

# María Pérez-Ortiz

Research Fellow – University College London – 01/08/1990 - Spain  
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Please note that this document contains hyperlinks to websites.

## Research experience

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My research has been mainly focused on different branches of artificial intelligence: machine learning, computer vision and the application of these to real-world problems (mostly biomedicine and environmental applications). Please find here a very brief summary of my duties in each post.

### Research Fellow

*Dpt. of Computer Science, University College London (UK)*

*Nov 2018-now*

Working with Prof. John Shawe-Taylor and Prof. Emine Yilmaz on probabilistic models and their application to recommender systems.

### Research Instructor on Artificial Intelligence

*ViaX*

*Aug 2019-now*

Student tutoring in machine learning research.

### Research Associate

*Hughes Hall College, University of Cambridge (UK)*

*April - Nov 2018*

Helping to organise different academic events for researchers and students.

### Research Associate

*Computer Laboratory, University of Cambridge (UK)*

*Jun 2017 - Nov 2018*

Working with Dr. Rafal Mantiuk on the use of Bayesian inference, deep learning and psychophysics for modeling human visual perception. Worked in projects with Apple and prepared different demos for industry. Co-supervised two PhD students and supervised/lectured at courses on machine learning.

### Visiting Academic

*School of Computer Science, University of Birmingham (UK)*

*May-Jul 2013/Feb-May 2017*

Working with Prof. Peter Tino and Prof. Xin Yao researching synthetic data generation.

### Lecturer

*Dpt. of Quantitative Methods, University Loyola Andalucía (Spain)*

*Sept 2015 - May 2017*

Research on weakly supervised learners and time series analysis. Developed a system to detect melanoma from dermatoscopic images and collaborated on predicting the production of renewable energy. Taught courses on Statistics to undergrad students and several seminars on machine learning and programming for the students of the PhD program on Data Science. Received an award for my research productivity.

### Research Assistant

*Spanish National Research Council (Spain)*

*March 2014 - Aug 2015*

Working with Dr. Francisca López-Granados on image processing and machine learning for sustainable agriculture. Developed a model to detect weeds in crops using drones, that helped significantly reduce herbicide application.

### Visiting Academic

*Centre for Research in Information Technology, University of Santiago de Compostela (Spain)*

*Jan - Feb 2014*

### Research Assistant

*Dept. of Computer Science and Numerical Analysis, University of Córdoba (Spain)*

*Jul 2011 - Feb 2014*

Working with Prof. César Hervás-Martínez on ordinal classification and biomedicine applications. Developed an organ allocation system for liver transplantation (using data from Spain and UK) that is currently under trial in Spanish hospitals. Worked as well on a project with the European Space Agency to build an early warning system for climate change.

### Honorary student with research and teaching tasks

*Dept. of Computer Science and Numerical Analysis, University of Córdoba (Spain)*

*2010-2015*

## Education

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### Ph.D in Machine Learning

University of Córdoba (Spain), thesis available [here](#), International Doctor Mention

Oct 2012 – Feb 2015

Thesis: *Exploiting decomposition methods, kernel algorithms and over-sampling techniques for ordinal regression.*

Received the Honorary Award from the PhD program on Engineering and Technology

### M.Sc in Intelligent Systems

University of Córdoba (Spain), Mean grade: 9.3/10, first class honours

Oct 2011 – Jul 2012

Master Thesis: *Ordinal regression using metaclassifiers: Reformulating the one-vs-all paradigm.*

### B.Sc in Computer Science

University of Córdoba (Spain), Mean grade: 8/10

Sept 2008 – Sept 2011

BSc project: *Ordinal classification based on local approximation. Applications in biomedicine.*

### Certified Health Coach

Institute of Integrative Nutrition (online, US)

2015–2016

## Selected research publications

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I have published around 70 peer-reviewed publications. This section includes a selection of these.

Most relevant information has been highlighted in bold face (e.g. venue, citations and impact factor (IF)).

Further information about my publication record can be found on my [Google Scholar profile](#).

