MINISTERIO DE CIENCIA E INNOVACIÓN

CURRICULUM VITAE (maximum 4 pages)

AGENCIA ESTATAL DE INVESTIGACIÓN

CV date	07/02/2023

Part A. PERSONAL INFORMATION

First and Family name	María del Mar Martínez Ballesteros		

(*) Optional
(**) Mandatory

A.1. Current position

Name of University/Institution	University of Seville		
Department	Computer Languages and Systems		
Address and Country	ETS Ingeniería Informática. Av. Reina Mercedes s/n 41012 Sevilla		
Current position	Associate Professor (Prof. Titular)	From	13/11/2019
Key words	Data Science, Big Data, Machine Learning		

A.2. Education

PhD, Licensed, Graduate	University	Year
PhD in Computer Science	University of Seville	2012
Master in Software Engineering and Technology	University of Seville	2010
Computer Science Engineer	University of Jaen	2009

A.3. General indicators of quality of scientific production *(see instructions)*

- **2 national Six-year research periods (2009-2014, 2015-2020).**
- **Publication in JCR journals:**
  - Total number of papers: 17.
  - Per year: 1 (2010), 2 (2011) 3 (2014), 1 (2015), 2 (2016), 2 (2017), 1 (2018), 2 (2019), 1 (2020), 2 (2023)
  - Per quartil: 11(Q1), 5 (Q2), 1 (Q4)

	Web of Knowledge	**Scopus**	**Google Scholar**
Total number of citations	313	372	550
H-index	12	12	18

Part B. CV SUMMARY *(max. 3500 characters, including spaces)*

Academic and Professional Experience: She defended her PhD in 2012 with European mention (Cum Laude unanimously) obtaining the Extraordinary PhD Award from the University of Seville in 2013. She belongs to the area of Computer Languages and Systems in the University of Seville since 2009. She achieved the last lecturer position in 2019. She has 2 national six-year research periods (2009-2014, 2015-2020), 4 lecturer trienniums (2009-2018) and 2 quinquenniums (2009-2019).
Teaching Experience: She has involved as lecturer in several degrees (Computer Engineering, Technical Computer Engineering, Health Informatics) and Masters (Software Engineering: Cloud, Data and IT Management and Computer Engineering), being coordinator of subjects in Health Informatics and Master. She also has experience in online teaching because the Master of Computer Engineering is 100% online.
PhD thesis supervision: She has supervised 2 PhD students.
Research Experience: From 2009 she has involved in research task and technology transfer. The research career is focused on the field of Data Mining, specifically in the development of unsupervised learning algorithms such as association rules and different fields of application: bioinformatics,

environment, time series, etc. Currently, it is focuses on the area of Big Data and Deep Learning. In fact, she has a certification in Cloudera Certified Developer for Apache Hadoop (CCDH), and she has carried out several specializing courses of Big Data and Deep Learning. Recently, she has participated in several Google Cloud courses focused on Core Infrastructure and Big Data and Machine Learning. Due to the expansion of big data technology and advances in deep learning, her next research objectives are focused on continuing this research with a more practical focus on several fields such as medicine, environmental science, among others.

Publications: She is author of more almost 40 publications in international journals and conferences. She is first author in 10 of 17 publications in international journals indexed in JCR being 11 of them ranked in first quartile and 5 in second quartile in Computer Science area. She has also 1 publication and 2 papers accepted in International Conferences of GGS Class 2.

Editorial activity: She has been guest editor in 2 special issues in international JCR journals.

Participation in projects: She is principal investigator of one project from the National Plan and she has participated in several research projects obtained through competitive calls, being 7 of them projects from the National Plan, 5 more from the Andalusian Research Plan. Furthermore, she has involved in several grants for projects of the University of Seville.

Participation in R&D contracts: She has participated in several research contracts (being 4 of them 68/83 LOU contracts).

Research stays: She has carried out four long-term research stays (3 months each) being 3 of them internationals and 1 of them national: 2 at University of Nottingham, 1 at Polytechnic of Milan and 1 at University of Jaen.

