _Data en Spanish)*
  http://carlosmateeconomiebigdata.blogspot.com.es/ (*Economie_Gestion d'entreprise_Big_data en Français*)
- http://carlosmatewirtschaftgrobedaten.blogspot.com.es/(*Wirtschaft_Betriebswirtschaft_Große_ Daten auf Deutsch*)