

Planetary Wellbeing initiative

Research projects 3rd Call (2021)

CATEGORIA 2. PROJECTES DE RECERCA PILOT I ESTABLIMENT DE COL·LABORACIONS DE RECERCA EN BENESTAR PLANETARI

PROPOSAL: WASTE RECYCLING FOR PLANETARY WELLBEING

RESEARCH TEAM

1. Jesica de Armas Adrián (project PI-1) - DEE - *Business Analytics Research Group (BARG)* - [CV](#)
2. Jaume Garcia Villar (project PI-2) - DEE - *Business Analytics Research Group (BARG)* - [CV](#)
3. Mohammad Ghaderi – DEE - *Business Analytics Research Group (BARG)* - [CV](#)
4. Mercè Roca i Puigvert - *ESCI-UPF Research in International Studies and Economics (RISE)* - [CV](#)
5. Alba Bala Gala - *ESCI-UPF UNESCO Chair in Life Cycle and Climate Change* - [CV](#)
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Further researchers from the participating research groups will potentially be invited to participate in specific activities of the project.

1. DESCRIPTION OF THE ACTIVITY

PROPOSAL SUMMARY

We propose to analyse the changes that the COVID-19 pandemic has induced in Catalan households' waste generation and recycling behaviour and its derived environmental impacts. In this respect, the objective of this project is two-fold: From one side, it aims to generate knowledge regarding the changes experienced and to identify those sociodemographic and psychographic factors that have affected them. From the other, the project aims to translate the experienced changes into environmental indicators, applying a life-cycle perspective, to assess the effects of COVID-19 on climate change.

Our research will pay special attention to those aspects that have the potential of having long-lasting effects on citizens' behaviour, on public recycling policies, and on the environment, aiding to predict citizens future

behaviour and contributing to the development of enhanced waste reduction programs and waste collection systems.

The ultimate aim of the project is to generate knowledge that contributes to the urgent need to mitigate the environmental impacts of waste, with the objective to enhance Planetary Wellbeing.

SOCIAL PROBLEM AND RESEARCH OBJECTIVES

Attention towards policies aiming to prevent environmental deterioration has grown. The European New Circular Economy Action Plan to devote substantial Covid-19 recovery resources to achieve climate-neutrality by 2050 contemplates the enhancement of waste management systems to recover, reuse or recycle materials (EC, 2020). In Catalonia, according to the last statistics from the *Agencia de Residus de Catalunya*, the amount of municipal waste recovered is about 38% (ARC, 2019). This is far from the target of the new Waste Directive (2018/852) to increase to a minimum of 65% by weight preparation for re-use and recycling of municipal waste by 2035.

The waste collection system is a municipal responsibility. In Catalonia it is mainly articulated by means of kerbside containers, including mixed and selective collection bins, or by a door-to-door collection system, although other strategies such as pneumatic collection or the return of packages to point of sales have also been implemented in certain municipalities or areas. Apart from that, there is a network of binning points (“deixalleries”, in Catalan) where citizens can also deposit their waste. Regarding packaging waste, it is managed by an Extended Product Responsibility Scheme (EPRS) articulated via a Green Dot (following the European Directive 94/62/EC, amended by Directive 2018/852, and the National Packaging Waste Act 11/97) and managed by Ecoembes (for paper and light packaging) and Ecodidrio (for glass packaging). These organizations collect the money from the packaging producers and distribute it among the municipalities to defray the cost of the separate collection. The rest of the cost of the collection service is paid through municipal taxes.

The efficacy and efficiency of waste management systems to recover, treat and recycle materials, critically depends on citizens' engagement. In the context of COVID-19, the daily lives of citizens, their consumption patterns, and, with these, their recycling behaviour, have dramatically changed, forcing public authorities and waste operators to rapidly adapt their systems and procedures (ACR+, 2020). This project aims to analyse the changes that COVID-19 has induced in Catalan households' waste generation and recycling behaviour, the factors that have had a contribution or affected these changes, and the environmental implications of these changes.

The main objectives of the proposed research are:

1. Analysing the waste generation and recycling trends in Catalan municipalities prior to the disruption of COVID-19 and afterwards, and translating these results into carbon footprint emissions, in order to analyse the contribution of the experienced changes in citizens' behaviour on climate change.

2. Analysing the factors that affect citizens' waste separation and recycling habits and the changes these have experienced due to Covid-19. These comprise changes in: a) Consumption patterns and waste generation, b) Attitudes towards recycling; c) Incentives and experienced (in)convenience of recycling d) Public information regarding the process and relevance of recycling.
3. Distilling the insights that can be gained from the changes that households' waste recycling has experienced during the COVID-19 crisis. Analysing the changes that have the potential to last and the learnings that can be obtained to enhance waste management policies in the longer term whilst linking them with the potential to reduce climate change emissions.

BACKGROUND AND INNOVATION OF THE PROPOSAL

The sociodemographic, psychological, cognitive and contextual determinants of households' recycling behaviour have been extensively studied in the environmental management literature. The analysis of factors affecting engagement and participation in recycling is a cornerstone to evaluate the suitability of alternative recycling systems (e.g. McCarthy and Shrum, 2001; Valle et al, 2004; Vicente and Reis, 2008; Ertz, 2016). There are very few studies prior to the Covid-19 crisis that analyse households' recycling behaviour in the Spanish context (Ecoembes, 2014; OCU, 2019).

We will contribute to the existing literature by assessing how the deep disruption caused by Covid-19 has altered household's participation in the Catalan selective waste collection system and the long-term consequences of these changes, linking them with climate change. In the first phase of the study we will identify those factors that affect recycling behaviour and have been substantially altered with Covid-19. The results of the analysis of public data and the results of the households' survey to be conducted analysing the effects of Covid-19 on waste disposal behaviour, its determinants, and the implication on climate change will be disseminated in an academic article. The project is intended to, on the one hand, contribute to the academic waste management and behavioural literature, and, on the other, to provide valuable insight to waste management authorities to improve the efficiency of waste management programs.

RESEARCH PHASES AND METHODOLOGY

We next describe the methodology proposed at each stage of the project:

PHASE 0: KICKOFF – ORGANIZATION AND SETTING CRITERIA

PHASE 1. IMPACTS' ASSESSMENT BASED ON SECONDARY DATA:

PHASE 1.1. Data search: We will compile existing public data (i.e. Catalan Waste Agency and IDESCAT) on consumption patterns, waste generation, waste composition and recycling rates in Catalonia before and after COVID-19.

PHASE 1.2. Analysis of changes in waste recycling rates: We will analyse the changes that Covid-19 has induced in Catalonia related to waste generation and treatment in different geographic areas.

PHASE 1.3. Computing CO2 emissions: We will translate the changes in recycling rates into CO2 emissions by applying Life Cycle Assessment methodology and using the prior experience and models developed by the UNESCO Chair in Life Cycle and Climate Change of ESCI-UPF.

PHASE 2: HOUSEHOLDS' SURVEY: a survey of a representative sample of Catalan households will be conducted to estimate and analyse the changes experienced in consumption, waste generation and waste disposal and how the different factors that affect recycling behaviour have been modified as a result of Covid-19. In particular, the survey will explore:

- Changes in consumption patterns, leading to changes in the composition of waste and the fractions to be managed in Catalan households (including the need to manage medical waste).
- Changes in the societal and individual values, citizens' motivation and attitudes that foster recycling behaviour.
- Changes in the incentives, perceived opportunities and experienced (in)convenience of recycling associated with the specific features of the Catalan selective waste collection system.
- Impact of the amount of information that the public has regarding the procedures to be followed to manage waste and regarding the relevance of recycling.

While originally designed by our research methodology experts, we intend that the survey will be administered by a demoscopic accredited research institute to ensure the sociodemographic and geographic representativity of results which enable a stratification and clustering of results by geographical and sociodemographic variables.

Survey Technical characteristics:

Survey type: desirably CATI (Computer Assisted Telephone Interviews).

Population: Catalan households.

Territorial scope: Catalonia.

Sample size: minimum 800 to ensure representativeness and have some possibility of segmenting results.

Duration of the questionnaire: maximum 15 minutes.

Survey design phases:

PHASE 2.1. Questionnaire design: Design of the data collection protocol.

PHASE 2.2. Population and sampling plan: defining the objective population, segmentation variables to be represented and sampling plan.

PHASE 2.3. Survey pilot: testing and adjusting the questionnaire.

PHASE 2.4. Data collection: obtaining responses of a representative samples. This activity will be subcontracted to a research institute.

PHASE 2.5. Data depuration and descriptive statistics: cleaning of the dataset and explorative analysis of the main results of the survey.

PHASE 3: ADVANCED ANALYSIS OF THE SURVEY RESULTS: Besides exploratory data analysis, the appropriate statistical multivariate techniques will be used to analyse the results of the survey, also at an inferential level. The following techniques will be considered to pursue the described objectives:

- **Cluster analysis:** used to identify distinctive groups of citizens depending on their behaviour and socio demographic characteristics.
- **Factor/Principal Component analysis:** to synthesize the interrelation between the factors that explain recycling behaviour by reducing the dimensionality of data to fewer explanatory dimensions.
- **Correlation / Multiple regression analysis:** to explain and quantify the dependencies between recycling behaviour and factors such as the sociodemographic characteristics, attitudes towards the environment perceived inconvenience of the recycling mechanism, perceived social pressures, etc. as well as the impact of Covid-19 on these measures.

PHASE 4: CONCLUSIONS, RECOMMENDATIONS AND DISSEMINATION: The results of the environmental impact assessment and its link with the sociodemographic factors affecting it will be aimed at publishing an academic article to be submitted to an internationally recognised Peer-review Journal (such as, Environment and Behaviour, Journal of Environmental Management, Waste Management, Journal of Cleaner Production or Sustainability). Moreover, the results will be analysed with the additional aim to provide specific recommendations to public authorities in order to enhance waste collection mechanisms. We will consider potential recommendations regarding changes in the waste collection and recycling mechanisms, the existing incentives to recycle or the information provided to the public, as well as changes in the regulatory framework.

The insights gained with the proposed study are thus relevant both at an academic and at a practical level. Academically, the study aims to contribute to our understanding of factors affecting household waste disposal attitudes which determine the efficiency and desirability of alternative waste collection programs and policies and the derived environmental impacts. This is in turn relevant to policymakers that can adjust waste collection systems, technologies and programs, as well as their communication campaigns to engage citizens in recycling. Moreover, the study will contribute to the analysis of factors affecting the urgent need to change citizens' behaviour regarding waste generation and management to mitigate waste environmental impacts in terms of climate change, one of the priority areas of the UPF Planetary Wellbeing initiative.