Organizer of research activities: She also has involved in the organization of international conferences and 4 special issues of international conferences (ISD, HAIS, SOCO, CISIS, ICEUTE). She is member of the Program Committee of different national and international conferences and regular evaluator of several indexed journals in JCR.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications (10 most relevant contributions from 2016)

[1] A.R. Troncoso-García, **M. Martínez-Ballesteros**, F. Martínez-Álvarez, A. Troncoso Lora. A new approach based on association rules to add explainability to time series forecasting models. Information Fusion, In press, 2023. IF (2021): 17.564, 4/145, CS- Artificial Intelligence, Q1.

[2] L. Macías-García, **M. Martínez-Ballesteros**, J.M. Luna-Romera, J.M García-Heredia, J. García-Gutiérrez, J.C. Riquelme-Santos. Autoencoded DNA Methylation Data to Predict Breast Cancer Recurrence: Machine Learning Models and Gene-Weight Significance, Artificial Intelligence in Medicine, Vol. 110 (101976), pp. 1-16, 2020. IF (2020): 5.326, 34/139, CS- Artificial Intelligence, Q1.

[3] J.M. Luna-Romera, F. Núñez-Hernández, **M. Martínez-Ballesteros**, J.C. Riquelme, C.U. Ibáñez. Analysis of the evolution of the Spanish labour market through unsupervised learning. IEEE Access, Vol. 7 (1) pp. 121695-121708, 2019. IF (2019): 3.745, 35/156, CS – Information Systems, Q1.

[4] J.M. Luna-Romera, **M. Martínez-Ballesteros**, J. García-Gutiérrez, J.C. Riquelme. External clustering validity index based on chi-squared statistical test. Information Science, Vol. 487, pp. 1-17, 2019. IF (2019): 5.910, 9/156, CS - Information Sciences, Q1.

[5] D. Martín, **M. Martínez-Ballesteros**, D. García-Gil, J. Alcalá-Fdez, F. Herrera, J.C. Riquelme-Santos. MRQAR: a generic MapReduce framework to discover Quantitative Association Rules in Big Data problems. Knowledge-Based Systems. Vol 153, pp. 176-192, 2018. IF (2018) 5.101, 17/134, CS- Artificial Intelligence, Q1.

[6] J.M. Luna-Romera, J. García-Gutiérrez, **M. Martínez-Ballesteros**, J.C. Riquelme Santos. An approach to validity indices for clustering techniques in Big Data. Progress in Artificial Intelligence. Vol. 7 (2), pp 81-94, 2018.

[7] L. Macías-García, J.M. Luna-Romera, J. García-Gutiérrez, **M. Martínez-Ballesteros**., J.C. Riquelme-Santos, R. González-Cámpora. A study of the suitability of autoencoders for preprocessing data in breast cancer experimentation. Journal of Biomedical Informatics. Vol. 72, pp. 33-44, 2017. IF (2017) 2.882, 28/105 Computer Science Interdisciplinary Applications Q2.

[8] **M. Martínez Ballesteros**, J.M. García-Heredia, I. Nepomuceno-Chamorro, J.C. Riquelme Santos. "Machine learning techniques to discover genes with potential prognosis role in Alzheimer's disease using different biological sources", Information Fusion, Vol. 36, pp. 114 – 129, 2017. IF (2016): 5.667, 9/133 CS – Artificial Intelligence Q1, 4/104 CS – Theory & Methods, Q1

[9] **M. Martínez-Ballesteros,** F. Martínez-Álvarez, A. Troncoso Lora, J.C. Riquelme Santos. Obtaining optimal quality measures for quantitative association rules, Neurocomputing. Vol. 176, pp. 36 - 47, 2016. IF (2016) 3.317, 24/133 CS – Artificial Intelligence Q1.

[10] **M. Martínez-Ballesteros,** F. Martínez-Álvarez, A. Troncoso Lora, J.C. Riquelme Santos. Improving a multi-objective evolutionary algorithm to discover quantitative association rules, Knowledge and Information Systems. Vol. 49 (2), pp. 481 – 509, 2016. IF (2016) 2.004, 57/133 CS – Artificial Intelligence Q2, 67/146 CS – Information Systems Q2.

