

Curriculum Vitae

Prof. Dr. J. de Curtò

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Alberto Aguilera, 23
Madrid, 28015

Professional Experience

- **Recognised Researcher**, 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

Education

- Ph.D. in Computer Science (Programa Oficial de Doctorado en Informática; Doctorado con Mención Internacional), Universitat Politècnica de València, València 46022, Spain 2021-2023
- M.Sc. in Multimedia Information Technology (with Distinction), City University of Hong Kong, Hong Kong, 2013-2015 [MSc thesis developed as exchange student at Carnegie Mellon, USA]

- 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

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 (h-index: 13)

Journal Articles

Pablo García, J. de Curtò, I. de Zarzà, Juan Carlos Cano and Carlos T. Calafate. (2025). "Foundation Models for Cybersecurity: A Comprehensive Multi-Modal Evaluation of TabPFN and TabICL for Tabular Intrusion Detection" *Electronics*, vol(14), 3792.

Álvaro Moraga, J. de Curtò, I. de Zarzà and Carlos T. Calafate. (2025). "AI-Driven UAV and IoT Traffic Optimization: Large Language Models for Congestion and Emission Reduction in Smart Cities." *Drones*, vol(9), 248.

J. de Curtò and I. de Zarzà. (2025). "LLM-Driven Social Influence for Cooperative Behavior in Multi-Agent Systems" *IEEE Access*. doi: 10.1109/ACCESS.2025.3548451.

J. de Curtò and I. de Zarzà. (2025). "Using Digital Tools to Understand Global Development Continuums" *Societies*, vol(15), 65.

J. de Curtò, I. de Zarzà, Leandro Sebastián Fervier, Victoria Sanagustín-Fons and Carlos T. Calafate. (2025). "An Institutional Theory Framework for Leveraging Large Language Models for Policy Analysis and Intervention Design" *Future Internet*, vol(17), 96.

J. de Curtò, I. de Zarzà, Juan Carlos Cano and Carlos T. Calafate. (2024). "Enhancing Communication Security in Drones Using QRNG in Frequency Hopping Spread Spectrum" *Future Internet*, vol(16), 412.

J. de Curtò and I. de Zarzà. (2024). "Isomorphic Structures and Operator Analysis in Mimetic Discretizations" *IEEE Access*, vol(12), 112482-112498. doi: 10.1109/ACCESS.2024.3443058

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

- Pablo García, J. de Curtò and I. de Zarzà (2025). "Foundation Models for Tabular Intrusion Detection: Evaluating TabPFN and LLM Few-Shot Classification on IoT Network Security." *IEEE 3rd International Conference on Foundation and Large Language Models (FLLM 2025)*, Vienna, Austria, 25–28 November, 2025.
- J. de Curtò, Cristina LiCalzi, Julien Tubiana Warin, Jack Gehlert, Brian Langbein, Alexandre Gamboa, Chris Sixbey, William Maguire, Santiago Fernández, Àlvaro Maestroarena, Alex Brenchley, Logan Maroclo, Philemon Mercado, Joshua DeJohn, Cesar Velez, Ethan Dahmus, Taylor Steinys, David Fritz and I. de Zarzà. (2025). "Advanced System Engineering Approaches to Emerging Challenges in Planetary and Deep-Space Exploration." *12th International Conference on Sustainable Design and Manufacturing (KES-SDM-25)*, Catania, Sicily, Italy, 17–19 September, 2025.
- J. de Curtò, I. de Zarzà and Carlos T. Calafate. (2025). "Integrating Polyglot Persistence with Large Language Models for Scalable Social Network Applications." *29th International Conference on Knowledge Based and Intelligent information and Engineering Systems (KES 2025)*, Osaka, Japan, 10–12 September, 2025.
- J. de Curtò and I. de Zarzà (2025). "LLM-Powered Cooperative Perception Framework for Mixed UAV-Vehicle Platoons." *The 10th International Conference on Fog and Mobile Edge Computing (FMEC 2025)*, Tampa, Florida, USA, 19–22 May, 2025.
- J. de Curtò and I. de Zarzà (2024). "Large Model Cognitive Radio: Software-Defined Radios and Advanced Language Models." *IEEE International Conference on Ubiquitous Computing and Communications (IUCC 2024)*, Chengdu, China, 20–22 December, 2024.
- J. de Curtò and I. de Zarzà (2024). "Comparative Analysis of Reasoning Capabilities in Foundation Models." *IEEE 2nd International Conference on Foundation and Large Language Models (FLLM 2024)*, Dubai, United Arab Emirates, 26–29 November, 2024.
- I. de Zarzà and J. de Curtò (2024). "Topological Data Analysis for Sustainable and Smart City Education Systems." *16th International Conference on Sustainability in Energy and Buildings (SEB-24); Invited Session: Big Data Analytics in Sustainable and Smart City*, Santa Cruz, Madeira, Portugal, 18–20 September, 2024.
- J. de Curtò and 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 and 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 and 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 and 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 and 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 and Carlos T. Calafate. (2023). "Decentralized Platooning Optimization for Trucks: A MILP and ADMM-based Convex Approach to Minimize Latency and Energy Consumption" *2023 IEEE 43rd International Conference on Distributed Systems Workshops (ICDCSW)*, Hong Kong. July 18, 2023.