PHASE 5: FURTHER RESEARCH AND INTERNATIONALIZATION: While the project will be centred on the analysis of waste behaviour and management changes experienced in the Catalan territory as a result of Covid-19, this project is born with a determined objective to extend the analysis to the European domain and to apply for international research competitive programs. The ultimate aim of our research line is to generate insights that are relevant for the implementation of European directives that aid in the progress of more sustainable waste management policies to contribute to waste reduction and to enhance recycling. The extension of this project fits the objectives of the new *Horizon Europe Work Programme 2021-2022. Food, Bioeconomy, Natural Resources, Agriculture and Environment* as well as the ones of the *Organization for Economic Co-operation and Development (OECD)'s Programme on the Circular Economy in Cities and Regions* and the *European Social Fund programme (2021-2027)*.

EXPERIENCE BY THE RESEARCH GROUP AND MULTIDISCIPLINARITY OF THE PROPOSAL

The research team includes experts in operations and logistics (Jesica de Armas), research design and multivariate statistics (Jaume Garcia, Mohamad Ghaderi, and Mercè Roca), and environmentalists (Pere Fullana and Alba Bala). These different disciplines are to be combined and integrated in developing the highly multidisciplinary research hereby proposed. Moreover, several of the team researchers have already published academic work linked to the analysis of the environmental, economic, and social impacts associated to waste recycling and management under the *ESCI-UPF UNESCO Chair in Life Cycle and Climate Change*. This expertise combined with the analytical techniques of the researchers of the *UPF Business Analytics Research Group (BARG)* will be critical to develop the proposed research activities.

2. WORKING PLAN

The following table describes the working plan and provides an approximate duration for the different phases of the project.

PHASE 0: KICKOFF MEETING – ORGANIZATION AND SETTING CRITERIA

Month 1

PHASE 1. IMPACTS' ASSESSMENT BASED ON SECONDARY DATA:

PHASE 1.1. Data search

PHASE 1.2. Analysis of changes in waste recycling rates

PHASE 1.3. Computing CO2 emissions

Months 1 to 6

PHASE 2: HOUSEHOLDS' SURVEY

PHASE 2.1. Questionnaire design
PHASE 2.2. Population and sampling plan
PHASE 2.3. Survey pilot
PHASE 2.4. Data collection (subcontracted)
PHASE 2.5. Data cleaning and descriptive statistics

Months 7 to 13

PHASE 3: ADVANCED ANALYSIS OF THE SURVEY RESULTS

Months 14 to 18

PHASE 4: CONCLUSIONS, RECOMMENDATIONS AND DISSEMINATION

Months 18 to 24

PHASE 5: FURTHER RESEARCH AND INTERNATIONALIZATION

Months 18 to 24



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Education

2012 – Ph.D in Computer Science. Universidad de La Laguna. Santa Cruz de Tenerife.

Spain 2009 – Research Proficiency. Universidad de La Laguna. Santa Cruz de Tenerife.

Spain 2007 – Computer Engineering. Universidad de La Laguna. Santa Cruz de Tenerife. Spain

2005 – Technical Computer Engineering. Universidad de La Laguna. Santa Cruz de Tenerife. Spain

Positions

Since 09/2017 Tenure Track. Department of Economics and Business, Universitat Pompeu Fabra, Barcelona, Spain.

09/2016-09/2017 Visiting Professor. Department of Economics and Business, Universitat Pompeu Fabra, Barcelona, Spain.

04/2015-09/2016 Postdoc Researcher. Computer Science Department, Universitat Oberta de Catalunya. Spain. 03/2015-04/2015 Postdoc Researcher. Computers and Systems Engineering Department. Universidad de La Laguna. Spain.

11/2013-09/2014 Postdoc Researcher. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

06/2012-05/2013 Postdoc Researcher. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

09/2008-06/2012 FPU Grant Researcher. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

03/2008-08/2008 CajaCanarias Fellowship Researcher. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

10/2007-01/2008 Researcher. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

09/2006-09/2007 Collaboration Fellowship. Statistics, Operations Research and Computer Science Department. Universidad de La Laguna. Spain.

Research

ResearcherID: F-1537-2014 ORCID: 0000-0002-7619-7407

Google Scholar: h-index 5, citations 93 (May 19th, 2017)

Areas of Research: Combinatorial Optimization, Metaheuristics, Scheduling, Operations Research, Artificial Intelligence, Vehicle Routing, Logistics, Transportation

Research Stays

1. University Colorado Boulder, Boulder, Colorado, USA. 13/07/2017. 1 month
2. University of Nottingham, Nottingham, UK. 14/10/2014. 1 month.
3. University of Calabria, Cosenza, Italy Fecha 21/07/2014. 1 week.
4. Edinburgh Parallel Computing Center. Edimburg. 03/05/2011. 3 months.

Awards

1. PhD Award from AEPIA (Asociación Española para la Inteligencia Artificial) 05/09/2014
2. PhD Extraordinary Award. Universidad de La Laguna. 27/06/2012
3. Special Award End of Computer Science Degree. Universidad de La Laguna. 17/09/2005

Technological transference

Technology Transfer Software for Vehicle Route Optimization
Universidad de La Laguna, Spain - Ingeniería Electronica Canarias S.L., Spain.
27/06/2012 – 1 year.

Publications

Journals:

1. Laura Calvet, Jesica de Armas, David Masip, Angel A Juan. Learnheuristics: hybridizing metaheuristics with machine learning for optimization problems with dynamic inputs. *Open Mathematics*. 15(1). pp. 261-280. 2017. Q4.
2. Jesica de Armas, Angel A. Juan, Joan M. Marquès, João Pedro Pedrosa. A Simheuristic Algorithm for the Uncapacitated Facility Location Problem with Stochastic Demands. *Journal of Operational Research Society*. pp.1- 16. 2016. Q2.
3. Jesica de Armas, Luis Cadarso, Angel A Juan, Javier Faulin. A multi-start randomized heuristic for real-life crew rostering problems in airlines with work-balancing goals. *Annals of Operations Research*, pp. 1-24. 2016. Q2.
4. Angel A. Juan, Carlos A. Mendez, Javier Faulin, Jesica de Armas, Scott E. Grasman. Electric Vehicles in Logistics and Transportation: A Survey on Emerging Environmental, Strategic, and Operational Challenges. *Energies* 2016, 9, 86. Q2.
5. Christopher Expósito Izquierdo; Eduardo Lalla Ruiz; Jesica de Armas Adrian; Belén Melián Batista; Marcos Moreno Vega. A Heuristic Algorithm based on an Improvement Strategy to Exploit Idle Time Periods for the Stacking Problem. *Computers & Industrial Engineering*. 87, pp. 410 - 424. 01/09/2015. ISSN 0360-8352. Q1.
6. Jesica de Armas Adrián; Eduardo Lalla Ruiz; Belen Melian Batista; Darío Landa Silva. A Hybrid GRASP-VNS for Ship Routing and Scheduling Problem with Discretized Time Windows. *Engineering Applications of Artificial Intelligence*. 45, pp. 350-360, 2015. Q1.
7. Jesica de Armas Adrian; Belén Melián Batista. Variable Neighborhood Search for a Dynamic Rich Vehicle Routing Problem with Time Windows. *Computers & Industrial Engineering*. 85, pp. 120 - 131. 23/07/2015. ISSN 0360-8352 . Q1.

8. Eduardo Lalla Ruiz; Jesica de Armas Adrian; Christopher Exposito Izquierdo; Belen Melian Batista; Marcos Moreno Vega. Multi-Leader Migrating Birds Optimization. *International Journal of Bio-Inspired Computation*. Accepted, to appear, 01/07/2015. Q1.
9. Jesica de Armas Adrián; Belén Melián Batista. GVNS for a Real-World Rich Vehicle Routing Problem with Time Windows. *Engineering Applications of Artificial Intelligence*. 42, pp. 45 - 56. 01/06/2015. ISSN 0952-1976. Q1.
10. Eduardo Lalla Ruiz; Christopher Exposito Izquierdo; Jesica de Armas Adrian; Belen Melian Batista; Marcos Moreno Vega. Migrating Birds Optimization for the Seaside Problems at Maritime Container Terminals. *Journal of Applied Mathematics*. 781907, 27/05/2015. SCOPUS (SJR) impact factor 0.72.
11. Jesica de Armas; Belén Melian Batista. Constrained Dynamic Vehicle Routing Problems with Time Windows. *Soft Computing*. 19 - 9, pp. 2481 - 2498. 06/01/2015. Q2.
12. Jesica de Armas; Miranda, Gara; León, Coromoto. Improving the efficiency of a best-first bottom-up approach for the constrained 2D cutting problem. *European Journal of Operational Research*. 219 - 0, pp. 201 - 213. 2012. ISSN 0377-2217 Impact factor 2.038, Q1.
13. Jéscica de Armas, Gara Miranda, Coromoto León, Carlos Segura. Optimisation of a multi-objective two- dimensional strip packing problem based on evolutionary algorithms. *International Journal of Production Research*. 48 - 7, pp. 2011 - 2028. 2009. ISSN 1478-6451. Impact factor 0.803. Q3.
14. Jéscica de Armas; León, Coromoto; Miranda, Gara; Segura, Carlos. Remote service to solve the two-dimensional cutting stock problem: an application to the canary islands costume. *International Journal of Web and Grid Services (IJWGS)*. 4 - 3, pp. 342 - 351. InderScience Publisher, 2008. ISSN 1741-1106. Impact factor 0.978, Q3.

Journals Under Review:

1. Aljoscha Gruler, Javier Panadero, Jesica de Armas, Jose A. Moreno-Pérez, Angel A. Juan. Combining variable neighborhood search with simulation for the inventory routing problem with stochastic demands and stock-outs. *Computers & Industrial Engineering*. Q1.
2. Manuel Chica, Joaquín Bautista, Jesica de Armas. Benefits of robust multiobjective optimization for flexible automotive assembly line balancing. *Flexible Services and Manufacturing Journal*. Q2.
3. Alex Grasas, Angel A. Juan, Javier Faulin, Jesica de Armas, Helena Ramalinho. Biased Randomization of Heuristics: supporting real-time decision making in transportation, logistics, and production. *Computers and Industrial Engineering*. Q1.
4. Aljoscha Gruler, Jesica de Armas, Angel A. Juan. Modeling Human Behavior in Social Networks: a survey and the need for simheuristics. *International Journal of Production Research*. Q2.
5. Jesica de Armas, Albert Ferrer, Angel A. Juan. A Biased Randomized Heuristic for Non-smooth Arc Routing Problems. *European journal of Production Research*. Q1.
6. Jesica de Armas, Peter Keenan, Angel A. Juan, Sean McGarraghy. Solving Large-

Scale Time Capacitated Arc Routing Problems: from real-time heuristics to metaheuristics. *Annals of Operations Research*. Q2.

7. Laura Calvet, Madeleine Lopeman, Jesica de Armas, Guillermo Franco, Angel A. Juan. Statistical and Machine Learning Approaches for the Minimization of Trigger Errors in Earthquake Catastrophe Bonds. *Computational Statistics and Data Analysis*. Q2.