A complete list can be found at: https://investigacion.us.es/sisius/sis_showpub.php?idpers=16399

C.2. Research projects

Principal Researcher:

- PID2020-117954RB-C22. Deep learning and efficient learning transfer for health and connected mobility. Funder Company/Institution: Ministerio de Ciencia e Innovación, Plan Estatal 2017-2020 Retos – Proyectos I+D+I. PI: José C. Riquelme/María del Mar Martínez Ballesteros. From 2021 to 2024 (36 months). Funding: 116.160€. Role: Principal Investigator.

Researcher:

- TED2021-131311B-C21. Digital solutions for predictive maintenance of wind power plants. Funder Company/Institution: Ministerio de Ciencia e Innovación, Proyectos de Transición Ecológica y Transición Digital. PI: José C. Riquelme/J.M. Riquelme. From 2022 to 2024 (24 months). Role: Investigator.
- P18-RT-2778. Adaptive Hybrid Models to Predict Solar and Wind Renewable Energy Production. Funder Company/Institution: Consejería de Economía y Conocimiento, Junta de Andalucía. PAIDI 2020: Proyectos I+D+i. PI: José C. Riquelme/Jorge García Gutiérrez. From 2020 to 2023 (48 months). Funding: 116.042 €. Role: Investigator.
- US-1263341. BIDASGRI: Big Data Technologies For Smart Grids. Funder Company/Institution: Consejería de Economía y Conocimiento, Junta de Andalucía. Proyectos I+D+i FEDER Andalucía 2014-2020. PI: José C. Riquelme/ Isabel Nepomuceno. From 2020 to 2022 (24 months). Funding: 90.000 €. Role: Investigator.
- TIN2017-88209-C2-2-R. Big Data Streaming: Continuous Big Data Analysis. Descriptive Models. Funder Company/Institution: Ministerio de Economía y Competitividad. PI: José C. Riquelme santos/ Cristina Rubio Escudero. From 2018 to 2021 (48 months). Funding: 116.039 €. Role: Investigator.
- TIN2014-55894-C2-1-R. Big Time-Aware Data: Analysis of Big Data indexed over time. Rules and Clustering. Funder Company/Institution: Ministerio de Economía y Competitividad. PI: José C. Riquelme santos. From 2015 to 2019 (54 months). Funding: 124.751 €. Role: Investigator.
- TIN2014-56425-REDT. BigData and scalable data analytics. Funder Company/Institution: Ministerio de economía y competitividad. Red de excelencia. PI: Francisco Herrera Triguero. From 2014 to 2016 (24 months). Role: Investigator.
- TIC-1728. Advanced Techniques for the Analysis of Temporal Data: Application to Earthquakes and Environmental Pollution. Funder Company/Institution: Junta de Andalucía (Consejería de Innovación, Ciencia y Empresas). Proyecto de excelencia. PI: Alicia Troncoso Lora. From 2014 to 2016 (48 months). Funding: 35.850 €. Role: Investigator.
- TIC-7528. Advanced Models for Intelligent Information Analysis. Application to Biomedical and Environmental Data. Funder Company/Institution: Junta de Andalucía (Consejería de Innovación, Ciencia y Empresas). Proyecto de excelencia. PI: Cristina Rubio Escudero. From 2012 to 2015 (48 months). Funding: 31.435.25 €. Role: Investigator.
- TIN-2011-28956-C02-02. Intelligent analysis of environmental information. Funder Company/Institution: MICINN. Ministerio de Ciencia e Innovación. PI: José C. Riquelme Santos. From 2012 to 2014 (36 months). Funding: 47.000 €. Role: Investigator.
- TIN-2007-68084-C02-02. HERCULES: Scalable Heuristics for the Extraction of Knowledge in Large Volumes of Information. Funder Company/Institution: MEC. Ministerio de Educación y Ciencia. PI: José C. Riquelme Santos. From 2009 to 2012 (17 months). Funding: 99.200 €. Role: Investigator.

