

CV date	02/09/2025
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Part A. PERSONAL INFORMATION

First name	Florencia
Family name	Almonacid Cruz
Open Research and Contributor ID (ORCID)(*)	0000-0001-7352-2377

A.1. Current position

Position	Full Professor		
Initial date	10/2022		
Institution	University of Jaén		
Departament/Center	Department of Electronic and Automatic Engineering		
Country	Spain	Teleph. number	953212426
Keywords	Solar Energy, Photovoltaics, PV converters, Light sources,		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
06/10/1999-31/03/2007	Profesor Asociado (University of Jaén , Spain)
01/04/2007-01/01/2010	Profesor Colaborador (University of Jaén, Spain)
02/01/2010-23/10/2019	Profesor Contratado Doctor (University of Jaén, Spain)
24/10/2019 -04/10/2022	Tenured Professor
05/10/2022-	Full Professor

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD. in Electronic Engineering	University of Jaén	2009

Part B. CV SUMMARY

Currently, I am full professor in the Department of Electronic and Automatic Engineering of the University of Jaén (2022-). I have more than 20 years of experience in the field of the photovoltaic solar energy. My main research lines are related with the photovoltaic (PV), concentrator photovoltaic (CPV) and **currently** in emerging photovoltaic technologies with the development of novel concept to promote their efficiency and competitiveness. In particular, in this last one, **I am working the development of new generation of ultra-efficient optical photovoltaic converters (OPC)** suitable for transforming power in the order of kilowatts. This new and exciting research line is attracting the interest of the science community and **has received a great interest from relevant PV social media** (<https://www.pv-magazine.com/2023/12/28/optical-photovoltaic-converters-for-high-power-transmission-systems/>).

As a summary of my research career, **I have participated in more than 20 research projects** with funding exceeding 8M euros, including 4 international and 4 EU. I have been **Principal Investigator of 9 projects**, including 2 EU and 4 nationals, with total funding exceeding 1M euros. Most of these projects are **related** to a greater or lesser extent **with the project theme** (see section C3). I have also conducted research visits in prestigious research centres for a total period above 1 year. Due to this activity, **I have published +100 peer-review papers (+50 related with the theme of the project**, see section C1 for the last ten) indexed in ISI JCR (+85% T1), ten book chapters and presented $\approx$ 50 contributions in the most relevant international conferences and workshops. **I am co-inventor of three patents**, one of them (PCT/US2019/026049) with the National Renewable Energy Laboratory of USA that is in an industrialization phase and has received funding of \$ 1.4 million from the Department of Energy (DOE) of USA". The last one (P202130520) has attracted the attention of an

independent venture capital firm specialized in industrial high technology transfer and Seed and Early stages, BeAble Capital (<https://beablecapital.com/>) that has already invested in a first stage ~ 190 000€ for the creation of a technology-based company of which **I am a one of the founding members, SOLARCROP, S.L.**, and the development of a Proof of Concept of the patented technology.

I have co-supervised six doctoral theses, two of them Extraordinary Thesis Award, that have generated high-impact publications and results, Thus, I would like to mention that **the majority of the graduated PhDs are working in prestigious institutions related to the PV sector**: Dr. Álvaro Fernández is working as researcher at the German Aerospace Center (DLR) - Plataforma Solar de Almería (https://www.dlr.de/en/images/2011/3/research-platform-in-almeria-spain_2109). Dr. Mathew Muller work as PV expert in the National Renewable Energy Laboratory (NREL) of USA; Dr. Alberto Soria Moya works as PV expert at the Solar Energy Training Centre (CENSOLAR); Dr. Pedro M. Rodrigo is researcher/teacher at the Panamericana University (Mexico) since 2014, Secretary for Research at the Engineering Faculty since 2016 and member of the National System of Researchers of México. He obtained a Beatriz Galindo fellowship from the Spanish Government (BGP18/00034) and a Marie Curie action (MSCA-IF-2019 HybridCPV2000 (882504)). Currently, he is the vice-chancellor of Research at the Panamericana University

Due my research activities, **I keep strong international and national collaborations with researchers from different centres and institution**, i.e.: the Environment and Sustainability Institute of Exeter University (UK), the Thermoelectrics and Photovoltaics laboratory of Cardiff University (UK), the Universidad Panamericana- Campus Aguascalientes (México), the FOSS Research Centre for Sustainable Energy of the University of Cyprus (Cyprus), the Universidad de Santiago de Compostela (Spain), the Lleida University (Spain), the National Renewable Energy Laboratory (USA) and the Sandia National Laboratories (USA).