8. Jesica de Armas, Belén Melián-Batista, Julio Brito. A Metaheuristic Approach for the Intermodal Vehicle Routing Problem with Time Windows. *Engineering Application of Artificial Intelligence*. Q1.

Book Chapter:

Christopher Expósito-Izquierdo, Eduardo Lalla-Ruiz, Jesica de Armas, Belén Melián-Batista, and J. Marcos Moreno-Vega. Maritime Container Terminal Problems. *Handbook of Heuristics*, 2017. DOI 10.1007/978-3-319-07153-4_57-1.

Congress Contributions:

1. Gabriel Alemany; Alvaro García-Sánchez; Jesica de Armas; Angel A. Juan; Roberto García-Meizoso; Miguel Ortega-Mier. Combining Monte Carlo Simulation with Heuristics to Solve a Rich and Real-life Multi-depot Vehicle Routing Problem. *Winter Simulation Conference 2016*. Washington, USA. 11/12/2016. ISBN 978-1-5090-4485-6

2. Xavier Serra; Jesica de Armas; Joan Manuel Mårques. Simulating and Optimizing Resource Allocation in a Micro-blogging Application. *Winter Simulation Conference 2016*. Washington, USA. 11/12/2016. ISBN 978-1-5090-4485-6

3. Angel A. Juan; Manuel Chica; Jesica de Armas; David Kelton. Simheuristics: a method of first resort for solving real-life combinatorial optimization problems. *OR58 Annual Conference*. Portsmouth, UK. 06/09/2016. pp. 147 - 156. ISBN 978-0-903440-60-8

4. Alba Agustín, Alioscha Gruler, Jesica de Armas, Angel A. Juan. Optimizing Airline Crew Scheduling Using Biased Randomization: A Case Study. *Conference of the Spanish Association for Artificial Intelligence*, 331-340. 2016. ISSN 0302-9743, ISBN 978-3-319-44635-6

5. Alioscha Gruler, Jesica de Armas, Angel A. Juan. Behavioral Factors in City Logistics from an Operations Research Perspective. *International Conference on Smart Cities*, 32-41. 2016.

6. Laura Calvet, Renatas Kizys, Angel A. Juan, Jesica de Armas. A SimILS-Based Methodology for a Portfolio Optimization Problem with Stochastic Returns Modeling and Simulation in Engineering, Economics and Management, 3-11. 2016.

7. Jesica de Armas, Laura Calvet, Guillermo Franco, Madeleine Lopeman, Angel A. Juan. Minimizing Trigger Error in Parametric Earthquake Catastrophe Bonds via Statistical Approaches. *Modeling and Simulation in Engineering, Economics and Management*, 167-175. 2016.

8. Jesica De Armas, Pere Tuset, Tengfei Chang, Ferran Adelantado, Thomas Watteyne,

et al.. Determinism Through Path Diversity: Why Packet Replication Makes Sense. International Conference on Intelligent Networking and Collaborative Systems (INCoS), Sep 2016, Ostrava, Czech Republic, France.

9. A Multi-Stage Approach Aimed at Optimizing the Transshipment of Containers in a Maritime Container Terminal. Eurocast 2015. Las Palmas, Canarias, Spain. 08/02/2015 - 13/02/2015 Christopher Expósito Izquierdo; Jesica de Armas Adrian; Eduardo Lalla Ruiz; Belén Melián Batista; J.Marcos Moreno Vega.

10. Intermodal Dynamic Vehicle Routing Problem. Eurocast 2015. Las Palmas, Canarias, Spain. 08/02/2015 - 13/02/2015 Jérica de Armas Adrián; Belén Melián Batista; Julio Brito Santana.

11. Búsqueda por Entornos Variables para el Problema de Asignación de Atraques. MAEB 2015: Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados. Mérida, Extremadura, Spain. 04/02/2015 - 06/02/2015.

Christopher Expósito Izquierdo; Eduardo Lalla Ruiz; Jesica de Armas Adrian; Belén Melián Batista; J. Marcos Moreno Vega. ISBN 978-84-697-2150-6.

12. Modelado del Transbordo de Contenedores en una Terminal Marítima de Contenedores. MAEB 2015: Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados. Mérida, Extremadura, Spain. 04/02/2015-06/02/2015. Christopher Expósito Izquierdo; Jesica de Armas Adrian; Eduardo Lalla Ruiz; Belén Melián Batista; J. Marcos Moreno Vega. ISBN 978-84-697-2150-6.

13. Un Problema Real de Planificación de Rutas de Vehículos con Intermodalidad. MAEB 2015: Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados. Mérida, Extremadura, Spain. 04/02/2015 - 06/02/2015. Jesica de Armas Adrian; Eduardo Lalla Ruiz; Christopher Expósito Izquierdo; Belén Melián Batista; Julio Brito Santana. ISBN 978-84-697-2150-6.

14. An Solution GVNS for an Intermodal VRPTW. META 2014: International Conference on Metaheuristics and Nature Inspired Computing Ciudad de celebración: Marrakech, Marruecos. 27/10/2014 - 31/10/2014 Jesica de Armas Adrián; Julio Brito Santana; Belén Melián Batista.

15. Híbrido basado en VNS para la Planificación real de Rutas de Vehículos con Ventanas de tiempo. MAEB 2013: IX Congreso Español de Metaheurísticas, Algoritmos Evolutivos y Bioinspirados. Madrid, Spain. 16/09/2013. Jesica de Armas Adrián; Belén Melián Batista; José Andrés Moreno Pérez. ISBN 978-84-695-8348-7

16. Constrained Dynamic Vehicle Routing Problem with Time Windows. VeRoLog 2013. Southampton, Reino Unido 07/07/2013 - 10/07/2013. University of Southampton. UK. Jesica de Armas Adrián; Belén Melián Batista; José A. Moreno Pérez.

17. Multiobjective Restricted Dynamic Vehicle Routing Problem with time Windows. International Workshop on locational Analysis and Related Problems. Málaga, Andalucía, Spain. 19/06/2013 - 21/06/2013 Jérica de Armas Adrián; Belén Melián Batista; José Andrés Moreno Pérez.

18. Multi-Objective Restricted Dynamic Vehicle Routing Problem with Time Windows. 22nd International Conference on Multiple Criteria Decision Making. Málaga, Andalucía, Spain. 17/06/2013 - 21/06/2013. Universidad de Málaga. Jesica de Armas

Adrián; Belén Melián Batista; José A. Moreno Pérez.

19. Restricted Dynamic Heterogeneous Fleet Vehicle Routing Problem with Time Windows. IWANN 2013: International Work Conference on Artificial Neural Networks. Puerto de la Cruz, Canarias, Spain. 12/06/2013 - 14/06/2013. Jesica de Armas Adrián; Belén Melián Batista; José A. Moreno Pérez. 2, pp. 36 - 45. 14/06/2013. ISSN 0302-9743

20. Parallelization of the Multi-objective Container Loading Problem. CEC 2012: IEEE Congress on Evolutionary Computation. Brisbane, Australia. 10/06/2015 - 15/06/2012. Jéscica de Armas Adrián; Yanira González González; Gara Miranda Valladares; Coromoto León Hernández. ISBN 978-1-4673-1508-1

21. Comparing Encoding Schemes for Multi-objective Two-dimensional Guillotine Cutting Problems. 9th ESICUP Meeting. San Cristobal de La Laguna, Canarias, Spain. 21/03/2012 - 23/03/2012. Jéscica de Armas Adrián; Gara Miranda Valladares; Coromoto León Hernández.

22. Parallel Models for the Multi-Objective Container Loading Problem. 9th ESICUP Meeting. San Cristobal de La Laguna, Canarias, Spain. 21/03/2012 - 23/03/2012. Yanira González González; Jéscica de Armas Adrián; Gara Miranda Valladares; Coromoto León Hernández.

23. El problema de carga de contenedores: una aproximación paralela y multi-objetivo. MAEB 2012: VIII Congreso Español sobre Metaheurísticas, Algoritmos Evolutivos y Bioinspirados. 08/02/2012. Albacete, Spain. Armas, Jesica de; González, Yanira; Miranda, Gara; León, Coromoto. ISBN 978-84-615-6931-1

24. Hyperheuristic encoding scheme for multi-objective guillotine cutting problems
Nombre del congreso: GECCO 2011: Genetic and Evolutionary Computation Conference. 12/07/2011. Dublin, Ireland Armas, Jesica de; Miranda, Gara; León, Coromoto. ISBN 978-1-4503-0556-0

25. A multi-objective approach for the 2d guillotine cutting stock problem. IWANN 2011: International Work Conference on Artificial Neural Networks. 08/06/2011. Torremolinos, Málaga, Spain. Armas, Jesica de; León, Gara Miranda; Coromoto. ISSN 0302-9743, ISBN 978-3-642-21497-4

26. Two encoding schemes for a multi-objective cutting stock problem. CEC 2011: IEEE Congress on Evolutionary Computation. 05/06/2011. New Orleans, LA Armas, Jesica de; Miranda, Gara; León, Coromoto. ISBN 978-1-4244-7833-0

27. Multi-objective Solution for 2D Guillotine Cutting Stock Problem. 8th ESICUP Meeting. Copenhagen, Dinamarca. 19/05/2011- 21/05/2011 Jéscica de Armas Adrián; Gara Miranda Valladares; Coromoto León Hernández.

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31. Fine and Coarse-grained Parallel Algorithms for the 2D Cutting Stock Problem. 18th Euromicro International Conference on Parallel, Distributed and Network-Based Computing. 17/02/2010. Pisa, Italy. Jéscica de Armas, Coromoto León, Gara Miranda. ISBN 978-0-7695-3939-3

32. A parallel evolutionary approach to solve a multi-objective two-dimensional strip packing problem. 6th esicup meeting. Valencia, Spain. 01/01/2009. Armas, Jesica de; León, Coromoto; Miranda, Gara; Segura, Carlos.

33. Remote service to solve the two-dimensional cutting stock. 2nd international conference on complex, intelligent and software intensive systems. Spain. 04/03/2008 Armas, Jesica de; León, Coromoto; Miranda, Gara; Segura, Carlos. ISBN 0-7695-3109-1

34. Interfaz gráfica de usuario para el problema de corte bidimensional. una aplicación al traje típico de las islas canarias. IX congreso internacional de interacción persona-ordenador. Albacete, Spain. 01/01/2008. Armas, Jesica de; León, Coromoto; Miranda, Gara; Segura, Carlos. ISBN 978-84-691-3871-7

35. Optimización del problema de corte bidimensional multi-objetivo Nombre del congreso: XIX jornadas de paralelismo. Valencia, Spain. 01/01/2008. Armas, Jesica de; León, Coromoto; Miranda, Gara; Segura, Carlos. ISBN 978-84-8021-676-0

36. Optimization of a two-dimensional cutting problem through parallel cooperation of multi-objective evolutionary algorithms. International workshop on state-of-the-art in scientific and parallel computing. 01/01/2008. Armas, Jesica de; León, Coromoto; Miranda, Gara; Segura, Carlos.

