MINISTERIO DE CIENCIA E INNOVACIÓN

Cofinanciado por la Unión Europea

AGENCIA ESTATAL DE INVESTIGACIÓN

CURRICULUM VITAE (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

CV date	20/01/2024

First name	Felix		
Family name	Garcia-Torres		
Gender (*)	Male	Birth date (dd/mm/yyyy)	13/08/77
Social Security, Passport, ID number	44.355.522E		
e-mail	fgtorres@uco.es	URL Web	
Open Researcher and Contributor ID (ORCID) (*)		0000-0001-7240-706X	

(*) Mandatory

A.1. Current position

Position	0000-0001-7240-706X		
Initial date	01/09/2022		
Institution	Universidad de Cordoba		
Department/Center	Electric Engineering and Automatic Control		
Country	Spain	Teleph. number	0034 677885643
Key words	Smart Grids, Electric Vehicles, Model Predictive Control, Power Electronics, Hybrid Energy Storage Systems		

A.2. Previous positions (research activity interuptions, art. 14.2.b))

Period	Position/Institution/Country/Interruption cause
2009-2021	Responsible for Microgrids Laboratory/National Hydrogen Center/Spain/Family and Work Life Reconciliation
2007-2008	R&D Engineer/GreenPower Technologies, S.L/Spain/End of Contract
2006-2007	R&D Engineer/Institute of Industrial Automation-CSIC/Spain/Reconciliation of Family and Work Life

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD	University of Seville	2015
Licensed	University of Seville	2004

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Metrics: Google Scholar. Index h: 11. Index i10: 11. Nº Cites: 803 (Since 2017: 724, Since 2022: 53)

My background as a researcher has focused on the topic of microgrids, being pioneer in the application of hybrid energy storage systems based on hydrogen, batteries and ultracapacitors using an advanced formulation based on model predictive control and mixed programming techniques with the aim of optimizing the use of different storage technologies, maximizing their complementarities in response to transients or autonomy while minimizing the effects of degradation. Among the most relevant publications is the publication with the highest number

of citations worldwide according to the Google Scholar metric, using the keywords Hydrogen Microgrids with a total of 307 citations. I have also been a pioneer in the publication of the first book on the topic Model Predictive Control of Microgrids. In total, I have published 19 JCR articles and 30 International conferences with a total of 1,685 citations (1,478 since 2019), according to Google Scholar metrics. of which 383 belong to 2023 and 27 to the current year, having an h-index of 17 (15 since 2019) and an i10-index of 20 (18 since 2019). According to the Scopus metric, my research items have an account of 1033 citations with an h-index 13 and 800 total citations according to Web of Science. Regarding my normalized impact factor (FWCI- Field-Weighted Citation Impact) for the period 2019-2022, it was 2.32 according to Scopus metrics. According to my Scopus profile, I have 17.1% international collaboration, with 42.9% of my publications being in the top publication percentiles. According to the Researchgate metric, my score exceeds 91% of ResearchGate members, being higher than 94% in the electrical engineering knowledge area.

Regarding obtaining funding, I have been the main researcher of the consortium of subproject 1 PSE H2Renov (PSE-120000-2009-3), with funding of €312,500, and principal investigator of the consortium of the INTERREG SUDOE IMPROVEMENT project (SOE3/P3/E0901) obtaining financing at the consortium level of €1,876,444.71 and at the entity level of €541,137.50, having also participated in 7 public funded projects.

In relation to contributions to society, I have been responsible for 2 technology transfer projects with companies, the CARDHIN project (MIG-20201042), subcontracted by ARIEMA Energía y Medioambiente, S.L. for €50,000 and AD-GRHID(MIG-20221009), subcontracted by Magtel Operaciones SLU for €150,000. I was subcontracted by the company TALGO for the development of Conceptual, Basic and Detail Engineering, collaboration in the construction, start-up, operation and optimization of a prototype of a hybridized hydrogen train with batteries (CF: 2002400), and by the company Flexiwatt Smartgrid SL for the development of a multivariable control tool to provide microgrids with flexibility. I have been part of 2018 CTN Committee on Electrical Energy Storage Systems of AENOR. I have been an active collaborator in the working groups of the Spanish Technological Platform for Hydrogen and Fuel Cells, and I also belong to the Andalusian Hydrogen Cluster.

