

Curriculum Vitae

Prof. Dr. J. de Curtò

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Alberto Aguilera, 23
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Education

- Ph.D. in Computer Science, Universitat Politècnica de València, València 46022, Spain 2021-2023
- M.Sc. in Multimedia Information Technology, City University of Hong Kong, Hong Kong, 2013-2015
- M.Sc. in Telecommunication Engineering (2n Cycle), Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain, 2011-2013
- M.Sc. in Telecommunication Engineering (1st Cycle), Universitat Politècnica de Catalunya, 08034 Barcelona, Spain, 2006-2009

Professional Experience

- **Recognised Researcher (R2)**, Department of Computer Applications in Science & Engineering, Group of Dual Technologies, BARCELONA Supercomputing Center - Centro Nacional de Supercomputación, 08034, Barcelona, 2024 -
- **Profesor Asociado**, Department of Electronics, Control Systems and Communications, Escuela Técnica Superior de Ingeniería (ICAI), Universidad Pontificia Comillas, 28015, Madrid, 2024 -
- **Postdoctoral Scholar**, Institute for Computer Science and Mathematics, GOETHE-University Frankfurt am Main, 60323 Frankfurt am Main, 2024
- **Research Associate (E-13, Level 3)**, Institute for Computer Science and Mathematics, GOETHE-University Frankfurt am Main, 60323 Frankfurt am Main, 2023
- **Research Assistant**, Centre for Intelligent Multidimensional Data Analysis, HK Science Park, Hong Kong, 2022-2023
- **Research Assistant**, Department of Computer Science and Engineering, CUHK, Hong Kong, 2017-2018
- **Research Assistant**, Robotics Institute, Carnegie Mellon, Pittsburgh (USA), 2017
- **Senior Research Assistant**, Department of Electrical Engineering, City University of Hong Kong, Hong Kong, 2017
- **Scientific Assistant**, Department of Information Technology and Electrical Engineering, ETH Zürich, Zürich, 2015-2016
- **Research Associate**, Department of Computer Science, City University of Hong Kong, Hong Kong, 2015
- **Research Associate**, Robotics Institute, Carnegie Mellon, Pittsburgh (USA), 2014

- **Research Scientist**, ALBA Synchrotron, Cerdanyola del Vallès (Barcelona), 2010
- **Research Assistant**, ALBA Synchrotron, Cerdanyola del Vallès (Barcelona), 2009-2010

Research Interests

- Large Language Models for Unmanned Aerial Robot Control and Communication.
- Advanced Computer Vision / Control Techniques for Autonomous Navigation.
- Robotic Systems Integration and Design for Enhanced Robot Performance.
- Space Mission Design.

Publications

Journal Articles

- J. de Curtò and I. de Zarzà. (2024). "Hybrid State Estimation: Integrating Physics-Informed Neural Networks with Adaptive UKF for Dynamic Systems" *Electronics*, vol(13), 2208.
- J. de Curtò and I. de Zarzà. (2024). "Spectral Properties of Mimetic Operators for Robust Fluid–Structure Interaction in the Design of Aircraft Wings" *Mathematics*, vol(12), 1217. [Most Notable Articles (March-May 2024)]
- J. de Curtò and I. de Zarzà. (2024). "Analysis of Transportation Systems for Colonies on Mars" *Sustainability*, vol(16), 3041.
- J. de Curtò and I. de Zarzà. (2024). "Optimizing Propellant Distribution for Interorbital Transfers" *Mathematics*, vol(12), 900.
- J. de Curtò, I. de Zarzà, Gemma Roig and Carlos T. Calafate. (2024). "Large Language Model-Informed X-ray Photoelectron Spectroscopy Data Analysis" *Signals*, vol(5), 181–201.
- J. de Curtò, I. de Zarzà, Juan Carlos Cano, Pietro Manzoni and Carlos T. Calafate. (2023). "Adaptive Truck Platooning with Drones: A Decentralized Approach for Highway Monitoring" *Electronics*, vol(12), 4913.
- I. de Zarzà, J. de Curtò, Gemma Roig and Carlos T. Calafate. (2023). "LLM Multimodal Traffic Accident Forecasting" *Sensors*, vol(23), 9225.
- I. de Zarzà, J. de Curtò, Juan Carlos Cano and Carlos T. Calafate. (2023). "Drone-Based Decentralized Truck Platooning with UWB Sensing and Control." *Mathematics*, vol(11), 4627.
- I. de Zarzà, J. de Curtò, Gemma Roig and Carlos T. Calafate. (2024). "Optimized Financial Planning: Integrating Individual and Cooperative Budgeting Models with LLM Recommendations" *AI*, vol(5), 91-114.
- J. de Curtò, I. de Zarzà and Carlos T. Calafate. (2023). "UWB and MB-OFDM for Lunar Rover Navigation and Communication." *Mathematics*, vol(11), 3835. [Most Notable Articles (November-December 2023)]
- J. de Curtò, I. de Zarzà, Gemma Roig, Juan Carlos Cano, Pietro Manzoni and Carlos T. Calafate. (2023). "LLM-Informed Multi-Armed Bandit Strategies for Non-Stationary Environments." *Electronics*, vol(12), 2814 [Feature Paper, Editor's Choice].