37. Interfaz gráfica para el corte del traje de mago de la Orotava. XVII Congreso Español en Informática Gráfica. Zaragoza, Sapin. 11/09/2007. Armas, J. de; León, C.; Miranda, G.; Segura, C."Thomson". ISBN 978-84-9732-595-0

Participation in Research Projects

1. Red de Excelencia en Transporte, Logística, y Producción Inteligente. Main researcher: Angel A. Juan. Spanish Ministry of Economy and Competitiveness. TRA2015-71883-REDT. 2016-2017

2. ComputerCOOP: Computer-based decision support for Horizontal Cooperation in Transportation and Logistics. Main researchers: Angel A. Juan & Joan M. Marques. Spanish Ministry of Economy and Competitiveness. TRA2013-48180-C3-3-P. 2014-2016

3. SmartLogistics@IB: Red Iberoamericana de Logística Inteligente en la Gestión Sostenible del Transporte en Núcleos Urbanos. Main researcher: Javier Faulin. CYTED2014-P514RT0013. 2015-2018

4. iTRANS. Development of an Intelligent System of Planning, Eco-Efficient Management and Dynamic Transport Optimization / iTRANS. Desarrollo de un Sistema Inteligente de Planificación, Gestión Eco-eficiente y Optimización Dinámica del

Transporte. Universidad de La Laguna. Main researcher: María Belén Melián Batista. Ministerio de Industria, Turismo y Comercio Ciudad. TSI-020100-2011-298. 01/11/2011 - 31/10/2012

5. TOP - Parallel Optimization Techniques. Hibridación de computación evolutiva e hiperheurísticas. Universidad de La Laguna. Main researcher: Coromoto León Hernández. Ministerio de Ciencia e Innovación. 01/01/2012 - 1 year.

6. Parallel algorithms and languages / Algoritmos y lenguajes paralelos. Universidad de La Laguna. Main researcher: Coromoto León Hernández. Vicerrectorado de Investigación, Desarrollo Tecnológico e Innovación. ULL. EXP.1341. 28/07/2010 – 5 months

7. Parallel algorithms and languages / Algoritmos y lenguajes paralelos Universidad de La Laguna. Main researcher: Coromoto León Hernández. Vicerrectorado de Investigación, Desarrollo Tecnológico e Innovación. ULL. 180.221.09.04. 01/04/2009 – 9 months.

8. Two-dimensional cutting problem: algorithms and applications / El problema de corte bidimensional: algoritmos y aplicaciones. Universidad de La Laguna. Main researcher: Coromoto León Hernández. Agencia Canaria de Investigación, Innovación y Sociedad de la Información. PI2007/015. 01/03/2009. 3 years.

9. Multiobjective metaheuristics and engineering / metaheurísticas multiobjetivo e ingeniería Main researcher: Coromoto León Hernández. Ministerio de ciencia e innovación. Plan Nacional Cód. según financiadora: TIN2008-06491-C04-02. 31/12/2008 - 3 years.

10. Optimization and network environments / Optimización y ambientes de red Universidad de La Laguna. Main researcher: Coromoto León Hernández. Vicerrectorado de Investigación, Desarrollo Tecnológico e Innovación. ULL. 180.221.07.02. 01/01/2007 -11 months

11. Optimization and network environments / Optimización y ambientes de red Universidad de La Laguna. Main researcher: Coromoto León Hernández. Ministerio de ciencia e innovación. TIN2005-08818-C04-04. 31/12/2005 - 3 years

Advising

1. PhD Thesis. Metaheuristics and Simheuristics for Telecommunication Systems in Smart Cities. Universitat Oberta de Catalunya. Stephanie Álvarez. 22/09/2016-currently.

2. Master Degree Thesis. Metaheuristic algorithms for solving the Multi-depot Arc Routing Problem. Universitat Oberta de Catalunya-Universitat Rovira Virgili. Patricio Page. 22/09/2016-currently.

3. Degree Thesis. VRP enriqueit aplicat al sector del transport d'hidrocarburs. Universitat Oberta de Catalunya. Gabriel Alemany. 22/01/2016

4. Degree Thesis. Ambulance routes on patient groups in response to emergency situations. Universidad de La Laguna. Enrique Tejera González. 25/09/2015

5. Degree Thesis. Simulator, based on heuristics and metaheuristics, for vehicle scheduling problems within a port terminal. Universidad de La Laguna. Bruno Alessio

Bibbó. 24/07/2015

6. Degree Thesis. Optimizing two-dimensional cutting problem using multiobjective metaheuristics. Universidad de Málaga. Rubén López García. 20/12/2009

Teaching Experience

1. Quantitative Methods for Decision-making / Métodos Cuantitativos para la toma de decisiones

Degree in Business and Management / Grado en Empresariales y Management

22/09/2016 - 22/09/2017

Universitat Pompeu Fabra

2. Distributed Systems / Sistemas Distribuidos

Degree in Computer Engineering / Grado en Ingeniería Informática

01/09/2015 – 01/01/2017

Universitat Oberta de Catalunya

3. Algorithms and Data Structures/ Algoritmos y Estructuras de Datos Degree in Computer Engineering / Grado en Ingeniería Informática

26/01/2014 - 30/04/2014

Universidad de La Laguna

1. Basis of Software Engineering/ Fundamentos de Ingeniería del Software

Degree in Computer Engineering / Grado en Ingeniería Informática

26/01/2014 - 14/02/2014

Universidad de La Laguna

5. Basic Computing / Informática Básica

Degree in Computer Engineering / Grado en Ingeniería Informática 01/09/2011 - 01/02/2012

Universidad de La Laguna

6. Distributed Systems Programming / Programación de Sistemas Distribuídos Technical Computer Engineering / Ingeniería Técnica en Informática de Sistemas

01/09/2011 - 01/02/2012

Universidad de La Laguna

7. Basic Computing / Informática Básica

Degree in Computer Engineering / Grado en Ingeniería Informática 01/09/2010 - 01/02/2011

Universidad de La Laguna

7. Design and Analysis of Languages / Diseño y Análisis de Lenguajes

Master in Applied Computer Science / Máster en Ingeniería Informática Aplicada a la Industria, la Ingeniería del Software y a los Sistemas y Tecnologías de la Información

01/09/2010 - 01/02/2011

Universidad de La Laguna

Accreditations

1. Profesor Agregado. AQU: Agència per a la Qualitat del Sistema Universitari de Catalunya. 04/10/2016

2. Profesor Contratado Doctor. ANECA: Agencia Nacional de Evaluación de la Calidad y Acreditación. 03/10/2016

3. Profesor Universidad Privada. ANECA: Agencia Nacional de Evaluación de la Calidad y Acreditación. 03/10/2016
4. Profesor Ayudante Doctor. ANECA: Agencia Nacional de Evaluación de la Calidad y Acreditación. 23/09/2013
5. Profesor Ayudante Doctor. ACECAU: Agencia canaria de calidad universitaria y evaluación educativa. 04/12/2012

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Born in Barcelona (Spain) in September 1st 1956

Education

Licenciado (B.Sc.) in Economics and Business, Universitat de Barcelona, July 1978, (Award of Distinction)

Master of Science in Econometrics and Mathematical Economics, London School of Economics and Political Science, University of London, July 1981 (Award of Distinction).

Ph.D. in Economics, London School of Economics and Political Science, University of London, December 1985. Ph.D. Thesis: 'The Econometric Analysis of Cross-Section and Panel Data Models as Applied to Labour Supply Models'. Thesis advisors: A.C. Harvey, S.J. Nickell and A. Zabalza.

Academic experience:

Assistant Professor, Departament d'Economia i de Història Econòmica, Universitat Autònoma de Barcelona, 1985-1986.

Associate Professor, Departament d'Economia i de Història Econòmica, Universitat Autònoma de Barcelona, 1986-1990.

Associate Professor, Departament d'Economia i Empresa, Universitat Pompeu Fabra, 1990-1991.

Professor, Departament de Economia i Empresa, Universitat Pompeu Fabra, since september 1991.

Teaching experience

Graduate level courses

Econometrics, Microeconometrics, Forecasting Techniques, Topics in Advanced Health Econometrics, Topics in Applied Econometrics, Applied Public Economics

Undergraduate level courses

Data Analysis, Statistics, Applied Economics, Econometrics I, Econometrics II, Econometrics III, Forecasting Techniques, Advanced Econometrics, Quantitative Methods, Applied Econometrics

Institutions where graduate courses were taught

Universitat Pompeu Fabra, Barcelona Graduate School of Economics, Universitat Autònoma de Barcelona, Universitat de Barcelona, CEMFI, Instituto de Estudios Fiscales, Universitat de València, Universidad de Las Palmas de Gran Canaria, El Colegio de México, Universitat de les Illes Balears, Instituto I+E, University of Zurich, St. Petersburg School of Economics and Management.

Fields of interest

Microeconometrics, Labour Economics, Sports Economics, Health Economics, Housing Economics, Official Statistics

Publications

Articles

'Causalidad y Exogeneidad en Econometría', *Cuadernos Económicos de ICE*, 24, 81-102, 1983 (with M. Arellano).

'Principales Rasgos del Desempleo Masculino en España', *Papeles de Economía Española*, 26, 91-107, 1986 (with C. Polo and J.L. Raymond).

'Factores Explicativos de la Demanda de Empleo', *Papeles de Economía Española*, 26, 180-195, 1986 (with C. Polo and J.L. Raymond).

'Empleo e Inversión en la Economía Española: 1955-1984', *Papeles de Economía Española*, 26, 200-216, 1986 (with C. Polo and J.L. Raymond).

'La Detección del Fraude en la Imposición sobre la Renta: Un Análisis Microeconómico', *Cuadernos Económicos de ICE*, 34, 45-63, 1986 (with J.L. Raymond and T. Valdés).

'Una Nota sobre la Relación Empleo-Capital en España: 1955-1984', *Investigaciones Económicas*, 12, 177-195, 1988 (with C. Polo and J.L. Raymond).

'Una Aproximación al Coste de Eficiencia de la Tributación Familiar en España', *Moneda y Crédito*, 188, 211-236, 1989 (with J.M. González-Páramo and A. Zabalza).

'Creixement del Producte Interior Brut a Catalunya: Avaluació a partir d'Indicadors de

Conjuntura', *Nota d'Economia*, 35, 39-45, 1989 (with T. García-Milà, S. Jiménez and J.L. Raymond).

'La Incidencia y la Duración del Desempleo Masculino en España', *Moneda y Crédito*, 189, 75-124, 1989 (with J. Andrés and S. Jiménez).

'La Restricción de Oferta de Trabajo en la Economía Española', *Revista de Economía*, 4, 29-34, 1990 (with J. Andrés).

'Algunes Consideracions sobre el Mercat de Treball a Catalunya', *Revista Econòmica de Catalunya*, 15, 21-33, 1990 (with J. Bosch, S. Jiménez and D. Vegara).