- J. Sánchez-Monedero, P. A. Gutiérrez and M. Pérez-Ortiz: “ORCA: a Matlab/Octave toolbox for Ordinal Regression”, **Journal of Machine Learning Research**, 2019.
- N. Ye, M. Pérez-Ortiz and R. Mantiuk: “Visibility Metric for Visually Lossless Image Compression”, **Picture Coding Symposium**, 2019.
- M. Pérez-Ortiz, A. Mikhailiuk, E. Zerman, V. Hulusic, G. Valenzise and R. Mantiuk: “From pairwise comparisons and rating to a unified quality scale”, **IEEE Transactions on Image Processing**, 2019.
- M. Pérez-Ortiz, P. Tino, R. K. Mantiuk and C. Hervás-Martínez: “Exploiting synthetically generated data with semi-supervised learning for small and imbalanced datasets”, **AAAI Conference on Artificial Intelligence**, 2019.
- M. Pérez-Ortiz, A.M. Durán-Rosal, P.A. Gutiérrez, J. Sánchez-Monedero, A. Nikolaou, F. Fernández-Navarro and C. Hervás-Martínez: “On the use of evolutionary time series analysis for segmenting paleoclimate data”, **Neurocomputing**, **IF 3.74**, 2018.
- M. Pérez-Ortiz, P.A. Gutierrez, P. Tino, C. Casanova-Mateo and S. Salcedo-Sanz: “A mixture of experts model for predicting persistent weather patterns”, **IEEE Int. Joint Conf. on Neural Networks (IJCNN)**, 2018.
- A. Mikhailiuk, M. Pérez-Ortiz and R. Mantiuk: “Psychometric scaling of TID2013 dataset”, **International Conference on Quality of Multimedia Experience**, 2018.
- R. Cruz, K. Fernandes, J.F. Pinto-Costa, M. Pérez-Ortiz and J.S. Cardoso: “Binary ranking for ordinal class imbalance”, **Pattern Analysis and Applications**, 2018.
- J. Sánchez-Monedero, M. Pérez-Ortiz, A. Sáez, P.A. Gutiérrez and C. Hervás-Martínez, “Partial order label decomposition approaches for melanoma diagnosis”, **Applied Soft Computing**, **IF 3.80**, 2018.
- M. Pérez-Ortiz, J. Martinovic, R. K. Mantiuk and S. Wuerger: “Luminance and chromatic contrast sensitivity at high light levels”, **European Conference on Visual Perception (ECVP)**, 2018.
- N. Ye, M. Pérez-Ortiz and R. K. Mantiuk: “Trained perceptual transform for quality assessment of high dynamic range images and video”, **IEEE Int. Conf. on Image Processing (ICIP)**, 2018.