C.3. Contracts, technological or transfer merits

- CEI20_00015. Deep Learning models for renewable energy systems: generation prediction and preventive and predictive maintenance. From 2021 to 2022. PAIDI 2020: Knowledge Transfer Activities. Junta de Andalucía. PI: José C. Riquelme Santos. Role: Investigator.
- AT17_5904_USE. SocietySoft-Transfer of tools, policies and principles for the creation of quality software for the digital society. From 2020 to 2021. PAIDI 2020: Transfer Activities 2017. Junta de Andalucía. PI: María José Escalona Cuaresma. Role: Investigador.
- P001-21/E22. Wearable platform for the early diagnosis of emotional disorders and exacerbations in patients with chronic diseases through the use of Artificial Intelligence (SENSING-AI). From 2021 to 2023. Contract 68/83. Salumedia Labs, S.L.U. PI: Cristina Rubio Escudero. Role: Investigator.
- P011-21/E22. IA + IoT for the construction of Smart Home Services II. From 2021 to 2022. Contract 68/83. Smart IoT Labs, S.L. PI: José María Luna Romera. Role: Investigator.
- P008-20/E22. IA + IoT for the construction of Smart Home Services II. From 2020 to 2021. Contract 68/83. Smart IoT Labs, S.L. PI: José María Luna Romera. Role: Investigator.
- P031-20/E22. Business Intelligence Services and Statistical Profiling of the Andalusian Employment Service. Contract 68/83. Ayesa A.T. PI: José C. Riquelme Santos. Role: Investigator.
- ITC-20181064. FEDER-INNTERCONECTA. Project DIGITAL PORT: Digital Platform for Port Logistics Services. From 2019 to 2020. Ingeniería y Soluciones Informáticas SL– Emergya Ingeniería SL – Secmotic Innovación SL – Easytosee Agtech SL – Pablo de Olavide University. Funding: 90.000 €. PI: Gualberto Asencio. Role: Investigator.
- 2017/00179/001. New communication protocols for the creation of smart cities. From 2017 to 2018. Lantia IOT S.L. Funding: 98.000 €. PI: Francisco Martínez. Role: Investigator.
- RTC-2016-5524-2. Retos-Colaboración. Artificial Intelligence applied to Pest Management, IA2GIP. From 2016 to 2018. AGC Market View Services. PI: José C. Riquelme. Funding: 38.672,6 €. Role: Investigator.
- ITC-20151078. FEDER-INNTERCONECTA. Optimization of the conservation of railway infrastructure for urban transport. From 2015 to 2017. Azvi S. A,. PI: Francisco Martínez. Funding: 54.540 €. Role: Investigator.
- PRY153/14. Query web service for access to information in OpenData portals. Funder Company/Institution: Junta de Andalucía (Fundación pública de centro de estudios andaluces. Consejería de Presidencia), Pablo de Olavide University, University of Seville. From 2014 to 2016. Funding: 30.000 €. PI: Alicia Troncoso Lora. Role: Investigator.

C.4. Awards

Extraordinary PhD Award (Engineering and Architecture) University of Seville. 2011/2012.

C.5. Supervisions of PhD theses

- Title: New internal and external validation indices for clustering in Big Data. PhD student: José María Luna Romera, Co-director: Jorge García Gutiérrez, University: University of Seville. Date: October 2019
- Title: Novel efficient deep learning architectures for time series forecasting. PhD student: Manuel Jesús Jiménez Navarro, Co-director: Gualberto Asencio Cortés, University: University of Seville. Date: 3 February 2023

C.6. Research Stays

- Polytechnic of Milan (Italy). 14/06/2014 – 14/09/2014. Host: Dr. Marco Masserolli.
- University of Nottingham (UK). 30/06/2012 – 30/09/2012. Host: Dr. Jaume Bacardit.
- University of Jaen. 30/11/2011 – 1/03/2012. Host: Dra. Maria José del Jesús.
- University of Nottingham (UK). 18/06/2011 – 17/09/2011. Host: Dr. Jaume Bacardit.

C.7. Research evaluation and management

- Organization of special sessions at international conferences (SOCO, HAIS, ICEUTE), Organizing Committee of National Conferences and International Conferences (ISD 2013, HAIS 2016, SOCO-CISIS-ICEUTE 2019), etc.
- Member of the program committee in national and international conferences.
- Reviewer of papers in scientific conferences and Journals indexed in JCR.
- Editor of special issues in 2 journals indexed in JCR (2 - Q2).

C.8. Certifications

- Certification in Cloudera Certified Developer for Apache Hadoop (CCDH), April 2015. Licence number: 100-013-015.