



CURRICULUM VITAE ABREVIADO (CVA)

Part A. PERSONAL INFORMATION

First name	David		
Family name	Marroquí Sempere		
Gender	Male	Birth date (dd/mm/yyyy)	20/05/1990
ID number	74374166D		
e-mail	dmarroqui@umh.es	http://www.umh.es	
Open Researcher and Contributor ID (ORCID)	0000-0001-5742-7871		

A.1. Current position

Position	Associate Professor		
Initial date	01/10/2022		
Institution	Miguel Hernandez University of Elche		
Department/Center	Materials Science, Optics and Electronic Technology	Polytechnic School of Engineering of Elche	
Country	Spain	Teleph. number	+34 96 522 2685
Key words	DC-DC power conversion, DC power distribution and protection, microsatellites		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
2016 – 2022	Assitant profesor / UMH / Spain
2015 – 2016	Electronics engineer / Fluidra / Spain
2014 – 2015	Process engineer / Ibertex / Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Electronic Engineering	Miguel Hernandez University of Elche	2020
Industrial Engineer	Miguel Hernandez University of Elche	2015

Part B. CV SUMMARY

After joining, in 2016, the Miguel Hernández University of Elche as assistant professor and as a member of the Industrial Electronics Group (IEg), my main research field is power electronics, in particular, power protection and control systems. Within this field, I have carried out applied research mainly on terrestrial high voltage DC distribution systems and aerospace power distribution systems. During the years 2017-20 I did my PhD thesis at the Miguel Hernández University of Elche entitled: "Design and implementation of SiC solid-state power controllers for DC applications" in the framework of the project High voltage solid state power controller with Silicon Carbide (SiC) devices and magnetoresistive current sensors for ion propulsion. In 2022, In 2022 I promoted to the position of Associate Professor that I currently hold. In addition, I am currently co-directing with Professor Ausiàs Garrigós two doctoral theses related to electronic systems applied to the space domain.

In recent years I have conducted several research stays. In 2018, as a pre-doctoral researcher, I stayed at the Center of Reliable Power Electronics at the University of Aalborg. The aim of that stay was to study the reliability of SiC transistors used in the protection systems I I was developing for my doctoral thesis. The results of that stay led to various publications at international conferences, as well as an indexed publication. Later on, in 2021, as a post-doctoral researcher, and within the framework of an activity carried out with the European Space Agency (ESA) [4000133775/21/NL/CBi], I carried out a research stay at ESA's European Space Research and Technology Centre (ESTEC) where, among other activities, I adapted the design of the protection systems developed during my doctoral thesis to space design.



Then in 2023, also in the framework of a research project [TED2021-129562B-C31], I conducted another research stay at the University of Aalborg, at the Reliability of Power Electronic Components (REPEC) centre, where I conducted the packaging of solid-state cascode switches and a best design study.

Currently, my research activity focuses on the development of power systems, control and power distribution for the space environment. At the time of writing this summary, my research numbers are: 15 publications in indexed journals, 28 publications in international conferences and 25 publications in national conferences. I have taken part in 13 competitive call projects and 5 non-competitive call projects/contracts.

Part C. RELEVANT MERITS

C.1. Publications

[J1] C. Torres, A. Garrigós, J. M. Blanes, P. Casado, and D. Marroquí, “Analog Maximum Peak Power Tracking Techniques for Small Satellites,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 59, no. 5, pp. 6599–6611, Oct. 2023, doi: 10.1109/TAES.2023.3275935.

[J2] C. Torres, J. M. Blanes, A. Garrigós, D. Marroquí, and J. A. Carrasco, “High-Reliability Solar Array Regulator for Deep Space Exploration Micro-Satellites,” *IEEE Access*, vol. 11, pp. 94138–94147, 2023, doi: 10.1109/ACCESS.2023.3310274.

[J3] C. Orts, A. Garrigós, D. Marroquí, and A. Franke, “Sequential switching shunt regulation using DC transformers for solar array power processing in high voltage satellites,” *IEEE Transactions on Aerospace and Electronic Systems*, pp. 1–11, 2023, doi: 10.1109/TAES.2023.3325314.

[J4] C. Torres, J. M. Blanes, A. Garrigós, D. Marroquí, and J. A. Carrasco, “Single Point Failure Free Interleaved Synchronous Buck Converter for Microsatellite Electrolysis Propulsion,” *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 10, no. 5, pp. 5371–5380, Oct. 2022, doi: 10.1109/JESTPE.2022.3174358.