'Una Interpretación de las Diferencias Salariales entre Sectores', *Investigaciones Económicas*, 15, 143-167, 1991 (with J. Andrés).

'A Participation Model with Non-Convex Budget Sets: the Case of the Wives of the Unemployed in Great Britain', *Applied Economics*, 23, 1401-1416, 1991.

'Métodos de Estimación de Modelos de Oferta de Trabajo Basados en la Predicción de los Salarios', *Investigaciones Económicas*, 15, 429-455, 1991.

'El Nivel de Estudios como Factor Explicativo del Desempleo, de los Ingresos y de la Movilidad Laboral', *Economía Industrial*, 278, 13-22, 1991 (with J. Andrés).

'Determinación de Salarios, Productividad y Empleo. Evidencia para la Economía Española', *De Economía Pública*, 11, 169-190, 1991 (with J. Andrés).

'Alternative Approaches to Modelling Zero Expenditures: An Application to Spanish Demand for Tobacco', *Oxford Bulletin of Economics and Statistics*, 58, 489-506, 1996 (with J.M. Labeaga)

'Diferencias salariales entre sector público y sector privado en España', *Papeles de Economía Española*, 72, 261-274, 1997 (with P. J. Hernández and A. López)

'Análisis microeconómico de los efectos de cambios en el sistema impositivo y de prestaciones sociales', *Moneda y Crédito*, 204, 67-92, 1997 (with J.M. Labeaga and A. López)

'How Wide is the Gap?. An Investigation of Gender Wage Differences using Quantile Regression', *Empirical Economics*, 26, 149-167, 2001 (with P.J. Hernández and A. López) [reprinted in *Economic Applications of Quantile Regression*, B. Fitzenberger, R. Koehler and J.A.F. Machado (eds.), Springer-Verlag, 149-167, 2002]

'The Determinants of Football Match Attendance Revisited. Empirical Evidence from the Spanish Football League', *Journal of Sports Economics*, 3, 18-38, 2002 (with P. Rodríguez) [reprinted in *The Economics of Association Football, Vol. II*, B. Gerrard (ed.), Edward Elgar Publishing, Ch. 23, 2006]

'La reforma del IRPF y la oferta laboral de las mujeres casadas', *Revista de Economía Aplicada*, 10, 53-77, 2002 (with M.J. Suárez)

'Determinación de las ofertas iniciales en la negociación de salarios en España', *Cuadernos Económicos de ICE*, 66, 107-127, 2002 (with S. Jiménez)

'Cautividad y demanda de seguros sanitarios privados', *Cuadernos Económicos de ICE*,

66, 71-87, 2002 (with J. Costa)

'Female Labour Supply and Income Taxation in Spain', *Hacienda Pública Española*, 164, 9-27, 2003 (with M.J. Suárez)

'The Demand for Private Health Insurance. How Important is the Quality Gap?', *Health Economics*, 12, 587-599, 2003 (with J. Costa)

'From Sports Clubs to Stock Companies: Financial Structure in Spanish Football', *European Sport Management Quarterly*, 3, 253-269, 2003 (with P. Rodríguez)

'Measuring Socio-economic Health Inequalities: Fiction or Reality?', *International Journal of Social Economics*, 30, 883-892, 2003 (with J. Costa)

'Análisis Empírico de la demanda en los deportes profesionales: un panorama', *Revista Asturiana de Economía*, 26, 23-60, 2003 (with P. Rodríguez)

'¿Es el balance competitivo la solución óptima para las ligas profesionales?', *Revista Econòmica de Catalunya*, 51, 70-81, 2005 (with P. Rodríguez and J. Lejarraga)

'Precios de la vivienda y localización: Evidencia empírica para la ciudad de Barcelona', *Papeles de Economía Española*, 109, 125-139, 2006 (with A. Matas, J.M. Raya and J.L. Raymond)

'La fiscalidad sobre la renta y el régimen de tenencia de la vivienda. Un análisis empírico para el caso español', *Papeles de Economía Española*, 109, 198-213, 2006 (with J.M. Raya)

'The Evolution of Adult Height in Europe: A Brief Note', *Economics and Human Biology*, 5, 340-349, 2007 (with C. Quintana)

"Mercat de treball: informació complementària per a un millor aprofitament de les taules input-output de Catalunya", *Nota d'Economia*, 87, 179-198, 2007 (with J. Bosch, L. Díaz and S. Solanas)

'The Demand for Football Pools in Spain: The Role of Price, Prizes and the Composition of the Coupon', *Journal of Sports Economics*, 8, 334-354, 2007 (with P. Rodríguez)

'Football Pool Sales: How Important is a Football Club in the Top Divisions?', *International Journal of Sport Finance*, 3, 167-176, 2008 (with L. Pérez and P. Rodríguez) [reprinted in *Recent Developments in the Economics of Sport, Vol. I*, W. Andreff (ed.), Edward Elgar Publishing, 157-166, 2011]

'Income and Body Mass Index in Europe', *Economics and Human Biology*, 7, 73-83, 2009 (with C. Quintana)

'Sports Attendance: A Survey of the Literature 1973-2007', *Rivista di Diritto ed Economia Dello Sport*, 5, 111-151, 2009 (with P. Rodríguez)

'Risk Attitudes and the Demand for Private Health Insurance: The Importance of Captive Preferences', *Annals of Public and Cooperative Economics*, 80, 499-519, 2009 (with J. Costa)

'Local Public Expenditures and Housing Prices', *Urban Studies*, 47, 1501-1512, 2010 (with D. Montoliu and J.M. Raya)

'Initial Offers and Outcomes in Wage Bargaining: Who Wins?', *Empirical Economics*, 39, 815-846, 2010 (with S. Jiménez)

'La estadística regional en España y la colaboración institucional en estadística oficial', *Información Estadística de Andalucía (2ª época)*, 1, 27-29, 2010 (with A. Costa)

'La estadística oficial como bien público en una sociedad democrática', *Índice*, 43, 5-7, 2010 (with M. Gómez)

'Price and Income Elasticities of Demand for Housing Characteristics in the City of Barcelona', *Regional Studies*, 45, 597-608, 2011 (with J.M. Raya)

'Los cambios en la realidad socio-económica y la estadística oficial: el caso del Índice de Precios de Consumo', *Boletín de Inflación y Análisis Macroeconómico*, 200, 48-53, 2011 (with I. González)

'The Willingness to Pay to Keep a Football Club in a City: How Important are the Methodological Issues?', *Journal of Sports Economics*, 12, 464-486, 2011 (with P. Castellanos and J.M. Sánchez)

'Estimation of a Structural Model of the Determinants of the Time Spent on Physical Activity and Sport: Evidence for Spain', *Journal of Sports Economics*, 12, 515-537, 2011 (with F. Lera and M.J. Suárez)

'First World Statistics Day and the INE Contributions to the Achievements of Official Statistics in Spain', *Boletín de Estadística e Investigación Operativa*, 27, 74-81, 2011 (with M.A. de Castro)

'Which Are the Real Determinants of Tenure? A Comparative Analysis of Different Models of the Tenure Choice of a House', *Urban Studies*, 49, 3645-3662, 2012 (with J.M. Raya)

'La estadística oficial como bien público: retos del presente', *Revista Asturiana de Economía*, 46, 61-85, 2012

'La (inelástica) demanda de juegos *lotto* en España", *Revista de Economía Aplicada*, 21, 91-113, 2013 (with L. Pérez and P. Rodríguez)

'Economic crisis, sport success and willingness to pay', *Sport, Business and Management. An International Journal*, 4, 237-249, 2014 (with P. Castellanos and J.M. Sánchez)

'Are All Quality Dimensions of Equal Importance when Measuring the Perceived Quality of Official Statistics? Evidence from Spain', *Journal of Official Statistics*, 30, 547-562, 2014 (with A. Costa and J.L. Raymond)

'The real estate and the credit bubble: evidence from Spain', *SERIEs*, 5, 223-243, 2014 (with O. Akin, J.M. García-Montalvo, J.L. Peydró and J.M. Raya) [Award to the best paper published in *SERIEs*, the Journal of the Spanish Economic Association, during the years 2014 and 2015]

'Use of a Gini Index to Examine Housing Price Heterogeneity: a Quantile Approach', *Journal of Housing Economics*, 29, 59-71, 2015 (with J.M. Raya)

'Who is afraid of smoking bans? An evaluation of effects of the Spanish clean air law on expenditure at hospitality venues', *European Journal of Health Economics*, 16, 813-834,

2015 (with A. López)

"A study of traveller decision-making determinants: prioritizing destination or travel models", *Tourism Economics*, 21, 1149-1167, 2015 (with C. Juaneda, J.M. Raya and F. Sastre)

"Número especial: Investigación en economía y gestión del deporte", *Intangible Capital*, 12, 755-758 (with P. Gálvez, J. Fernández and J. García)

"Research and analysis in sports economics and management", *Revista de Psicología del Deporte*, 25, Supl. 1, 9-10, 2016 (with J. Fernández, P. Gálvez and J. García)

"Does the football matter? An insight into football pools players' behaviour", *Revista de Psicología del Deporte*, 25, Supl. 1, 23-27, 2016 (with L. Pérez and P. Rodríguez)

"Comparative Analysis of Sports Practice by Types of Activities", *International Journal of Sport Finance*, 11, 221-231, 2016 (with C. Muñiz, P. Rodríguez and M.J. Suárez)

"El sector economic de l'esport a Catalunya", *Revista Econòmica de Catalunya*, 77, 8-19, 2018 (with J. Bosch and C. Murillo)

"TV Rights, Financial Inequality and Competitive Balance in European Football: Evidence from the English Premier League and the Spanish LaLiga", *International Journal of Sport Finance*, 13, 201-224, 2018 (with M. Carreras)

'Satisfacción e importancia de las competencias adquiridas en la universidad según la perspectiva de graduados y ocupadores: una primera aproximación', *Cuadernos Económicos de Información Comercial Española*, 95, 99-123, 2018 (with M. Cervini)

'Deporte y economía: una relación peculiar, creativa y beneficiosa para ambas partes', *Papeles de Economía Española*, 159, 2-11, 2019

'La demanda en los deportes profesionales: asistencia y audiencia', *Papeles de Economía Española*, 159, 109-130, 2019 (with I. Artero, E. Bandrés and P. Rodríguez)

'eSports: ¿una nueva era para el sector del deporte y un nuevo impulso a la investigación sobre economía del deporte?', *Papeles de Economía Española*, 159, 294-313, 2019 (with Y. Chikish and M. Carreras)

'Subnational purchasing power of parity in OECD countries: Estimates based on the Balassa-Samuelson hypothesis', *OECD Regional Development Working Papers 2019/12*, 2019 (with A. Costa, J.L. Raymond and D. Sánchez)

'Organised and non-organised after-school physical activity among children in Spain: the role of school-related variables', *European Sport Management Quarterly*, 20, 171-188, 2020 (with M.J. Suárez)

'Sports video games participation: What can we learn for eSports?', *Sports, Business and Management: An International Journal*, 10, 169-185, 2020 (with C. Murillo)

'The Demand for the Characteristics of Football Matches: A Hedonic Price Approach', *Journal of Sports Economics*, 21, 688-704, 2020 (with P. Rodríguez and F. Todeschini)

'Surveys assessing sports services and municipal governance', *European Journal of Government and Economics*, 9, 143-154, 2020 (with J. Bosch, L. Fanega, N. Hernández,

X. Moya and C. Murillo)

Books and book chapters

Aplicación de Modelos de Elección Discreta para la Detección del Fraude en la Imposición sobre la Renta, Instituto de Estudios Fiscales, Monografía No. 51, 1987 (with J.L. Raymond and T. Valdés).