- M. Pérez-Ortiz, P.A. Gutiérrez, M.D. Ayllón-Terán, N. Heaton, R. Ciria and C. Hervás-Martínez: "Synthetic semi-supervised learning in imbalanced domains: Constructing a model for donor-recipient matching in liver transplantation", **Knowledge-based systems**, IF 4.39, 2017.
- R. Cruz, K. Fernandes, J.F. Pinto-Costa, M. Pérez-Ortiz and J. S. Cardoso: "Ordinal class imbalance with ranking", **Iberian Conference on Pattern Recognition and Image Analysis**, 2017.
- M. Dorado-Moreno, M. Pérez-Ortiz, P.A. Gutiérrez, R. Ciria, J. Briceño and C. Hervás-Martínez: "Dynamically weighted evolutionary ordinal neural network for solving an imbalanced liver transplantation problem", **Artificial intelligence in medicine**, IF 2.87, 2017.
- M. Pérez-Ortiz, P.A. Gutiérrez, M. Carbonero-Ruz and C. Hervás-Martínez: "Semi-supervised learning for ordinal kernel discriminant analysis", **Neural Networks**, IF 5.28, 2016.
- M.D. Ayllón, R. Ciria, M. Cruz-Ramírez, M. Pérez-Ortiz, R. Valente, J. O'Grady, M. de la Mata, C. Hervás-Martínez, N. D. Heaton and J. Briceño: External validation of artificial neural networks as a methodology for donor-recipient matching for liver transplantation, **Liver transplantation**, IF 3.75, 2016.
- M. Pérez-Ortiz, S. Jiménez-Fernández, P.A. Gutiérrez, E. Alexandre, C. Hervás-Martínez and S. Salcedo-Sanz: "A review of classification problems and algorithms in renewable energy applications", **Energies**, ~30 citations, IF 2.67, 2016.
- M. Pérez-Ortiz, A. Saez, J. Sánchez-Monedero, P. A. Gutiérrez and C. Hervás-Martínez: "Tackling the ordinal and imbalance nature of a melanoma image classification problem", **IEEE Int. Joint Conf. on Neural Networks (IJCNN)**, 2016.
- P. A. Gutiérrez, M. Pérez-Ortiz, J. Sánchez-Monedero and C. Hervás-Martínez: "Representing ordinal input variables in the context of ordinal classification", **IEEE Int. Joint Conf. on Neural Networks (IJCNN)**, 2016.
- M. Pérez-Ortiz, P. A. Gutiérrez, M. Carbonero-Ruz and C. Hervás-Martínez: "Adapting linear discriminant analysis to the paradigm of learning from label proportions", **IEEE Symposium Series on Computational Intelligence**, 2016.
- M. Pérez-Ortiz, P.A. Gutiérrez, P. Tino and C. Hervás-Martínez: "Over-sampling the minority class in the feature space", **IEEE Trans. on Neural Networks and Learning Systems**, ~20 citations, IF 4.85, 2015.
- P.A. Gutiérrez, M. Pérez-Ortiz, J. Sánchez-Monedero, F. Fernández-Navarro and C. Hervás-Martínez: "Ordinal regression methods: survey and experimental study", **IEEE Trans. on Knowledge and Data Engineering**, ~130 citations, IF 2.56, 2015.
- M. Pérez-Ortiz, P.A. Gutiérrez, J. Sánchez-Monedero and C. Hervás-Martínez: "Evaluation of centred kernel-target alignment for multi-scale kernel optimisation", **Neural Processing Letters**, 2015.
- M. Pérez-Ortiz, J.M. Peña, P.A. Gutiérrez, J. Torres-Sánchez, C. Hervás-Martínez and F. López-Granados. "Selecting patterns and features for between-and within-crop-row weed mapping using UAV-imagery", **Expert Systems with Applications**, ~70 citations, IF 3.76, 2015.
- M. Pérez-Ortiz, J.M. Peña, P.A. Gutiérrez, J. Torres-Sánchez, C. Hervás-Martínez and F. López-Granados: "A semi-supervised system for weed mapping in sunflower crops using unmanned aerial vehicles and a crop row detection method", **Applied Soft Computing**, ~60 citations, IF 3.64, 2015.
- M. Pérez-Ortiz, P.A. Gutiérrez and C. Hervás-Martínez: "Projection-based ensemble learning for ordinal regression", **IEEE Trans. on Cybernetics**, >30 citations, IF 4.94, 2014.
- M. Pérez-Ortiz, P.A. Gutiérrez, X. Yao and C. Hervás-Martínez: "Graph-based approaches for over-sampling in the context of ordinal regression", **IEEE Trans. on Knowledge and Data Engineering**, ~40 citations, IF 2.24, 2014.

- M. Pérez-Ortiz, P.A. Gutiérrez, M. Cruz-Ramírez, J. Sánchez-Monedero and C. Hervás-Martínez. 2014. "Kernelising the proportional odds model through kernel learning techniques", **Neurocomputing**, IF 3.12, 2014.
- M. Pérez-Ortiz, M. de la Paz-Marín, P.A. Gutiérrez and César Hervás-Martínez. "Classification of EU countries' progress towards sustainable development based on ordinal regression techniques", **Knowledge-Based Systems**, IF 4.56, 2014.
- M. Pérez-Ortiz, P.A. Gutiérrez and C. Hervás-Martínez, "Learning kernel label decompositions for ordinal classification problems", **Int. Conf. on Neural Comp. Theory and Applications (NCTA)**, 2014.
- M. Pérez-Ortiz, P.A. Gutiérrez and C. Hervás-Martínez: "Incorporating privileged information to improve manifold ordinal regression", **Int. Conf. on Neural Comp. Theory and Applications (NCTA)**, 2014.
- M. Pérez-Ortiz, P.A. Gutiérrez and C. Hervás-Martínez: "Log-gamma distribution optimisation via maximum likelihood for ordered probability estimates", **Int. Conf on Hybrid Art. Intell. Systems (HAIS)**, 2014.
- M. Pérez-Ortiz, M. Cruz-Ramírez, M. D. Ayllón-Terán, N. Heaton, R. Ciria and C. Hervás-Martínez: "An organ allocation system for liver transplantation based on ordinal regression", **Applied Soft Computing**, >20 citations, IF 3.56, 2014.
- M. Pérez-Ortiz, M. de la Paz-Marín, P.A. Gutiérrez and C. Hervás-Martínez. "Classification of EU countries' progress towards sustainable development based on ordinal regression techniques", **Knowledge-Based Systems**, IF 4.56, 2014.
- L. García-Hernández, M. Pérez-Ortiz, A. Arauzo-Azofra, L. Salas-Morera and C. Hervás-Martínez. "An evolutionary neural system for incorporating human expert knowledge into the UA-FLP", **Neurocomputing**, IF 3.12, 2014.
- M. Pérez-Ortiz, P.A. Gutiérrez and C. Hervás-Martínez: "Synthetic over-sampling in the empirical feature space", **European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)**, 2013.
- M. Pérez-Ortiz, P.A. Gutiérrez, J. Sánchez-Monedero and C. Hervás-Martínez: "Multi-scale support vector machine optimization by kernel-target alignment", **European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)**, 2013.
- J. Sánchez-Monedero, P.A. Gutiérrez, M. Pérez-Ortiz and C. Hervás-Martínez: "A  $n$ -spheres based synthetic data generator for supervised classification", **Int. Work Conf. on Artificial Neural Networks (IWANN)**, >10 citations, 2013.
- M. Cruz-Ramírez, C. Hervás-Martínez, P.A. Gutiérrez, M. Pérez-Ortiz, J. Briceño and M. de la Mata: "Memetic Pareto differential evolutionary neural network used to solve an unbalanced liver transplantation problem", **Soft Computing**, >10 citations, 2013.
- M. Pérez-Ortiz, P.A. Gutiérrez, C. Hervás-Martínez, J. Briceño and M. de la Mata: "An ensemble approach for ordinal threshold models applied to liver transplantation", **IEEE Int. Joint Conf. on Neural Networks (IJCNN)**, 2012.
- P.A. Gutiérrez, M. Pérez-Ortiz, F. Fernández-Navarro, J. Sánchez-Monedero and C. Hervás-Martínez: "An experimental study of different ordinal regression methods and measures", **International Conference on Hybrid Artificial Intelligence Systems**, >30 citations, 2012.