[J5] A. Garrigós, D. Marroquí, C. Orts, C. Torres, and J. M. Blanes, “Latching Current Limiter for Space Platform Power Distribution Using a Low-Voltage p-MOSFET and a Normally-ON SiC JFET,” *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 10, no. 5, pp. 5464–5473, Oct. 2022, doi: 10.1109/JESTPE.2022.3165430.

[J6] D. Marroqui, A. Garrigós, and J. M. Blanes, “LVDC SiC MOSFET Analog Electronic Fuse With Self-Adjusting Tripping Time Depending on Overcurrent Condition,” *IEEE Transactions on Industrial Electronics*, vol. 69, no. 8, pp. 8472–8480, Aug. 2022, doi: 10.1109/TIE.2021.3104606.

[J7] D. Marroqui, J. M. Blanes, A. Garrigos, and R. Gutierrez, “Self-Powered 380 V DC SiC Solid-State Circuit Breaker and Fault Current Limiter,” *IEEE Transactions on Power Electronics*, vol. 34, no. 10, pp. 9600–9608, Oct. 2019, doi: 10.1109/TPEL.2019.2893104.

[J8] D. Marroqui, A. Garrigos, J. M. Blanes, R. Gutierrez, E. Maset, and F. Iannuzzo, “SiC MOSFET vs SiC/Si Cascode short circuit robustness benchmark,” *Microelectronics Reliability*, vol. 100–101, no. May, pp. 113429–113429, Sep. 2019, doi: 10.1016/j.microrel.2019.113429.

[J9] R. Gutierrez, J. M. Blanes, D. Marroqui, A. Garrigos, and F. J. Toledo, “System-on-Chip for Real-Time Satellite Photovoltaic Curves Telemetry,” *IEEE Transactions on Industrial Informatics*, vol. 14, no. 3, pp. 951–957, Mar. 2018, doi: 10.1109/TII.2017.2755463.

[J10] D. Marroqui, J. Borrell, R. Gutierrez, J. M. Blanes, A. Garrigos, and E. Maset, “Comparative Study of SiC Transistors for Active Current Limitation in S3R,” *Elektronika ir Elektrotechnika*, vol. 23, no. 5, pp. 54–60, Oct. 2017, doi: 10.5755/j01.eie.23.5.19243.



C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

[C1] A. Garrigós, D. Marroquí, J. M. Blanes, C. Orts, P. Casado, and C. Torres, "High Voltage Power Bus: Solar Array Power Conversion and Power Distribution," in 2023 13th European Space Power Conference (ESPC), Oct. 2023, pp. 1–10. Oral Presentation.

[C2] C. Torres et al., "Microsatellite Power System for Deep Space Exploration," in 2023 13th European Space Power Conference (ESPC), Oct. 2023, pp. 1–6. Oral Presentation.

[C3] D. Marroquí et al., "Towards Higher Current and Voltage LCLs," in 2023 13th European Space Power Conference (ESPC), Oct. 2023, pp. 1–6. Oral Presentation.

[C4] J. A. Carrasco et al., "On the Implementation of a DC-DC Power Supply for Reducing Electromagnetic Interference from Power Converters and Filters," in 2023 13th European Space Power Conference (ESPC), Oct. 2023, pp. 1–6. Oral Presentation.

[C5] A. Garrigós, C. Orts, D. Marroquí, J. M. Blanes, C. Torres and P. Casado, "Bus voltage regulation using sequentially switched ZVZCS converters for spacecraft power systems," 2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe), Hanover, Germany, 2022, pp. P.1-P.10. Poster

[C6] C. Torres, J. M. Blanes, A. Garrigós, D. Marroquí, C. Orts and J. A. Carrasco, "High-Reliability Solar Array Regulator Proposal for Harsh Environments," 2022 IEEE 21st Mediterranean Electrotechnical Conference (MELECON), Palermo, Italy, 2022, pp. 698-702, Oral Presentation.

[C7] D. Marroqui, A. Garrigos, J. M. Blanes, and R. Gutierrez, "SiC Based SSPC for High Voltage Space Applications," in 2018 International Power Electronics Conference (IPEC-Niigata 2018 -ECCE Asia), IEEE, May 2018, pp. 1435–1441. doi: 10.23919/IPEC.2018.8507719. Poster.