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

C.1. Publications (selection of the last ten)

1. J.F., Lozano, Javier F., N., Seoane Iglesias, Natalia, J.M., Guedes, J. M., E., Comesaña, Enrique, J.G., Fernández, Julián G., F.M., Almonacid Cruz, Florencia M., E.F., Fernández, Eduardo F., A.J., Garcia-Loureiro, Antonio Jesus. Gallium nitride: a strong candidate to replace GaAs as base material for optical photovoltaic converters in space exploration (2025) Optics and Laser Technology, 192, art. no. 113447 DOI: 10.1016/j.optlastec.2025.113447
2. P., Sanmartín, Pablo, E.F., Fernández, Eduardo F., A.J., Garcia-Loureiro, Antonio Jesus, F.M., Almonacid Cruz, Florencia M. High-power optical photovoltaic transmission: towards a new paradigm (2025) Renewable and Sustainable Energy Reviews, 223, art. no. 116031 DOI: 10.1016/j.rser.2025.116031
3. Á., Fernández-Solas, Álvaro, N.C., Riedel-Lyngskaer, Nicholas C., N., Hanrieder, Natalie, F., Norde Santos, Fernanda, S., Wilbert, Stefan, H.N., Riise, Heine Nygard, J.M., Polo, Jesús M., E.F., Fernández, Eduardo F., F.M., Almonacid Cruz, Florencia M., D.L., Talavera, D. L. Photovoltaic soiling loss in Europe: Geographical distribution and cleaning recommendations (2025) Renewable Energy, 239, art. no. 122086 DOI: 10.1016/j.renene.2024.122086
4. P., Sanmartín, Pablo, E.F., Fernández, Eduardo F., A.J., Garcia-Loureiro, Antonio Jesus, J., Montes-Romero, J., A., Cano, Aitana, P., Martín, Pablo, I., Rey-Stolle, Ignacio, I., Garcia, Ivan, F.M., Almonacid Cruz, Florencia M. Design and Characterization of a 53.5% Efficient Gallium Indium Phosphide-Based Optical Photovoltaic Converter under 637 nm Laser Irradiation at 10 W cm⁻² (2024) Solar RRL, 8 (15), art. no. 2400278 DOI: 10.1002/solr.202400278
5. Micheli L., Muller M., Theristis M., Smestad G.P., Almonacid F., Fernández E.F. Quantifying the impact of inverter clipping on photovoltaic performance and soiling losses (2024) Renewable Energy, 225, art. no. 120317. DOI: 10.1016/j.renene.2024.120317

6. Fernández Solas Á., Riedel-Lyngskær N., Hanrieder N., Norde Santos F., Wilbert S., Nygard Riise H., Polo J., Fernández E.F., Almonacid F., Talavera D.L., Micheli L. Photovoltaic soiling loss in Europe: Geographical distribution and cleaning recommendations (2025) *Renewable Energy*, 239, art. no. 122086 DOI: 10.1016/j.renene.2024.122086
7. Bessa J.G., Valerino M., Muller M., Bergin M., Micheli L., Almonacid F., Fernandez E.F. An Investigation on the Pollen-Induced Soiling Losses in Utility-Scale PV Plants (2024) *IEEE Journal of Photovoltaics*, 14 (1), pp. 178 - 184. DOI: 10.1109/JPHOTOV.2023.3326560
8. Lozano J.F., Seoane N., Comesaña E., Almonacid F.M., Fernández E.F., García-Loureiro A. A new path towards ultra-high efficient laser power converters: Silicon carbide-based multijunction devices (2024) *Results in Engineering*, 21, art. no. 101987. DOI: 10.1016/j.rineng.2024.101987
9. Rodrigo P.M., Mouhib E., Fernandez E.F., Almonacid F., Rosas-Caro J.C. Comprehensive ground coverage analysis of large-scale fixed-tilt bifacial photovoltaic plants (2024) *Renewable and Sustainable Energy Reviews*, 192, art. no. 114229. DOI: 10.1016/j.rser.2023.114229
10. Mouhib E., Fernández-Solas Á., Pérez-Higueras P.J., Fernández-Ocaña A.M., Micheli L., Almonacid F., Fernández E.F. Enhancing land use: Integrating bifacial PV and olive trees in agrivoltaic systems (2024) *Applied Energy*, 359, art. no. 122660. DOI: 10.1016/j.apenergy.2024.122660

C.2. Books/ Book chapters

1. E., Mouhib, Elmehdi, F.M., Almonacid Cruz, Florencia M., P.M., Rodrigo, Pedro M., E.F., Fernández, Eduardo F. Chapter 10-Spectral factors for PV technologies (2025), pp. 279 – 307, *Applications in Photovoltaic Conversion*. DOI: 10.1016/B978-0-443-23839-0.00010-9
2. E. F. Fernández, F. Almonacid, P. M. Rodrigo, P. Pérez-Higueras, “Chapter II-4-A: CPV Systems”, *McEvoy's Handbook of Photovoltaics* (3rd edition), Elsevier (2017), pp. 931-985.
3. M. Martínez, D. Sánchez, F. Rubio, E. F. Fernández, F. Almonacid, N. Abela, T. Zech, Gerstmaier, T., “Chapter 8: CPV Power Plants”, *Handbook on Concentrator Photovoltaic Technology*, Wiley (2016), pp. 433-490.
4. Rodrigo, P., Micheli, L., Almonacid, F. The high-concentrator photovoltaic module (2015) *Green Energy and Technology*, 190, pp. 115-151. DOI: 10.1007/978-3-319-15039-0_5
5. F. J. Muñoz-Rodríguez, E. Muñoz-Cerón, F. Almonacid, E. F. Fernández, “Chapter 8: Efficiencies and energy balance in high-concentrator photovoltaic devices”, *Green Energy and Technology* (2015), 190, pp. 239-260.
6. Hontoria, L., Aguilera, J., Almonacid, F., Nofuentes, G., Zufiria, P. Artificial neural networks applied in PV systems and solar radiation. (2006) *Artificial Intelligence in Energy and Renewable Energy Systems*, pp. 163-200.

