

Marta Baldomero Naranjo

Universidad de Cádiz

ACADEMIC TITLES

2012 – 2016

BACHELOR'S DEGREE IN MATHEMATICS

- + Universidad de Cádiz.
- + Mark: 9.53.
- + Extraordinary Degree Award.
- + Collaborator student of Department of Mathematics 2013/2014, 2014/2015.

2016 – 2017

MASTER'S DEGREE IN MATHEMATICS

- + Universidades de Almería, Cádiz, Granada, Jaén, and Málaga.
- + Mark: 9.44.
- + Runners-up prize in the XVI Arquímedes Contest conferred once a year by the Ministry of Education, Culture and Sports of Spain for the research project "Feature Selection with Ramp Loss models".
- + Extraordinary Master Award.

2016 – 2017

MASTER'S DEGREE IN PROFESSIONAL DEVELOPMENT 4.0

- + Universidad de Alcalá.
- + Mark: 8.15.

2019 – 2021

MASTER'S DEGREE IN COMPULSORY AND HIGH SECONDARY EDUCATION, VOCATIONAL TRAINING AND LANGUAGE TEACHING (MATHEMATICS).

- + Universidad Nacional de Educación a Distancia (UNED).
- + Mark: 8.2.

2017 – 2021

PHD IN MATHEMATICS

- + Universidades de Almería, Cádiz, Granada, Jaén, and Málaga.
- + Title: Supervised Classification and Network Location Problems via Mathematical Optimization.
- + Supervisor: Antonio M. Rodríguez Chía.
- + Mark: Summa Cum Laude.
- + International PhD Mention.

POSITIONS

2016 - 2017

INTERSHIP IN AIRBUS DEFENCE AND SPACE– Centro Bahía de Cádiz Planning and Control Department (Data Analysis).

2017 - 2021

PREDOCTORAL RESEARCHER IN UNIVERSIDAD DE CÁDIZ

- + Department of Statistics and Operations Research.
- + Teacher of 7 courses in 11 Bachelor's Degrees.
- + Co-supervisor of a Bachelor's Degree Dissertation in Mathematics and two Master's Degree Dissertations in Mathematics.
- + Participation in two innovative teaching projects.

2021-present

INTERIM LECTURER IN UNIVERSIDAD DE CÁDIZ

- + Department of Statistics and Operations Research.
- + Teacher of 6 courses in 5 Bachelor's Degrees.
- + Co-supervisor of two Bachelor's Degree Dissertations in Mathematics.
- + Participation in an innovative teaching project.

AWARDS

2016

UNIVERSITY SOCIAL RESPONSIBILITY AWARD.

Awarded by the Social Council of Universidad de Cádiz.

2016

PROFESOR MANUEL CABALLERO A LA EXCELENCIA DISCENTE AWARD.

Conferred once a year by the Faculty of Science at the Universidad de Cádiz to the Graduate student with the best Academic marks.

2017

RUNNERS-UP PRIZE AND "ESTANCIA EN CENTRO DE INVESTIGACIÓN CSIC" AWARD IN XVI ARQUÍMEDES CONTEST.

Conferred once a year by the Ministry of Education, Culture and Sports of Spain for the research project "Feature Selection with Ramp Loss models".

2018

THE BRITISH SPANISH SOCIETY AND TELEFÓNICA SCHOLARSHIP

Conferred by the BritishSpanish Society and Telefónica to support research in the project "Locating Service Facilities in Cities" in the University of Edinburgh.

SCIENTIFIC EDITION

2017

CO-EDITOR OF THE BOOK "PROCEEDINGS OF VIII INTERNATIONAL WORKSHOP ON LOCATIONAL ANALYSIS AND RELATED PROBLEMS".

Editors: M. Baldomero-Naranjo, I. Espejo-Miranda, L. I. Martínez-Merino, A. M. Rodríguez-Chía, D. Ruiz-Hernández. ISBN: 978-84-697-5263-0.

2019

CO-EDITOR OF THE BOOK "PROCEEDINGS OF IX INTERNATIONAL WORKSHOP ON LOCATIONAL ANALYSIS AND RELATED PROBLEMS".