## Awards and achievements

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<b>Award Young Researchers in Computer Science</b> <i>BBVA and Spanish Scientific Society for Computer Science, 5000€</i>	2017
<b>Annual award to research productivity</b> <i>University Loyola Andalucía</i>	2017
<b>Young Cordoba Awards: University and Innovation</b> <i>Regional Government of Andalusia, Spain</i>	2017
<b>First honorary award at the PhD Program of Engineering and Technology</b> <i>University of Córdoba</i>	2016
<b>Award Frances Allen</b> <i>Spanish Association for AI</i>	2015
<b>Third place award and award of the public: Your thesis in three minutes</b> <i>Spanish Network for the Advance and Transfer of Applied Comp. Intelligence, 1500€</i>	2013
<b>Grant to attend the Dagstuhl Seminar on Automating Data Science</b> <i>Leibniz-Zentrum für Informatik (Germany)</i>	2018
<b>Grant to attend the 6th Heidelberg Laureate Forum (a week with Fields, Abel &amp; Turing laureates)</b> <i>University of Heildelberg (Germany) (highly competitive)</i>	2018
<b>Grant to attend the Global Young Scientists Summit (a week with Nobel laureates)</b> <i>Nanyang Technological University (Singapore) (highly competitive)</i>	2019

## Teaching experience

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I have mainly contributed to courses related to machine learning, statistics and programming. I have also collaborated in two teaching innovation projects and supervised three degree final projects.

<b>Past, present and future of Artificial Intelligence</b> <i>Summer School at St Catharine's College, Lectures (20 hours) and preparation of material</i>	<b>University of Cambridge</b> 2018
<b>Artificial Intelligence I (2nd year)</b> <i>B.Sc in Computer Science, Supervisions</i>	<b>University of Cambridge</b> 2018
<b>Probabilistic Machine Learning</b> <i>M.Sc in Computer Science, Grading</i>	<b>University of Cambridge</b> 2017-2018
<b>Statistics I (2nd year)</b> <i>B.Sc in Business and Administration, Lectures (120 hours), 40 students per group</i> Mean grade given by students: 8/10	<b>University Loyola Andalucía</b> 2016-2017
<b>Seminars on programming and machine learning</b> <i>PhD Program in Data Science, Lectures (90 hours) and preparation of material</i>	<b>University Loyola Andalucía</b> 2015-2017
<b>Help in the practicals of Introduction to Machine Learning</b> <i>B.Sc in Computer Science, 30 students per group</i>	<b>University of Córdoba</b> 2012-2014
<b>Help in the practicals of Distributed Operative Systems</b> <i>B.Sc in Computer Science, 30 students per group</i>	<b>University of Córdoba</b> 2011-2012
<b>B.Sc project supervision</b> <i>Analysing country positioning using industry potential indexes (distinction)</i>	<b>University Loyola Andalucía</b> 2016
<b>B.Sc project supervision</b> <i>Softcomputing models in ordinal regression (distinction)</i>	<b>University of Córdoba</b> 2013
<b>B.Sc project supervision</b> <i>Ordinal regression for manifold learning (distinction)</i>	<b>University of Córdoba</b> 2013
<b>Collaboration in teaching innovation project</b> <i>Use of kaggle's platform in the classrom</i>	<b>University of Córdoba</b> 2016-2017
<b>Collaboration in teaching innovation project</b> <i>Teaching tool for learning Evolutionary Computing and neural networks</i>	<b>University of Córdoba</b> 2013-2014