Regarding the constitution of Research Teams, I was part of the initial team of 10 engineers that was formed in 2009 for the Creation of the Spanish National Hydrogen Center, being responsible for the microgrid area until 2021, the year in which I joined the Department. of Electrical and Automatic Engineering from the University of Córdoba. Currently, I am directing 5 doctoral theses in relation to the topic application of the model-based predictive control technique applied to hybrid energy storage microgrids. Regarding editorial activities, I have been a member of the Technical Committee of the National Smart Grids Congress during the editions from 2017 to 2020, and also of the I International Conference on Smart Energy Systems and Technology (SEST). Likewise, I am a regular reviewer for the IEEE Transaction on Smart Grids and IEEE Transaction on Industrial Electronics magazines, and I have been Editor of the Special Issue of the MDPI Energies magazine “Model Predictive Control for Energy Management in Microgrids”.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications *(see instructions)*

1. C. Bordons, **F. Garcia-Torres** and M.A. Ridao, Libro: “Model Predictive Control of Microgrids”, Cham, Switzerland: Springer, 2020. AC (2/3). Nº Cites 205 (Google Scholar), 80 (Web of Science) Average Citation: 51,25 (Google Scholar) 20 (Scopus)
2. **F Garcia-Torres**, C Bordons, Optimal economical schedule of hydrogen-based microgrids with hybrid storage using model predictive control. IEEE Transactions on Industrial Electronics 62 (8), 5195-5207, 2015. DOI. 10.1109/TIE.2015.2412524. AC (1/2). Nº Cites: 247 (Scopus) 307 (Google Scholar). Average Citation: 27 (Scopus).

3. **F Garcia-Torres**, L Valverde, C Bordons, Optimal load sharing of hydrogen-based microgrids with hybrid storage using model-predictive control, IEEE Transactions on Industrial Electronics 63 (8), 4919-4928, 2016. AC (1/3) **DOI:**10.1109/TIE.2016.2547870. Nº Cites: 112 (Scopus), 144 (Google Scholar). Average Citation 14 (Scopus).
4. **F Garcia-Torres**, C Bordons, MA Ridao, Optimal economic schedule for a network of microgrids with hybrid energy storage system using distributed model predictive control. IEEE transactions on industrial electronics 66 (3), 1919-1929, 2018. **DOI:** 10.1109/TIE.2018.2826476, AC (1/3). Nº Cites:86(Scopus) 112 (Google Scholar), Average Citation: 17,2 (Scopus)
5. Javier Tobajas, **F. Garcia-Torres**, Pedro Roncero-Sanchez, Javier Vázquez, Ladjel Bellatreche, Emilio Nieto. Resilience-oriented schedule of microgrids with hybrid energy storage system using model predictive control. Applied Energy,Volume 306, Part B, 2022, 118092, ISSN 0306-2619, **DOI:** 10.1016/j.apenergy.2021.118092, AC (2/6), Nº Cites: 53 (Scopus) 66 (Google Scholar), Average Citation: 33 (Scopus)
6. **F Garcia-Torres**, DG Vilaplana, C Bordons, P Roncero-Sanchez. Optimal management of microgrids with external agents including battery/fuel cell electric vehicles, IEEE Transactions on Smart Grid 10 (4), 4299-4308, 2019. **DOI:** 10.1109/TSG.2018.2856524. AC (1/5). Nº Cites: 48 (Scopus) 67 (Google Scholar). Average Citation: 9,6 (Scopus)
7. **F Garcia-Torres**, C Bordons, J Tobajas, R Real-Calvo, IS Chiquero, S. Grieu. Stochastic Optimization of Microgrids with Hybrid Energy Storage Systems for Grid Flexibility Services Considering Energy Forecast Uncertainties, IEEE Transactions on Power Systems, 2021. **DOI:** 10.1109/TPWRS.2021.3071867 AC (1/6), Nº Cites: 40 (Scopus), 53 (Google Scholar). Average Citation: 13 (Scopus)
8. **F Garcia-Torres**, A Zafra-Cabeza, C Silva, S Grieu, T Darure. Model Predictive Control for Microgrid Functionalities: Review and Future Challenges. Energies 14 (5), 1296, 2021. https://doi.org/10.3390/en14051296 .AC (1/6). N Cites: 39 (Scopus), 52 (Google Scholar). Average Citation: 13 (Scopus).
9. **F Garcia-Torres**, C Bordons, J Tobajas, JJ Márquez, J Garrido-Zafra, A. Moreno-Munoz. Optimal schedule for networked microgrids under deregulated power market environment using model predictive control. IEEE Transactions on Smart Grid 12 (1), 182-191, 2020. **DOI:** 10.1109/TSG.2020.3018023. AC (1/6). NºCites: 35 (Scopus), 45 (Google Scholar). Average Citation: 8,75.