Editors: M. Baldomero-Naranjo, I. Espejo-Miranda, L. I. Martínez-Merino, J.M. Muñoz Ocaña, A. M. Rodríguez-Chía. ISBN: 978-84-09-07742-7.

2020

CO-EDITOR OF THE BOOK "PROCEEDINGS OF X INTERNATIONAL WORKSHOP ON LOCATIONAL ANALYSIS AND RELATED PROBLEMS".

Editors: M. Albareda Sambola, M. Baldomero Naranjo, L. I. Martínez Merino, D. Ponce, M. A. Pozo, J. Puerto, V. Rebillas Loredo. ISBN: 978-84-09-17797-4.

2022

CO-EDITOR OF THE BOOK "PROCEEDINGS OF XI INTERNATIONAL WORKSHOP ON LOCATIONAL ANALYSIS AND RELATED PROBLEMS".

Editors: M. Albareda Sambola, M. Baldomero Naranjo, J.M. Muñoz Ocaña, J. Rodríguez Pereira. ISBN: 978-84-123480-6-4.

2020

TIGHTENING BIG MS IN INTEGER PROGRAMMING FORMULATIONS FOR SUPPORT VECTOR MACHINES WITH RAMP LOSS.

Authors: M. Baldomero-Naranjo, L.I. Martínez-Merino, A.M. Rodríguez-Chía.

Journal: *European Journal of Operational Research*, 286(1), 84-100.

DOI: [10.1016/j.ejor.2020.03.023](https://doi.org/10.1016/j.ejor.2020.03.023)

Main contribution: This paper considers various models of support vector machines with ramp loss and develop algorithms that provide efficient methodologies to exactly solve these optimization problems. The proposed resolution methods were tested and compared with existing solution methods in simulated and real-life datasets, showing the efficiency of the developed methodology.

2021

MINMAX REGRET MAXIMAL COVERING LOCATION PROBLEMS WITH EDGE DEMANDS.

Authors: M. Baldomero-Naranjo, J. Kalcsics, A.M. Rodríguez-Chía.

Journal: *Computers & Operations Research*, 130, 105181.

DOI: [10.1016/j.cor.2020.105181](https://doi.org/10.1016/j.cor.2020.105181)

Main contribution: This paper addresses a version of the single-facility Maximal Covering Location Problem on a network where the demand is: i) distributed along the edges and ii) uncertain with only a known interval estimation. To deal with this problem, we propose a minmax regret model where the service facility can be located anywhere along the network. Furthermore, we present two polynomial algorithms for finding the optimal location under different assumptions of the demand realization. We also include a computational study to illustrate the potential and limits of the proposed methodology.

2021

A ROBUST SVM-BASED APPROACH WITH FEATURE SELECTION AND OUTLIERS DETECTION FOR CLASSIFICATION PROBLEMS.

Authors: M. Baldomero-Naranjo, L.I. Martínez-Merino, A.M. Rodríguez-Chía.

Journal: *Expert Systems with Applications*, 178, 115017.

DOI: [10.1016/j.eswa.2021.115017](https://doi.org/10.1016/j.eswa.2021.115017)

Main contribution: This paper proposes a robust classification model, based on support vector machine (SVM), which simultaneously deals with outlier detection and feature selection. Two different approaches (exact and heuristic) are proposed to solve the model. The heuristic approach is validated by comparing the quality of the solutions provided by this approach with the exact approach. In addition, the classifiers obtained with the heuristic method are tested and compared with existing SVM-based models to demonstrate their efficiency.

2022

UPGRADING EDGES IN THE MAXIMAL COVERING LOCATION PROBLEM.

Authors: M. Baldomero-Naranjo, J. Kalcsics, A. Marín, A.M. Rodríguez-Chía.

Journal: *European Journal of Operational Research*, In press.