## Media coverage and public engagement

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This section covers popular science articles, interviews in press and others.

- Book chapter [Artificial intelligence and freedom](#) for the book “Technology for sustainable development”, (Spanish and English) 2019.
- Article in press (Mujeresconciencia.com, in Spanish, 2019): [Women and Computer Science: Breaking the unary code](#)
- Article in press (El pais, in Spanish/English, 2018): [Can we build truly intelligent machines?](#)
- Story at the beginning of my PhD thesis (in English, 2015): [The story of the little kernel who wanted to surf the equations of life \(on kernel functions and support vector machines\)](#)
- Article in Advances in Engineering (press, 2016): [Weed mapping using drones.](#)
- Collaboration as expert in the book [What robot stole my cheese? Looking for answers in the automatization labyrinth](#) (in Spanish, 2018).
- Participation in the book [600 women that make Cordoba](#) (in Spanish, 2018).
- Participation in the project [Women, science and technology](#) from the Regional Government of Andalusia (2019) to demonstrate the work of female scientists in schools.
- Participation in the photographic exhibition [Millennial Generation: Women standing strong](#) (in Spanish, 2019).
- Interview in press (El pais, in Spanish, 2017): [Liver transplantation organ allocation system in Spain.](#)
- Interview in press (ABC, in Spanish, 2017): [AI can save lifes.](#)
- Interview in press (ConSalud, in Spanish, 2017): [Donor-recipient compatibility in transplantation.](#)
- Interview in press (The Objective, in Spanish, 2017): [Young researchers in the technological revolution.](#)
- Interview in press (Diario Córdoba, in Spanish, 2017): [Research in AI in Spain.](#)

## Organisation and management of scientific events

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### Member of program committee

ECML PKDD Workshop on Automating Data Science 2019

### Member of program committee

International Work-Conference on Artificial Neural Networks (IWANN) 2019

### Organiser and chair of reading group “Machine learning for imaging”

University of Cambridge (UK) 2017-2018

### Co-organiser of society “Women at the Computer Laboratory”

University of Cambridge (UK) 2017-2018

### Organiser and chair of workshop: “Neural computing and deep learning”

Heildelberg Laurate Forum, Heildelberg, Germany 2018

### Organiser and chair of special session: “Machine learning for imbalanced domains”

International Work-Conference on Artificial Neural Networks, Cádiz, Spain 2017

### Organiser and chair of special session: “Ordinal regression and ranking”

World Conference on Computational Intelligence, Vancouver, Canada 2016

### Journal reviewer:

2013-2019

IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Cybernetics, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Image Processing, Neural Processing Letters, Applied Soft Computing and Neurocomputing

## Open-source developed code and datasets

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- [Ordinal regression framework](#) (Matlab and Octave)
- [Toolbox for pairwise comparison experiments](#) (Matlab)
- [Projection-based ensemble learning](#) (Matlab)
- [Over-sampling in the feature space](#) (Matlab)
- [Kernelised Proportional Odds Model](#) (Matlab)
- [Graph-based over-sampling in ordinal regression](#) (Matlab)
- [Synthetic data generator](#) (Matlab)
- Dataset [Cross-content quality scaling of TID2013 image quality dataset](#)

- Dataset **Visually Lossless Image Compression** (link to be released soon)
- Dataset **Unified Photometric Image Quality** (link to be released soon)
- [Mixing pairwise comparisons and rating measurements](#) (Matlab)