- I. de Zarzà, J. de Curtò, Enrique Hernández-Orallo and Carlos T. Calafate. (2023). "Cascading and Ensemble Techniques in Deep Learning." *Electronics*, vol(12), 3354. [Editor's Choice]
- I. de Zarzà, J. de Curtò, Gemma Roig, Pietro Manzoni and Carlos T. Calafate. (2023). "Emergent Cooperation and Strategy Adaptation in Multi-Agent Systems: An Extended Coevolutionary Theory with LLMs." *Electronics*, vol(12), 2722.
- I. de Zarzà, J. de Curtò, Gemma Roig and Carlos T. Calafate. (2023). "LLM Adaptive PID Control for B5G Truck Platooning Systems" *Sensors*, vol(23), 5899.
- I. de Zarzà, J. de Curtò and Carlos T. Calafate. (2023). "Optimizing Neural Networks for Imbalanced Data." *Electronics*, vol(12), 2674.
- J. de Curtò, I. de Zarzà, Gemma Roig and Carlos T. Calafate. (2023). "Signature and Log-Signature for the Study of Empirical Distributions Generated with GANs." *Electronics*, vol(12), 2192.
- J. de Curtò, I. de Zarzà, Gemma Roig and Carlos T. Calafate. (2023). "Summarization of Videos with the Signature Transform." *Electronics*, vol(12), 1735. [Most Notable Articles (March-May 2023)]
- J. de Curtò, I. de Zarzà and Carlos T. Calafate. (2023). "Semantic Scene Understanding with Large Language Models on Unmanned Aerial Vehicles." *Drones*, vol(7), 114. [Editor's Choice]
- I. de Zarzà, J. de Curtò and Carlos T. Calafate. (2022). "Detection of glaucoma using three-stage training with EfficientNet." *Intelligent Systems with Applications*, vol(16), 200140.
- J. de Curtò, I. de Zarzà, Hong Yan and Carlos T. Calafate. (2022). "On the applicability of the Hadamard as an input modulator for problems of classification." *Software Impacts*, vol(13), 100325.

International Conference Articles

- J. de Curtò, I. de Zarzà. (2024). "Physics-Informed Neural Networks for Enhanced Thermal Regulation in a Spacecraft." *28th International Conference on Knowledge Based and Intelligent information and Engineering Systems (KES 2024)*, Sevilla, Spain, 11–13 September, 2024.
- J. de Curtò, I. de Zarzà, Carlos T. Calafate. (2024). "LLM Multi-agent Decision Optimization." *18th International Conference on Agents and Multi-Agent Systems: Technologies and Applications (AMSTA 2024)*, Santa Cruz, Madeira, Portugal, 19–21 June, 2024.
- I. de Zarzà, J. de Curtò, Carlos T. Calafate. (2023). "UMAP for Geospatial Data Visualization." *27th International Conference on Knowledge Based and Intelligent information and Engineering Systems (KES 2023)*, Athens, Greece, 6–8 September, 2023.
- I. de Zarzà, J. de Curtò, Carlos T. Calafate. (2023). "Area Estimation of Forest Fires using TabNet with Transformers." *27th International Conference on Knowledge Based and Intelligent information and Engineering Systems (KES 2023)*, Athens, Greece, 6–8 September, 2023.
- I. de Zarzà, J. de Curtò, Carlos T. Calafate. (2023). "Socratic Video Understanding on Unmanned Aerial Vehicles." *27th International Conference on Knowledge Based and Intelligent information and Engineering Systems (KES 2023)*, Athens, Greece, 6–8 September, 2023.