DOI: [10.1016/j.ejor.2022.02.001](https://doi.org/10.1016/j.ejor.2022.02.001)

Main contribution: The upgrading version of the maximal covering location problem is introduced. To solve it, we propose three different mixed-integer formulations and a preprocessing phase for fixing variables and removing some of the constraints. Moreover, we strengthen the proposed formulations including valid inequalities. Finally, we compare the three formulations and their corresponding improvements by testing their performance over different datasets.

OTHER MERITS

2018-2022

COMMUNICATIONS IN 14 CONFERENCES

Some of these are:

- + 31st European Conference on Operational Research (EURO).
- + XV International Symposium on Locational Decisions (ISOLDE XV) and XXVI EUROWorking Group on Locational Analysis (EWGLA XXVI).
- + XXIV, XXV EWGLA.
- + IX, X, XI International Workshop on Locational Analysis and Related Problems (IWOLOCA).
- + XXXVIII Congreso Nacional de Estadística e Investigación Operativa (SEIO).
- + 1st EUROYoung Workshop.

2017-present

MEMBER OF THE RESEARCH GROUP OREL-OPTIMIZACIÓN DE RECURSOS, ESTADÍSTICA, TRANSPORTE Y LOGÍSTICA

Participation in the research projects:

- + Optimización de recursos en empresas de transporte por carretera (OT2021/015). Company: Orbistat Consultoría Estadística, S.L.
- + Optimization on data science and network design problems: Data Science meets optimization and network models (PID2020-114594GB-C22).
- + Retos de la optimización combinatoria en los nuevos modelos de redes complejas y ciencia de datos (P18-FR-1422).
- + BIDCLAMP Big Data CLAssification via Mathematical Programming (FEDER-UCA18-106895).
- + Nuevos desafíos matemáticos en problemas logísticos y de transporte integrado sobre redes complejas: Diseño y Optimización (MTM2016-74983-C2-2-R).
- + Thematic Network: Location and Related Problems (MTM2016-81874-REDT).

2018

SCIENTIFIC STAYS

- + The University of Edinburgh, UK, 14/09/2018 - 14/12/2018. Funded by The BritishSpanish Society and Telefónica Scholarship Award 2018.
- + Instituto de Ciencias Matemáticas (ICMAT), Madrid, Spain, 04/06/2018 - 15/06/2018. Funded by prize in Arquímedes Contest.

2017, 2019, 2020, 2022

MEMBER OF THE ORGANIZING COMMITTEE

The VIII, IX, X, and XI International Workshop on Locational Analysis and Related Problems.

2017-present

ATTENDANCE TO COURSES AND SEMINARS

- + Autumn School on Bilevel Optimization, Universität Trier, October 12-14, 2020.
- + Data science and predictive modeling applied to business analytics, Universidad de Cádiz, February 3-6, 2020.
- + 1st MINOA PhD School Mixed-Integer Nonlinear Optimization meets Data Science, Ischia, Italy, June 24-28, 2019.
- + 7th Winter School on Network Optimization, January 15-19, 2018, Estoril, Portugal.
- + Training courses for teaching (500 hours).

2013-present

PARTICIPATION IN SCIENCE FAIRS AND SCIENTIFIC DISSEMINATION ACTIVITIES

- + *Transformando problemas de la vida real al lenguaje matemático. Una introducción a la IO. Programa de enriquecimiento extracurricular Mentorías universitarias (Ediciones VII y VIII)*. Enrichment program for students with high intellectual ability, April 2021 and February 2022. Universidad de Cádiz and Territorial Delegation of Education in Cádiz.
- + 2019 European Researchers' night.
- + *Ciencias Around You* 2016, 2017, 2019. Universidad de Cádiz.
- + *Semana de la Ciencia y la Tecnología* 2015, 2017. Universidad de Cádiz.
- + I Feria de la Ciencia en la Calle, May, 15, 2016, Universidad de Cádiz.
- + Math Rules!- ES4FUN, XVI Feria de la Ciencia y Jornada de Puertas Abiertas, May 11, 2013, Granada.

LANGUAGE SKILLS

2015

B1 GERMAN. Escuela Oficial de Idiomas, Junta de Andalucía.

2016

C1 ENGLISH. CAE, the University of Cambridge.

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