[C8] A. Garrigós, D. Marroquí, J. M. Blanes, R. Gutiérrez, M. Compadre and C. Clark, "An Analog Global Maximum Power Point Tracking for photovoltaic systems: Application to nanospacecrafts," 2017 19th European Conference on Power Electronics and Applications (EPE'17 ECCE Europe), Warsaw, Poland, 2017, pp. P.1-P.9. Poster.

[C9] C. Torres, A. Garrigós, J. M. Blanes, P. Casado, D. Marroquí and C. Orts, "Analog MPPT Comparison for Interplanetary Small Satellites Missions," 2022 24th European Conference on Power Electronics and Applications (EPE'22 ECCE Europe), Hanover, Germany, 2022, pp. 1-9. Poster.

[C10] D. Marroqui, A. Garrigos, J. M. Blanes, R. Gutierrez, and E. Maset, "Circuit proposals for high-voltage latching current limiters," in 2019 European Space Power Conference (ESPC), IEEE, Sep. 2019, pp. 1–8. Oral Presentation.

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.

[P1] Title: Design and implementation of current-limiting power distribution switches for high-reliability.

Principal investigator: Ausias Garrigos Sirvent

Role: Power system engineer. Test plan definition, execution of test plans, verification of results, design of experimental validation workbenches.

Funding: Ministry of Science, Innovation and Universities (85445 €) Duration: Jan 2023 – Dec 2024.



[P2] Title: Solar Array to High Voltage Power Bus: Power Conversion Techniques.

Principal investigator: Ausias Garrigos Sirvent

Role: Power system engineer. Power conversion system design. Validation of the proposed systems. Co-director of the doctoral thesis carried out in the project.

Funding: European Space Agency (67000 €) Duration: March 2022 – Feb 2025.

[P3] Title: High-voltage, high current latching current limiters and solid-state current breakers.

Principal investigator: Ausias Garrigos Sirvent

Roel: Power system engineer. Development of the proposed protection systems. Implementation, validation and improvement of the designed LCLs. Research stay at ESA to adapt the design to the space environment.

Funding: European Space Agency. (15877 €) Duration: March 2021 – Feb 2022

[P4] Title: High voltage solid state power controller using Silicon Carbide (SiC) devices and magnetoresistive current sensors for ion propulsion.

Principal investigator: Ausias Garrigós Sirvent

Role: Power system engineer. Design, development and validation of power controllers. Dissemination of results. Project on which he completed his PhD.

Funding: Ministry of Economy and Business. (60500 €) Duration: Jan 2016 – Dec 2018

[P5] Title: Desarrollo y validación de modelo de ingeniería del sistema de potencia de un microsatélite de exploración del espacio profundo a temperaturas extremadamente bajas.

Principal investigators: José Manuel Blanes Martínez / Ausias Garrigós Sirvent

Roel: Power system engineer.

Funding: Generalitat Valenciana (284050€) Duration: Apr 2022 – March 2025.

[P6] Title: Power System for a Deep Space Micro Satellite Electrolysis Propulsion Thruster

Principal investigator: José Antonio Carrasco Hernández

Role: Power system engineer.

Funding: Ministry of Science, Innovation and Universities. (72000€) Duration: Jan'23 – Dec '24

[P7] Title: Power system Integration and test for the micro-plattform for deep space exploration.

Principal investigator: José Antonio Carrasco Hernández

Role: Power system engineer.

Funding: Ministry of Science, Innovation and Universities. (60300 €) Duration: Jan'19 – Dec'21

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

[Co1] Title: Reduction of electromagnetic interference from power converters and filters

Funding organization: European Space Agency (Prime: EMXYS, Subco: UMH and ALTER)

Principal investigator: Ausias Garrigós Sirvent

Duration: May 2021 – Dec 2022 Funding: 119985€

[Co2] Title: WCA and PSA for a FPGA for an space FPGA board

Funding organization: Clyde Space LTD

Principal investigator: Ausias Garrigós Sirvent

Duration: March 2018 – May 2018 Funding: 3600€

[Co3] Title: WCA and PSA for a Power Conditioning Unit

Funding organization: Clyde Space LTD

Principal investigator: Ausias Garrigós Sirvent

Duration: Apr 2017 – Sept 2017 Funding: 12000€