I. de Zarzà, J. de Curtò and Carlos T. Calafate. (2023). "Decentralized Planning of Platoons in Road Transport using Reinforcement Learning" *2023 IEEE 43rd International Conference on Distributed Systems Workshops (ICDCSW)*, Hong Kong. July 18, 2023.

National Conference Articles

J. de Curtò and I. de Zarzà. (2025). "Modelos de lenguaje para navegación autónoma: casos prácticos de uso" *Congreso Nacional de I+D en Defensa y Seguridad 2025 (DESEID2025)*, Zamora, Spain, 11–13 November, 2025.

J. de Curtò and 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.

Extended Abstracts

J. de Curtò and I. de Zarzà. (2025). "Spectral Properties of Mimetic Operators for Robust Fluid-Structure Interaction" *The 15th International Congress on Spectral and High Order Methods (ICOSAHOM 2025)*, Montreal, Canada, 13–18 July, 2025. Symposium: High Order Mimetic Differences and Applications.

J. de Curtò and I. de Zarzà. (2025). "Algebraic Approaches to Combining Multiple Large Language Models" *SuperComputing Asia (SCA 2025)*, Singapore, 10–13 March, 2025. Workshop: Harnessing the Power of Generative AI for Science and Engineering - The Trillion Parameter Consortium (TPC).

J. de Curtò and I. de Zarzà. (2025). "Isomorphic Structures and Operator Analysis in Mimetic Discretizations" *SIAM Conference on Computational Science and Engineering (CSE25)*, Fort Worth, USA, 3–7 March, 2025. Symposium: Current Developments in Mimetic Differences and Applications Part I.

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

Guest Associate Editor. Collection on: Advanced Integration of Large Language Models for Autonomous Systems and Critical Decision Support, *Frontiers in Artificial Intelligence*, 2025.

Topic Editor of *Frontiers in Artificial Intelligence* since 2025.

Early Career Editorial Board for *MDPI Drones* since 2025.

Topical Advisory Panel - Innovative Urban Mobility for *MDPI Drones* since 2024 to 2025.

Guest Editor. *MDPI Drones*. Special issue on: Visual Language Models and Large Language Models for Unmanned Aerial Vehicles. May 2024 - October 2025.

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 Bachelor's Degree in 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 2023-2024. Course covering topics on Space Mission Design for 4th-year Bachelor's Degree in Engineering in Telecommunications Technologies / Bachelor's Degree in Engineering for Industrial Technologies: spacecraft design, subsystems and advanced topics on estimation and control. 80% international student body. [Course coordinator] 3 ECTS.
- Aerospace Electronics. Universidad Pontificia Comillas. Spring Semester 2024-2025. 4th-year Bachelor's Degree in Engineering in Telecommunications Technologies / Bachelor's Degree in Engineering for Industrial Technologies. [Course coordinator] 3 ECTS.

- Aerospace Electronics. Universidad Pontificia Comillas. Spring Semester 2025-2026. 4th-year Bachelor's Degree in Engineering in Telecommunications Technologies / Bachelor's Degree in Engineering for Industrial Technologies. [Course coordinator] 3 ECTS.

Advising

- Soulaymane Loukili. Universitat Autònoma de Barcelona (UAB). MSc Modeling for Science and Engineering. Dept of Mathematics. Title: Modeling in Computational Mechanics through Physics-Informed Neural Networks. [Excellent] Joint advising with David Modesto. 03-2024 / 09-2024.
- Pablo García. Universidad Pontificia Comillas, Madrid, while at University of Illinois Urbana-Champaign (USA). Bachelor's Degree in Mathematical Engineering and Artificial Intelligence. Title: AI intrusion detection system for IoT networks. [Excellent] 09-2024 / 07-2025.
- Álvaro Moraga. Universidad Pontificia Comillas, Madrid, while at University of San Diego (USA). Dual degree program: Bachelor's Degree in Engineering in Telecommunications Technologies and Bachelor's Degree in Business Analytics. Title: Adaptive traffic management system with IoT and Edge Computing. [Excellent] 09-2024 / 07-2025.
- Mauro Liz. Universidad Pontificia Comillas, Madrid, while at Boston University (USA). Bachelor's Degree in Engineering for Industrial Technologies Title: OneMap+: Evaluation, Extensions, and Efficient Deployment of an Open-Vocabulary Semantic Mapping System for Real-Time Multi-Object Navigation. 09-2025 / 07-2026.
- Victoria Guillén. Universidad Pontificia Comillas, Madrid. Bachelor's Degree in Mathematical Engineering and Artificial Intelligence. Title: Rectified Point Flow for Unsupervised 3D Part Pose Estimation and Shape Assembly using Diffusion Generative Models. 09-2025 / 07-2026.

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)