The Nature of Unemployment in Britain, Oxford University Press, 1989 (with S.J. Nickell, W. Narendranathan and J. Stern).

'Real Earnings Gains and Losses from Unemployment', in S.J. Nickell, W. Narendranathan, J. Stern and J. García, *The Nature of Unemployment in Britain*, Oxford University Press, 78-107, 1989 (with J. Stern).

'Incentive and Welfare Effects of Reforming the British Benefit System', in S.J. Nickell, W. Narendranathan, J. Stern and J. García, *The Nature of Unemployment in Britain*, Oxford University Press, 164-198, 1989.

'Participación y Fecundidad de las Mujeres Casadas en España: Un Análisis a partir del Censo de Población de 1981', in *Economía del Trabajo Femenino: Sector Mercantil y no Mercantil*, Ministerio de Asuntos Sociales, Instituto de la Mujer, Serie Debate, 9, 93-99, 1989 (with S. Jiménez).

'La Persistencia del Desempleo en España: Un Enfoque Agregado', in J. Velarde, J.L. García Delgado and A. Pedreño (eds.), *La Industria Española. Recuperación, Estructura y Mercado de Trabajo*, Colección "Economistas Libros", Colegio de Economistas de Madrid, 347-385, 1990 (with J. Andrés).

'Spain and the 'EC cum 1992' Shock', in C. Bliss and J. Braga de Macedo (eds.), *Unity with Diversity in the European Economy: The Community's Southern Frontier*, Cambridge University Press, 145-233, 1990 (with J. Viñals, J. Andrés, J.M. González-Páramo, J. Gual, L. Mañas, C. Martín, A. Torres and X. Vives).

'Principales Rasgos del Mercado de Trabajo Español ante 1992', in J. Viñals (ed.), *La Economía Española ante el Mercado Único Europeo. Las Claves del Proceso de Integración*, Alianza Economía, Alianza Editorial, 313-378, 1992 (with J. Andrés).

'Factores Determinantes de los Salarios. Evidencia para la Industria Española', in J.J. Dolado, C. Martín and L. Rodríguez (eds.), *La Industria y el Comportamiento de las Empresas Españolas (Ensayos en homenaje a Gonzalo Mato)*, Alianza Economía, Alianza Editorial, 171-196, 1993 (with J. Andrés).

'Indiciación Salarial y Desempleo', in J. Velarde, J.L. García Delgado and A. Pedreño (eds.), *Empresas y Empresarios Españoles en la Encrucijada de los Noventa*, Editorial Civitas, 261-285, 1993 (with J. Andrés and S. Jiménez).

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2001

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'The Determinants of Audience for Spanish Football: A First Approach", in J. García, P. Rodríguez and S. Késenne (eds.), *Sport Economics After Fifty Years: Essays in Honour of Simon Rottenberg*, Universidad de Oviedo, 147-167, 2006 (with P. Rodríguez)

'Obesity, Employment and Wages in Europe', in J. Cawley (ed.), *Advances in Health Economics and Health Services Research, Vol. 17*, 187-217, 2007 (with C. Quintana)

'The Economics of Soccer in Spain', in W. Andreff and S. Szymanski (eds.), *Handbook on the Economics of Sport*, Edward Elgar Publisher, 474-485, 2007 (with P. Rodríguez)

"El mercat de treball a Catalunya en els últims deu anys (1996-2006)", in *Economia catalana: reptes de futur*, Generalitat de Catalunya, BBVA, 127-154, 2007

'Spanish Football: Competitive Balance and the Impact of the UEFA Champions League', in J. García, P. Rodríguez and S. Késenne (eds.), *Governance and Competition in Professional Sports Leagues*, Universidad de Oviedo, 171-190, 2007 (with P. Rodríguez)

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'Guessing Who Wins or Predicting the Exact Score: Does it Make any Difference in terms of the Demand for Football Pools?', in W. Andreff (ed.), *Contemporary Issues in Sports Economics: Participation and Professional Team Sports*, Edward Elgar Publishing, 114-130, 2011 (with L. Pérez and P. Rodríguez)

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'Presentació', in Fundació Ernest Lluch, *L'impacte de la crisi al futbol. Estratègies adaptatives*, 1a Conferència acadèmica Ernest Lluch d'Economia i Futbol, 13-15, 2013

'Introducció', in Fundació Ernest Lluch, *L'estadística al servei del futbol. Racionalitzant decisions econòmiques i esportives*, 2a Conferència acadèmica Ernest Lluch d'Economia i Futbol, 13-16, 2015

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(with A. Costa, X. López and J.L. Raymond)

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'Introducció', en Fundació Ernest Lluch, *El vector futbol en l'economia (o com entendre l'economia des del futbol)*, 3er Diàleg acadèmic Ernest Lluch d'Economia i Futbol, 13-17, 2016

'Prefacio', in P. Gálvez et al. (coords.), *Economía, gestión y deporte. Una visión actual de la investigación*, Thomson Reuters. Aranzadi, 9-10, 2016

'Does the football matter? An insight into football pools' players behaviour', in P. Gálvez et al. (coords.), *Economía, gestión y deporte. Una visión actual de la investigación*, Thomson Reuters. Aranzadi, 309-312, 2016 (with L. Pérez y P. Rodríguez)

Avaluació del pes econòmic de l'esport a la demarcació de Barcelona el 2013, Diputació de Barcelona, Col·lecció Eines, Sèrie Esports 1, 2016 (with J. Bosch and C. Murillo)

'Introducció acadèmica', in Fundació Ernest Lluch, *Una mirada econòmica al futur del futbol*, 4rt Diàleg acadèmic Ernest Lluch d'Economia i Futbol, 11-14, 2017

'Saluda presidente del Comité Científico del VIII CIED"', in J. del Corral and C. Gómez-González (eds.), *El uso de datos en la economía del deporte. Mirando al futuro, VIII Congreso Iberoamericano de Economía del Deporte*, Ediciones de la Universidad de Castilla y La Mancha, Colección Jornadas y Congresos No. 11, 15, 2017 (DOI: http://doi.org/10.18239/jor_11.2017.03)

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'Efectos del deporte en la economía de Catalunya"', in J. del Corral and C. Gómez-González (eds.), *El uso de datos en la economía del deporte. Mirando al futuro, VIII Congreso Iberoamericano de Economía del Deporte*, Ediciones de la Universidad de Castilla y La Mancha, Colección Jornadas y Congresos No. 11, 96-99, 2017 (DOI: http://doi.org/10.18239/jor_11.2017.03) (with J. Bosch and C. Murillo)

'E-Sports: Perfil de los participantes (¿o deportistas?)"', in J. del Corral and C. Gómez-González (eds.), *El uso de datos en la economía del deporte. Mirando al futuro, VIII Congreso Iberoamericano de Economía del Deporte*, Ediciones de la Universidad de Castilla y La Mancha, Colección Jornadas y Congresos No. 11, 150-153, 2017 (DOI: http://doi.org/10.18239/jor_11.2017.03) (with C. Murillo)

'After-School Physical Activity among Spanish Children"', in J. del Corral and C. Gómez-González (eds.), *El uso de datos en la economía del deporte. Mirando al futuro, VIII Congreso Iberoamericano de Economía del Deporte*, Ediciones de la Universidad de Castilla y La Mancha, Colección Jornadas y Congresos No. 11, 154-157, 2017 (DOI: http://doi.org/10.18239/jor_11.2017.03) (with M.J. Suárez)

'Prólogo', in J. García, J.M. González-Páramo and A. Matas (dirs.), *Análisis empíricos*

sobre la economía española. Ensayos en homenaje a Josep Lluís Raymond Bara, Thomson Reuters Aranzadi, Funcas, 19-23, 2017 (with J.M. González-Páramo and A. Matas)

'Introducción', in J. García, J.M. González-Páramo and A. Matas (dirs.), *Análisis empíricos sobre la economía española. Ensayos en homenaje a Josep Lluís Raymond Bara*, Thomson Reuters Aranzadi, Funcas, 25-38, 2017 (with J.M. González-Páramo and A. Matas)

'La relación entre el gasto, los ingresos y la composición de los hogares: Elasticidades renta y escalas de equivalencia. Evidencia para España', in J. García, J.M. González-Páramo and A. Matas (dirs.), *Análisis empíricos sobre la economía española. Ensayos en homenaje a Josep Lluís Raymond Bara*, Thomson Reuters Aranzadi, Funcas, 389-419, 2017

'Forecasting Football Match Results: Are the Many Smarter than the Few', in P. Rodríguez, B.R. Humphreys and R. Simmons (eds.), *The Economics of Sports Betting*, Edward Elgar Publishing, 71-91, 2017 (with L. Pérez and P. Rodríguez)

'Introducció acadèmica', in Fundació Ernest Lluch, *Dia de partit: Reptes per al màxim rendiment econòmic de la gestió de l'estadi*, 5è Diàleg acadèmic Ernest Lluch d'Economia i Futbol, 11-15, 2018

'La dimensió econòmica i social de l'esport a Catalunya', in *La musculatura del sistema empresarial català. Cap a un model eficient i equitatiu*, Col·legi d'Economistes de Catalunya, 257-290, 2018 (with J. Bosch and C. Murillo)

'Introduction', in J. García (ed.), *Sports (and) Economics*, FUNCAS Social and Economic Studies, 7, 1-24, 2019

'Demand of Professional Sports: Attendance and Audience', in J. García (ed.), *Sports (and) Economics*, FUNCAS Social and Economic Studies, 7, 183-218, 2019 (with I. Artero, E. Bandrés, and P. Rodríguez)

'eSports: A New Era for the Sports Industry and a New Impulse for the Research in Sports (and) Economics?', in J. García (ed.), *Sports (and) Economics*, FUNCAS Social and Economic Studies, 7, 477-508, 2019 (with Y. Chikish and M. Carreras)

'Does Specification Assumptions Make a Difference when Analysing the Correlates of Sports Practice?' in A. Aguiar et al (coord.), *Libro de Actas del X Congreso Iberoamericano de Economía del Deporte. El futuro de los deportes profesionales: una vision económica*, ISBN: 978-84-09-12298-1, 29-32, 2019 (with M.J. Suárez)

'Vamos al estadio o nos quedamos en casa: cómo tomamos la decisión' in A. Aguiar et al (coord.), *Libro de Actas del X Congreso Iberoamericano de Economía del Deporte. El futuro de los deportes profesionales: una vision económica*, ISBN: 978-84-09-12298-1, 39-43, 2019 (with I. Artero, E. Bandrés and P. Rodríguez)

'Encuestas de valoración de servicios deportivos y gobernanza municipal' in A. Aguiar et al (coord.), *Libro de Actas del X Congreso Iberoamericano de Economía del Deporte. El futuro de los deportes profesionales: una vision económica*, ISBN: 978-84-09-12298-1, 98-101, 2019 (with J. Bosch, L. Fanega and X. Moya)

'El deporte como sector de desarrollo económico y su medición' in N. Puig-Barata and A. Camps-Povill (eds.), *Diálogos sobre el deporte*, Generalitat de Catalunya, Editorial INDE, 355-374, 2020 (with J. Bosch and C. Murillo)

'COVID-19 y deporte: proyecciones de la repercusión económica', in J.L. Pérez-Triviño (ed.), *El deporte tras el coronavirus*, 43-53, 2020 (with J. Bosch and C. Murillo)

Ph.D. Thesis supervised

'A Microeconometric Analysis of the Demand for Tobacco in Spain', submitted by José María Labeaga at the Universitat Autònoma de Barcelona, December 1990.