C.2. Congress

1. **F. García-Torres, "**Model Predictive Control Applied To Different Control Levels of a Renewable Energy Microgrid with Multiple Energy Storage Systems", 3rd. Anual Microgrid Global Innovation Forum, Lisboa, 22-23 Nov 2016. (Invited Speaker)
2. **F. García-Torres, ""**Interconnection of Microgrids Using Distributed Model Predictive Control", 4th Anual Microgrid Global Innovation Forum, Barcelona, 5-6 Septiembre 2017 (Invited Speaker)
3. **F. Garcia-Torres**, C. Bordons and S. Vazquez, "Voltage predictive control for microgrids in islanded mode based on Fourier transform," 2015 IEEE International Conference on Industrial Technology (ICIT), 2015, pp. 2358-2363, doi: 10.1109/ICIT.2015.7125446. AC (1/3) Cites: 13 (Scopus). (Oral communication)
4. **F. Garcia-Torres**, S. Vazquez, C. Bordons, I. Moreno-Garcia, A. Gil, P. Roncero-Sanchez, Power Quality Management of Interconnected Microgrids using Model Predictive Control, IFAC 2020, Vol. 53 (2). Cites: 3 (Scopus). (Oral communication)

C.3. Research projects

Main Researcher:

1. Consortium Main Researcher Interreg SUDOE Project IMPROVEMENT (SOE3/P3/E0901) “INTEGRATION OF COMBINED COOLING, HEATING AND POWER MICROGRIDS IN ZERO-ENERGY PUBLIC BUILDINGS UNDER HIGH POWER QUALITY AND CONTINUITY OF SERVICE REQUIREMENTS)1.876.444,71 € (2019-2021)
2. Consortium Main Researcher Subproject 1 PSE H2 RENOV (PSE-120000-2009-3) SP01. Integración en Sistemas de Generación de Energía Eléctrica basados en pila de combustible con hidrógeno renovable (HYDROCASA) (PSS-120000-2009-21). 40000 €

Member of the Research Team.

1. SAFEMPC: ◦Técnicas de Gestión Segura y Fiable de la Energía en Microrredes IntegrandoCambios en la Demanda y Control Predictivo Estocástico (PID2019-104149RB-I00) 01/06/2020-31/12/2022
2. CONFIGURA: ◦Control Predictivo de Microrredes Reconfigurables con Almacenamiento Híbrido y Móvil (DPI2016-78338-R) 01/01/2017-31/12/19
3. COOPERA: Control Predictivo de Sistemas Energéticos Distribuidos con Fuentes Renovables y Almacenamiento Estacionario y Móvil (DPI2013-46912-C2-1-R) 01/01/2014- 31/12/2016
4. IRHIS: INTEGRACIÓN DE SISTEMAS DE HIDRÓGENO EN MICRORREDES DE GENERACIÓN MEDIANTE FUENTES RENOVABLES (IPT-2011-1182-920000) 05/05/2011-30/04/2012
5. DESPHEGA: Desarrollo de Sistemas de Producción de Hidrogeno Energético de Generación Alcalina (IPT-120000-2010-010) 01/07/2010-30/06/2012
6. GEBE: (GESTOR DE BALANCES DE REDES DE ENERGIA CON GENERACIÓN DISTRIBUIDA INTELIGENTE). IPT-120000-2010-011 01/01/2011-31/03/2013
7. SINTER: Sistemas Inteligentes Estabilizadores de Red (PEN-120000-2009-14) 01/06/2009-31/12/2010

C.4. Contracts, technological or transfer merits

1. AD-GRHID. Tecnología Avanzada para aumentar la flexibilidad y la resiliencia de las redes de Distribución mediante microrredes híbridas ACDC de energía Renovable, electrólisis de óxido-sólido, pila de combustible y almacenamiento de Hidrógeno reciclable y estanco. CONVOCATORIA DEL PROGRAMA MISIONES CDTI DEL AÑO 2022 Expediente: MIG -20221009. Periodo: 2022-2025.
   Entidad financiadora: Ministerio de Ciencia e Innovación. Centro para el Desarrollo Tecnológico Industrial (CDTI). Subcontratado por la empresa MAGTEL OPERACIONES SLU Cuantía 150.000 € (Contract Responsible)
2. CARDHIN. Carga dinámica inductiva y mediante hidrógeno para vehículos eléctricos basada en fuentes renovables. CONVOCATORIA DEL PROGRAMA MISIONES CDTI DEL AÑO 2019 Expediente: MIG-20201042.. Period: 2020-2023.
   Entidad financiadora: Ministerio de Ciencia e Innovación. Centro para el Desarrollo Tecnológico Industrial (CDTI). Company ARIEMA Energia y MedioAmbiente S.L. Budget 50.000 €. Contract Responsible
3. DESARROLLO DE LA INGENIERÍA CONCEPTUAL, BASICA Y DE DETALLE, COLABORACIÓN EN LA CONSTRUCCIÓN, PUESTA EN MARCHA Y OPTIMIZACIÓN DE UN PROTOTIPO DE TREN DE HIDRÓGENO HIBRIDADO CON BATERÍA TPH2. Company: TALGO. Budget 435.025 €. Participant