## Invited talks

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<b>Neural computation and deep learning</b> <i>Heidelberg Laureate Forum (Germany)</i>	2019
<b>How to collect visual perception data and its application to image compression</b> <i>Department of Applied Mathematics, University of Cambridge (UK)</i>	2018
<b>Learning from our visual perception</b> <i>Virtual Reality observatory, Malaga (Spain)</i>	2018
<b>Understanding visual perception to improve computer displays</b> <i>Hughes Hall College research showcase, University of Cambridge</i>	2018
<b>Learning from humans and the law of comparative judgment</b> <i>Women at the Computer Laboratory Talklet, University of Cambridge</i>	2018
<b>My personal experience with research</b> <i>Spanish Association of Women in STEM, Seville (Spain)</i>	2018
<b>Learning from humans: A broad overview of approaches to model preferences, skills and perception</b> <i>Computer Laboratory, University of Cambridge</i>	2017
<b>Ordinal classification and time series segmentation: Potential applications</b> <i>Centro Singular de Investigación en Tecnoloxías da Información, University of Santiago de Compostela</i>	2014
<b>Ensemble methodologies for ordinal regression</b> <i>University of Granada (Spain)</i>	2012

## Research projects and scientific networks

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Projects and scientific networks as official co-investigator.....  
This section includes research projects and scientific networks in which I have been **co-investigator** officially.

<b>Advanced diversification of learning machines</b> 35.000€, <i>Spanish Ministry of Economy and Competitiveness</i>	2016-2017
<b>Ordinal classification algorithms and renewable energy prediction</b> 79.200 €, <i>Spanish Ministry of Economy and Competitiveness</i>	2015-2017
<b>Monitoring of crops and weeds using UAVs with infrared sensors for improving agric. manag.</b> 320.000€, <i>CSIC-MINECO-FEDER (technological funds)</i>	2014-2015
<b>Climate Tipping Points: detection and analysis of patterns using ordinal regression</b> 25.000 €, <i>European Space Agency</i>	2013-2014
<b>Advanced Neuromodelling with hybrid learning algorithms</b> 64.377€, <i>Spanish Ministry of Research, Development and Innovation</i>	2012-2014
<b>NEMOTECH: Neuromodelling techniques with hybrid learning algorithms</b> 65.461€, <i>Spanish Ministry of Research, Development and Innovation</i>	2012-2014
<b>Data Mining and Machine Learning Spanish Network</b> 12.000€, <i>Spanish Ministry of Education and Science</i>	2010-2012

Projects as research staff/collaborator.....  
This section includes research projects in which I have worked as research staff or collaborated.

<b>A spatio-chromatic colour appearance model for retargeting high-dynamic-range images</b> 322.345£, <i>Apple and UK Engineering and Physical Sciences Research Council</i>	2017-2019
<b>MURI: Semantic Information Pursuit for Multimodal Data Analysis</b> 563.778£, <i>UK Engineering and Physical Sciences Research Council</i>	2018-2022

## Impact of my research beyond academia

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This section covers some of the problems I have worked on and how these have made an impact on the world.

- **Liver transplantation in Spain:** I worked on a system to find the most compatible recipient for a donor in liver transplantation. This model is now in trial virtual validation in several Spanish hospitals, as the last step before being implanted as a decision system for organ allocation.
- **Drones for detecting weeds in crops:** I developed a system for detecting weeds from drone imaging so that herbicide application in crops can be reduced. There is a group now offering this service in agriculture.
- **Early warning of climate change:** I collaborated with the European Space Agency to develop a model for finding statistical descriptors of small nonlinear changes in climate dynamics that could lead to abrupt climate changes.
- **Melanoma detection:** I helped develop a non-invasive system for detecting melanoma from dermatoscopic imaging. The rest of the group is looking now for partners to build a prototype.
- **Human visual perception:** I helped build an experiment to test human colour sensitivity in Cambridge, that has applications in different graphic applications (virtual reality, cinema, videogames, etc) and is being used by the research group in different papers and industry demos to show how displays could be adapted to the specific visual features of the user (e.g. to patients with visual colour deficiencies).
- **Recommendation of educational resources:** At the moment I am working on a project related to the construction of a recommender system for open educational resources. The system will be able to capture your knowledge and recommend educational resources of your interest and level. There will be a prototype soon.

## Research interests

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- Weakly supervised learners
- Data augmentation
- Multimodal and transfer learning
- Inter-disciplinary applications of machine learning and the inclusion of expert knowledge
- Automatisation of data science
- Intersection of machine learning and neuroscience
- The future of machine learning and its impact on our society
- AI and biomedicine

## Languages

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### Proficiency Certificate in English (C2 level)

University of Cambridge

2015

### Intermediate level of German (B1 level)

Official Language School of Córdoba (2008) and GLS Sprachenzentrum in Berlin (2007)

2007–2008

Native in Spanish