'Bargaining about Wages. Evidence from Spain', submitted by Sergi Jiménez at the Universitat Pompeu Fabra, November 1994.

'Factores Explicativos de las Diferencias Salariales entre Hombres y Mujeres en España: Un Análisis Empírico', submitted by Pedro Jesús Hernández at the Universitat Autònoma de Barcelona, May 1995.

'Labour Supply Behaviour and Income Taxation: Three Empirical Exercises for the Spanish Case', submitted by Marta Segura at the Universitat Pompeu Fabra, December 1996.

'Estudios sobre la oferta de trabajo femenina en España: Modelización de las restricciones en la jornada y del sistema de imposición directa', submitted by María José Suárez in Universidad de Oviedo, December 2000.

'Análisis económico de la demanda de entradas en el fútbol español', submitted by Plácido Rodríguez in Universidad de Oviedo, February 2001

'Ensayos sobre el mercado de la vivienda en España: precios hedónicos y regímenes de tenencia', submitted by Josep Maria Raya in Universitat de Barcelona, September 2005.

'The Demand for Gambling: Empirical Evidence from State-Operated Lotteries and Football Pools in Spain', submitted by Levi Pérez in Universidad de Oviedo, January 2010.

'Ensayos sobre la discriminación salarial por razón de género en España', submitted by Carmen María Rubio Castaño in Universidad Pablo de Olavide, September 2017.

Other activities

Referee for the journals: *Health Economics*, *Computers in Human Behavior*, *Cuadernos de Economía*, *Investigaciones Económicas*, *Journal of Human Resources*, *Revista Española de Economía*, *Revista de Economía Aplicada*, *Moneda y Crédito*, *Hacienda Pública Española*, *Review of Economics and Statistics*, *Health Economics Letters*, *European Economic Review*, *Revista de Estudios Regionales*, *Investigaciones Regionales*, *Labour Economics*, *European Sports Management Quarterly*, *Journal of Health Economics*, *Empirical Economics*, *Journal of Sports Economics*, *Economics and Human Biology*, *Economics e-journal*, *Journal of Population Economics*, *Journal of Regional Science*, *Applied Economic Perspectives and Policy*, *European Journal of Development Research*, *Journal of Economic Behavior & Organization*, *Sport, Business and Management: An International Journal*, *Asian Economic and Financial Review*, *Real Estate Economics*, *Economic Inquiry*, *Contemporary Economic Policy*, *Journal of Housing and the Built Environment*, *Mathematical Problems in Engineering*, *Sport Management Review*, *Statistical Journal of the International Association of Official Statistics*, *Oxford Economic Papers*, *Journal of Housing Economics*.

Associate Editor of *Investigaciones Económicas*, 1989-1991.

Co-Editor of *Investigaciones Económicas*, 1991-1994.

Co-Editor of *Revista de Economía Aplicada*, 1998-2002.

Member of the Editorial Board of *Applied Economic Perspectives and Policy*, 2012-2017

Member of the Editorial Advisory Committee of SORT (Statistics and Operations Research Transactions), since 2013.

Member of the Scientific Committee of *Revista Gestión & Desarrollo*, since 2015

Emphasis Editor of *Statistical Journal of the International Association of Official Statistics*, since 2019.

Editor of the books:

Sport Economics After Fifty Years: Essays in Honour of Simon Rottenberg, Universidad de Oviedo, 2006 (with P. Rodríguez and S. Késenne)

Governance and Competition in Professional Sports Leagues, Universidad de Oviedo, 2007 (with P. Rodríguez and S. Késenne)

Threats to Sports and Sports Participation, Universidad de Oviedo, 2008 (with P. Rodríguez and S. Késenne)

The Econometrics of Sport, Edward Elgar Publishing, 2013 (with P. Rodríguez and S. Késenne)

Análisis empíricos sobre la economía española. Ensayos en homenaje a Josep Lluís Raymond Bara, Thomson Reuters Aranzadi, Funcas, 2017 (with J.M. González-Páramo and A. Matas)

Sports (and) Economics, FUNCAS Social and Economic Studies, 7, 2019

Editor of the Special Issue "Neale Golden Anniversary" of the *Journal of Sports Economics*, 16(8), 2015 (with S. Késenne and P. Rodríguez)

Editor of the Special Issue "Economía, gestión y marketing en organizaciones deportivas" of the *Revista de Psicología del Deporte*, 25, Supl. 1, 2016 (with J. Fernández, P. Gálvez and J. García)

Editor of the Special Issue "Investigación en economía y gestión del deporte", *Intangible Capital*, 12(3), 2016 (with J. Fernández, P. Gálvez and J. García)

Coordinator of "Deporte y Economía", *Papeles de Economía Española*, 159, 2019

Dean of the Facultad de Ciencias Económicas y Empresariales, Universitat Pompeu Fabra, 1991-1992.

Vice-Rector of Administration and Services, Universitat Pompeu Fabra, 1992-1994.

Vice-Rector of Scientific Policy and Doctoral Studies, Universitat Pompeu Fabra, 1997-

1999.

Academic Director of *Escola Superior de Comerç Internacional*, Universitat Pompeu Fabra, 1999-2005

Chairman of the Social Sciences Committee for Lecturers and *Colaboradores*, *Agencia de la Qualitat Universitaria*, *Generalitat de Catalunya*, 2006-2008

President of the Spanish National Statistics Institute (*Instituto Nacional de Estadística*), 2008-2011

Opinion articles in: *El País*, *La Vanguardia*, *El Periódico*, *Palco23* and *DEPORCAM*.

President of the scientific committee of the project "Ocupadors", *Agencia de la Qualitat Universitaria*, *Generalitat de Catalunya*, 2014

Peer reviewer in the project by Eurostat of evaluation to the extent to which national statistical institutes comply with the European Statistics Code of Practice, 2014-2015

Member of the Board of Trustees of the *Fundació Ernest Lluch*, since 2015

Chairman of the Scientific Committee of the *VII Congreso Iberoamericano de Economía del Deporte*, Seville, June 2016

Chairman of the Scientific Committee of the *VIII Congreso Iberoamericano de Economía del Deporte*, Ciudad Real, June 2017

Chairman of the Organising Committee of the *X Congreso Iberoamericano de Economía del Deporte*, Barcelona, June 2019.

Member of the *Consell Català d'Estadística*, since 2016

Member of the *European Statistical Governance Advisory Board*, 2018-2019

Member of the First Instance Committee of the UEFA license, Spanish Football Federation, since 2019

Member of the Economic Control Committee for the futsal competitions, Spanish Football Federation, since 2020

CV - Mohammad Ghaderi

Assistant professor (tenure-track), Pompeu Fabra University

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Education: PhD in Management Sciences, ESADE (2017); Master of Research in Management Sciences, ESADE (2013), MScin Industrial Engineering, Sharif University of Technology (2012); BSc in Mechanical Engineering; dual major in Industrial Engineering, Sharif University of Technology (2010)

Publications

- [1] Ghaderi, M., Kadzinski, M., (2021), Incorporating Uncovered Structural Patterns in Value Functions Construction, *Omega*, 99 (JCR Rank 3/83 in OR & Management Science, SJR Q1, IF: 5.324)
- [2] Kadzinski, M., Ghaderi, M., Dabrowski, M, (2020), Contingent Preference Disaggregation Model for Multiple Criteria Sorting Problem, *European Journal of Operational Research*, 281(2), 369-387. (ABS 4, SJR Q1, IF: 4.213)
- [3] Ghaderi, M., Ruiz, F., J., Agell, N. (2017), A Linear Programming Approach for Learning NonMonotonic Additive Value Functions in Multiple Criteria Decision Aiding, *European Journal of Operational Research*, 259 (3), 1073-1084. (ABS 4, SJR Q1, IF: 4.213)
- [4] Kadzinski, M., Ghaderi, M., Wasilowski, J., Agell, N. (2017), Expressiveness and Robustness Measures for the Evaluation of an Additive Value Function in Multiple Criteria Preference Disaggregation Methods: an Experimental Analysis, *Computers & Operations Research*, 87, 146-164. (ABS 3, SJR Q1, IF: 3.424)
- [5] Ghaderi, M., Ruiz, F., J., Agell, N. (2015). Understanding the Impact of Brand Colour on Brand Image: a Preference Disaggregation Approach, *Pattern Recognition Letters*, 67 (1), 11-18. (ABS 3, SJR Q1, IF: 3.255)
- [6] Ghaderi, M., Ruiz, F.,J., Agell, N. (2014). Understanding Color Trends by Means of Non-Monotone Utility Functions. in *Artificial Intelligence Research and Development: Recent Advances and Applications*, 269, 107-115.

Grants & Project participation

- Barcelona GSE Seed Grant (SG2021-13), funded by The State Research Agency (AEI) through the Severo Ochoa Programme for Centres of Excellence in R&D (CEX2019-000915-S)
- Generalitat de Catalunya with the ESF (FI grants: FI-DGR2014, 2015FI B1-00105, 2016FI B200058)
- SENSORIAL Research Project (TIN2010-20966-C02-01, 02) funded by the Spanish Ministry of Science and Information Technology
- Mathematical structure for evaluating linguistics in decision making processes: advanced solutions for tourism management in smart cities (TIN2016-80049-C2-1-R), Funded by the Spanish Ministry of Economy and Competitiveness

Awards: 2018 PhD Thesis Competition Prize by the European Doctoral Association in Management and Business Administration (EDAMBA); Extraordinary Doctorate Dissertation Award from Universitat Ramon Llull; Finalist (top 3) for the 2019 MCDM Doctoral Dissertation Award (International Society on Multiple Criteria Decision Making); Funded with the competitive pre-doctoral grant (FI-DGR2014) by the Catalan Government, 2013; Doctoral scholarship grant by ESADE Business School, 2013; Student Talent Scholarship by ESADE Business School, 2012; Exempted from the M.Sc. Entrance Exam in Iran as Exceptionally Talented Student, 2009; Ranked 3rd among more than 420,000 participants in the Iranian National University Entrance Exam, 2005; Outstanding Reviewer Award by the *European Journal of Operational Research* (EJOR), 2017.