I. de Zarzà, J. de Curtò, Carlos T. Calafate. (2023). "Decentralized Platooning Optimization for Trucks: A MILP and ADMM-based Convex Approach to Minimize Latency and Energy Consumption" *6th International Workshop on Vehicular Networking and Intelligent Transportation Systems (VENITS 2023)*, Hong Kong. July 18, 2023.

I. de Zarzà, J. de Curtò, Carlos T. Calafate. (2023). "Decentralized Planning of Platoons in Road Transport using Reinforcement Learning" *6th International Workshop on Vehicular Networking and Intelligent Transportation Systems (VENITS 2023)*, Hong Kong. July 18, 2023.

National Conference Articles

J. de Curtò, I. de Zarzà. (2024). "Dinámica de Estrategias en la Confrontación de Enjambres de Drones." *Congreso Nacional de I+D en Defensa y Seguridad 2024 (DESEID2024)*, Jaén, Spain, 12–14 November, 2024.

J. de Curtò, David Modesto and Joan Farnós. (2024). "Algoritmos de Coordinación por Radio Definida por Software en Simulaciones de Combate de Múltiples Entidades" *Congreso Nacional de I+D en Defensa y Seguridad 2024 (DESEID2024)*, Jaén, Spain, 12–14 November, 2024.

Thesis

J. de Curtò. (2023). "Frontiers of Large Language Models: Empowering Decision Optimization, Scene Understanding, and Summarization Through Advanced Computational Approaches" [*Tesis doctoral*]. Universitat Politècnica de València.

Editorial Participation

Topical Advisory Panel - Innovative Urban Mobility for MDPI Drones since 2024.

Guest Editor. MDPI Drones. Special issue on: Visual Language Models and Large Language Models for Unmanned Aerial Vehicles. May - December 2024.

Invited Talks

7th May 2024. High Performance Computing for Advanced Transportation Systems. Universidad Francisco de Vitoria - UFV Madrid. Invited talk for the subject 'Control Systems'. 3rd-year Mathematical Engineering. Recognized for the students as 0.2 ECTS.

21st June 2024. Supercomputación e Inteligencia Artificial para Sistemas de Transporte Avanzados. 3a Semana de la Innovación, 11-21 June 2024. Ingeniería de Sistemas para la Defensa de España (ISDEFE), Madrid. Keynote speaker. Covering Topics of Supercomputing, Artificial Intelligence and Foundation Models applied to Advanced Transportation Systems in Dual Technologies.

Awards and Honors

- Top Achiever, City University of Hong Kong, 2015
- MSc Summer Internship Award, City University of Hong Kong, 2014
- MSc Entrance Scholarship, City University of Hong Kong, 2013
- First Year Scholarship for University Studies. Universitat Politècnica de Catalunya, 2006

Grants and Fellowships

- ITF Research Talent Hub Award, HK Government, 252000 HKD, 2022

Teaching Experience

- "Drones in Action: Leveraging the power of LLMs to understand the world around us." Workshop. GOETHE-University Frankfurt am Main. April 27, 2023.
- Aerospace Electronics. Universidad Pontificia Comillas. Spring Semester 2024. Course covering topics on Space Mission Design for 4th-year Telecommunication Engineering / Industrial Engineering, undergraduate students: spacecraft design, subsystems and advanced topics on estimation and control. 80% international student body. [Course coordinator] 3 ECTS.

Professional Memberships

- IEEE, Member since 2019
- ACM, Member since 2019
- SIAM, Member since 2019
- AAAI, Member since 2021
- KES, Member since 2023

Skills

Technical Skills

- Programming Languages: Python, MATLAB, C++
- Software: LaTeX, Git, Microsoft Office, Adobe Creative Suite
- Frameworks/Libraries: TensorFlow, PyTorch, Scikit-learn

Languages

- Spanish/Catalan: Native
- English: Fluent (Reading, Writing, Speaking)