C.3. Research projects

1. Materiales fotovoltaicos III-V de banda ancha para la transmisión óptica remota de alta potencia para la Tierra (PowerForEarth) (Cod. PID2023-147898OB-I00) Funded by Ministerio de Ciencia, Innovación y Universidades, Agencia Estatal de Investigación y fondos FEDER. Proyectos de Generación de Conocimiento 2023. Principal Investigators: Almonacid Cruz, Florencia; Fernández Fernández (2024-2028). 373.750,00€
2. High-Efficiency High-Power Laser Beaming In-Space Systems Based on SiC (RePowerSiC) (Cod. 101160868). Funded by Unión Europea. EIC Pathfinder Challenge: In-space solar energy harvesting for innovative space applications. Coordinator: Universidad de Santiago de Compostela (2024-2028). 3.999.997,25 € (elegible 4.025.771,25 €)
3. Rear concentrator photovoltaic bifacial module for agrivoltaics. RearCPVbif (Cód.: TED2021-130463B-I00). Funded by the AEI. Proyectos transición ecológica y digital 2021

(2023-2025), Principal Investigators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo. (12/2022- 11/2024). 143.750€.

4. Ultra-efficient Micro-scale new generation hybrid Concentrator PhotoVoltaic systems: ULTRAMicroCPV (Cód.: PID2019-106497RBI00). Funded by Ministerio de Ciencia, Innovación y Universidades. Proyectos de I+D+i 2019. Principal Investigators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo. (01/06/2020- 31/05/2023). 272.250€.
5. Nuevas Arquitecturas de Células de Concentración Fotovoltaica y TERmoeléctricos para el desarrollo de módulos híbridos de nueva generación: NACe-CPV/TE (Cód.: P18-RT-1595). Funded by Plan Andaluz de Investigación (2020-2023). Principal Investigators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo. (01/01/2020-31/12/202) 122.968 €.
6. Efficient lightweight hybrid thermoelectric generator-concentrator photovoltaic module at 2000x light concentration factor. HybridCPV2000 (882504). Funded by UE. H2020-MSCA-IF-2019. Coordinators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo (2020). €172,932.48.
7. Novel Soiling Identification Logics for Photovoltaics. NoSoilPV (793120). Funded by UE. H2020-MSCA-IF-2017. Coordinators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo (2018-2020). €158,121.60
8. Nuevas Arquitecturas para el Desarrollo de Sistemas a Ultra-Alta Concentración Fotovoltaica (ENE2016-78251-R). Funded by Ministerio de Economía y Competitividad. Programa estatal de investigación. Principal Investigators: Almonacid Cruz, Florencia; Fernández Fernández, Eduardo (2016-2019). 113.740€
9. Nuevos conceptos basados en tecnología de concentración fotovoltaica: Desarrollo de sistemas de muy alta concentración (ENE2013-45442-R). Funded by Ministerio de Economía y Competitividad. Principal Investigator: Perez-Higueras, Pedro Jesus. (2014-2016). 115580 EUR.
10. Desarrollo de un módulo fotovoltaico basado en nuevos conceptos ópticos operando a ultra alta concentración (UHCPV) (Ref: UJAEN2015/07/01). Funded by Universidad de Jaén. Principal Investigator: Florencia Almonacid Cruz (01/01/2016-31/12/2017). 30000€

C.4. Contracts, technological or transfer merits

- **Patent.** E. F. Fernández, F. Almonacid, P. Rodrigo, P. Pérez-Higueras, “Bifacial semi-transparent photovoltaic module with back irradiance concentrators”, University of Jaén (Spain), 2021, P202130520, 2021
- **Patent.** E. F. Fernández, M. Muller, L. Micheli, F. Almonacid, "Methods and systems for determining soiling on photovoltaic devices", National Renewable Energy Laboratory (USA) and University of Jaén, US Patent 16/376,547 (US 2019/0312548 A1) and international PCT Patent PCT/US2019/026049 (WO 2019/195718), 2019. This patent has received funds >1 million euros from the Department of Energy (DOE) of USA (<https://www.sbir.gov/node/1541715> - Phase I ref. 245689, Phase II ref 0000254206).
- **Patent.** P. Perez-Higueras, E. F. Fernández, F. Almonacid, J. I. Fernández-carrasco, “Sistema de concentración de haces de rayos de luz (Concentration system of beams of sunlight), University of Jaén (Spain), P201430087 (Publication no. ES2493740A1, 2015).
- **Technology-based company.** Founding member of the UJA Spin-Off, SOLARCROP, S.L, which has received fund (~190.000€) from BeAble Capital (<https://beablecapital.com/>), company specialized in industrial high technology transfer and Seed and Early stages