CV - Mercè Roca i Puigvert

Associate Professor at ESCI-UPF – Professora Agregada AQU / Titular ANECA
merce.roca@esci.upf.edu

PhD Leeds University Business School, The University of Leeds (2016)

Expertise: application of qualitative and quantitative market research techniques in the domain of consumer/citizen behaviour and decision making; sustainability, recycling and behaviour.

Selection of indexed articles related with Planetary Wellbeing

1. **Roca, M.**, Ayuso, S., Bala, A., Fullana-i-Palmer (2020). What factors determine attitudes towards the implementation of a packaging deposit and refund system? A qualitative study of the perception of Spanish consumers. *Journal of Environmental Management*, 270, 15.
2. Batlle-Bayer, L., Bala, A., **Roca, M.**, Lemaire, E., Aldaco, R., Fullana-i-Palmer, P. (2020) Nutritional and environmental co-benefits of shifting to “Planetary Health” Spanish tapas. *Journal of Cleaner Production*, 271, 20.
3. Blanca-Alcubilla, G., **Roca, M.**, Bala, A., Sanz, N., De Castro, N., Fullana-i-Palmer, P. (2019). *Airplane cabin waste characterization: Knowing the waste for sustainable management and future recommendations*. *Waste management*, 91, 1.
4. Albertí, J., **Roca, M.**, Brodhag, C., Fullana-i-Palmer, P. (2019). *Allocation and system boundary in life cycle assessments of cities*. *Habitat International*, 83.
5. Ayuso, S., **Roca, M.**, Arebalo, J.A., Arabind, D. (2016). *What determines principle-based standards implementation? Reporting on Global Compact adoption in Spanish firms*. *Journal of Business Ethics*, 133 (3).
6. Ayuso, S., **Roca, M.**, Colomé, R. (2013). *SMEs as “transmitters” of CSR requirements in the supply chain*. *Supply Chain Management: an International Journal*, 18, 5.

Participation in recent related competitive projects

1. KAIROS BIOCIR - PID2019-104925RB (AEO/FEDER, UE) - Enhancing the nexus water energy food to improve the agri-food sector in Spain: Opportunities based on circular bioeconomy and sustainable consumption.
2. CERES – CTM2016-76176-C2-2-R - Food Consumption Strategies for the mitigation of Climate Change towards an environmentally sustainable diet. I+D+I - Ministerio de Ciencia Innovación y Universidades.
3. Creative Europe Programme Call EACEA-34-2018. Analysis of Opera sets eco-design and circular practices among European opera houses and festivals.
4. Zero Cabin Waste. LIFE15/ENV/ES/000209- Co-financed by the European Commission. Senior researcher.
5. BUSINESSCOOP subproject of GREEN COOP - Métodos Híbridos para la Cooperación Horizontal en Transporte y Logística Sostenibles). Ministerio de Economía y Competitividad.
6. Ministerio de Ciencia e Innovación (ECO2009-11307). Métodos cuantitativos de decisión en entornos logísticos y productivos (2009-2013).
7. European Commission (FENIX LIFE 08 ENV/E/000135). Finding environmental life cycle assessment information on packaging waste management through flexible software tools and databases.

Member of UPF Research groups: RISE ESCI-UPF; Mango CSR Chair. ESCI-UPF; UNESCO Chair in Life Cycle and Climate Change ESCI-UPF; UPF BARG; UPF BESLab; Observatori de Sostenibilitat BSM-UPF

CV - Alba Bala Gala

PhD in Environmental Sciences (2015); Master in Environmental Sciences (2004) and Environmental Scientist (2000). Her main field of expertise is Life Cycle Assessment (LCA) applied to the analysis of waste management systems.

She is currently a researcher and responsible for the line of research on packaging and waste at the UNESCO Chair in Life Cycle and Climate Change. Previously, she worked as a teacher in the field of Ecodesign and Environmental Analysis of products at the School of Industrial Design (ESDI, Ramón Llull University), as a researcher and teacher at Elisava School of Design (UPF), as a researcher at the Institute Environmental Science and Technology (UAB) and as an environmental consultant at Randa Group (Barcelona).

She is author of 55 scientific papers, 29 of them in Q1 peer review journals, with an h-index 16 (Scopus), and has participated in more than 30 national and international projects related to LCA. Among them, highlighting the technical coordination of the Life FENIX project (FENIX LIFE 08 ENV/E/000135), the participation in the Life Zero Cabin Waste project (LIFE15/ENV/ES/000209), and the development of the ARIADNA project, carrying out a comparative sustainability assessment between the current packaging waste collection system and the introduction of a mandatory deposit and return system in Catalonia and Spain.

Scientific articles (5 selected)

Bala, A., Raugel, M., Texeira, C.A., Fernández, A., Pan-Mantojo, F., Fullana-i-Palmer, P. Assessing the Environmental Performance of Municipal Solid Waste Collection: A new predictive LCA model. *Sustainability*, 2021. 13, 5810. <https://www.mdpi.com/2071-1050/13/11/5810>

Sazdovski, L.; **Bala, A.**, Fullana-i-Palmer, P. Linking LCA literature with circular economy value creation: A review on beverage packaging. *Science of the Total Environment*, 2021. Volume 771, 145322.

R. Aldaco, D. Hoehn, J. Laso, M. Margallo, I. Ruiz-Salmón, J. Cristóbal, R. Kahhat, P. Villanueva-Rey, **A. Bala**, L. Batlle-Bayer, P. Fullana-i-Palmer, A. Irabien, I. Vázquez-Rowe. Food waste management during the COVID-19 outbreak: a holistic climate, economic and nutritional approach. *Science of the Total Environment*, 742, 140524, 2020.

Abejón, R., Laso, J., Margallo, M., Aldaco, R., Blanca-Alcubilla, G., **Bala, A.**, Fullana-i-Palmer, P. 2020. Environmental impact assessment of the implementation of a Deposit-Refund System for packaging waste in Spain: A solution or an additional problem? *Science of the Total Environment*, 721, <https://doi.org/10.1016/j.scitotenv.2020.137744>.

Bala, A., Laso, J., Abejón, R., Margallo, M., Fullana-i-Palmer, P., Aldaco, R. 2020. Environmental assessment of the food packaging waste management system in Spain: Understanding the present to improve the future. *Science of the Total Environment*, 702. <https://doi.org/10.1016/j.scitotenv.2019.134603>.

Participation in Technical-Scientific Networks

- Spanish Network of Excellence in Life Cycle Assessment (CTM2015-71930-REDT).
- Life Cycle Assessment Thematic Network (CICYT (PPQ2001-4089-E), CICYT (PPQ2002-12458-E), CTM2007-30870-E / TECNO).
- Member of the International Expert Group on Life Cycle Assessment for Integrated Waste Management (IEG)

CV- Pere Fullana-i-Palmer

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Director of the UNESCO Chair in Life Cycle and Climate Change at ESCI-UPF
PhD in Industrial Engineering, Ramon Llull University (1994)

Accredited Full-professor (Catedràtic – Recerca Avançada) by AQU Catalunya

Education: Doctorate in Industrial Engineering (URL), 6-year Chemical Engineer (IQS, URL) and Industrial Engineer (UAB) degrees, Postgraduate studies in Chemical Informatics (IQS, URL) and Business Administration (IQS, URL).

Positions: Dr. Fullana is currently the Director of the UNESCO Chair in Life Cycle and Climate Change and Full Professor (Sustainability) at ESCI-UPF (Universitat Pompeu Fabra, Barcelona). He is well-known as international expert in LCA Critical Review, Spanish delegate for the ISO 14000 series of standards, editor for the International Journal of LCA (IJLCA), member of the International Expert Group for Life Cycle Assessment for Integrated Waste Management and former Board Member of the UNEP/SETAC Life Cycle Initiative. He is former Chair of the SETAC Europe LCA Steering Committee and first LCA practitioner to be a SETAC Europe Council member.

Experience: Dr. Fullana has participated in more than 25 European research projects and 250 national research studies in environmental management, LCA, carbon footprint, ecodesign, environmental labeling and clean technologies. Current projects include: "Zero Cabin Waste in airlines" funded by the LIFE Program; "Food production and consumption strategies against climate change (CERES) funded by the Spanish Government; or "Opera Sceneries Circularity and Resource efficiency (OSCAR), funded by the Creative Europe Program.

He was chosen to represent the academic world at Chile/Madrid COP25 closing plenary.

Publications:

He has published books in Catalan, Spanish and English, such as the one published by UNEP: "Communication of Life Cycle Information in the Building and Energy sectors". He is a known LCA author in scientific journals. Dr. Fullana has participated as co-author for the WRI/WBCSD Green House Gases Protocol for Products. With an **h-index of 21, he has published 55 scientific papers in indexed journals in the last 5 years, 35 of which in the first quartile.** He has been or is supervising 19 PhD thesis.

Awards (solo or co-awarded). P. Salvador Gil Award to the Best Final Project in Chemical Engineering 1988. Caja Madrid Award 1994 for his PhD thesis. Most Relevant Contribution Award by the International Society for Industrial Ecology at the 2009 Life Cycle Management Congress in Cape Town. Catalan Government Environmental Award in 2008. Finalist to the Europa Innova Award by the European Commission. Nominated to the Sustainable Energy Europe & managEnergy Awards 2013 by the European Commission. Mention in the Energy Excellence Awards 2014 by the Catalan Government. Best Poster Award (Nutritional and Environmental Food Data Management under a Life Cycle Approach: Toward a more Sustainable Food Production and Consumption) at 12th International Food Data Conference. Best presentation award ("Diet matters: the case of Spain") and Best poster award ("A fair comparison of GHG emissions and nutritional quality of 4 ready-to-eat meals") by Springer at LCAFood 2018. Alfonso Maíllo Award to the best innovative study on waste management ("LIFE Zero Cabin Waste project: Aviation catering waste management. Environmental impacts through LCA perspective) at RECUWaste 2018. Finalist to the Smart Logistics & Packaging Awards at PickPack 2020, in the "Excellence in sustainability and industrial ecodevelopment" category, for the project "Packaging recyclability label". ODS12 (Responsible production and consumption) award winner at the go!ODS Awards for the Project LIFE Zero Cabin Waste by UN Global Compact (Spanish Chapter).