Carlos Cárdenas-Bravo

Per aspera ad astra

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Professional summary

My focus lies in developing innovative solutions to recent challenges, specifically in the area of solar photovoltaic energy. I'm deeply passionate about driving forward environmental energy research, to pioneer new approaches for a more sustainable future.

Education

Doctor of Philosophy (Ph.D.) in Applied Mathematics **Sep. 2021 – Sep. 2024**
Université Savoie Mont Blanc, France
Thesis title: *Coupled electrical and thermal models for photovoltaic module diagnostics.*

Master of Science (M.Sc.) in Electrical Engineering **Mar. 2018 – Nov. 2021**
Universidad Técnica Federico Santa María, Chile
Thesis title: *Failure mode characterization of solar photovoltaic modules based on their electrical response.*

Bachelor of Science (B.Sc.) in Electrical Engineering **Mar. 2011 – Mar. 2018**
Universidad Técnica Federico Santa María, Chile
Thesis title: *Characterization of the Operating Conditions of Solar Farms based on the Analysis of Electrical Variables.*

Experience

Research Visitor **Sep. 2023**
Khalifa University, United Arab Emirates
Comment: *Fresh perspective of a new reality at both the human and professional levels..*

Project engineer **May 2018 – Jul. 2021**
Universidad Técnica Federico Santa María, Chile
Comment: *Participation in: FONDEF ID17I10043, Atacama Module and System Technology Center (AtaMoS TeC), and Engineering 2030 14ENI2-26862..*

Part-time professor **Mar. 2020 – Jul. 2020**
Universidad Técnica Federico Santa María, Chile
Comment: *Course ELI270 – Introduction to Basic Electrotechnics..*

Publications in journals

[1] C. Cárdenas-Bravo, F. Morales, R. Barraza, A. Sánchez-Squella, and P. Valdivia, "Online crack detection on photovoltaic devices using a dynamic response analysis," *Renewable energy.* **Peer review: first round.**

[2] C. Cárdenas-Bravo, D. Dutykh, and S. Lespinats, "On the parameters domain of the single-diode model," *Solar Energy.* vol. 277, 112718, ISSN 0038-092X, Jul. 2024.

[3] R. Cortés-Severino, C. Cárdenas-Bravo, R. Barraza, A. Sánchez-Squella, P. Valdivia Lefort, and F. Castillo-Burns, "Optimal design and experimental test of a solar simulator for solar photovoltaic modules," *Energy Science & Engineering*, vol. 9, no. 12, pp. 2514–2528, Oct. 2021.

[4] C. Cárdenas-Bravo, R. Barraza, A. Sánchez-Squella, P. Valdivia-Lefort, and F. Castillo-Burns, "Estimation of Single-Diode Photovoltaic Model Using the Differential Evolution Algorithm with Adaptive Boundaries," *Energies*, vol. 14, no. 13, p. 3925, Jan. 2021.

Publications in conference proceedings

[1] C. Cárdenas-Bravo, S. Lespinats, and D. Dutykh, " A Practical Example of the Impact of Uncertainty on the One-Dimensional Single-Diode Model," in *2024 IEEE International Symposium on Systems Engineering*, Perugia, Italy, Oct 2024.

[2] C. Cárdenas-Bravo, S. Lespinats, and D. Dutykh, "A new robust methodology for the identification of parameters on the electrical response of photovoltaic systems through the application of polar coordinates," in *2024 European PVPMC Workshop*, Copenhagen, Denmark, Aug 2024.

[3] C. Cárdenas-Bravo, D. Dutykh, and D. L. Ha, "Computation of Faulty IV Curves Based on a Distributed Solar Cell Algorithm," in *8th World Conference on Photovoltaic Energy Conversion*, Milan, Italy, Sep 2022, pp. 701–703.

[4] C. Cárdenas-Bravo, R. Cavieres, R. Barraza, D. Godoy, and P. Lefort, "Assessment of the Economic Impact and Management Techniques on Fault Modes present in Photovoltaic Systems," in *International Conference on Solar Heating and Cooling for Buildings and Industry SHC2019*, Santiago, Chile, Nov 2019, p. 10.

Patents granted

[1] D.L. Ha, A. Mohamed, C. Cárdenas-Bravo, and D. Dutykh, "Method for estimating the breakdown voltage of a photovoltaic cell.", EP4376296; WO2024110535, 2024.

[2] R. Cortés-Severino, C. Cárdenas-Bravo, P. Valdivia-Lefort, A. Sánchez-Squella, and R. Barraza, "System and method for determining the operating state of solar photovoltaic modules," US 2024 0039473A1, 2024.

Patents submission

[1] S. Lespinats and C. Cárdenas-Bravo, "Method for generating artificial infrared images of a solar photovoltaic panel for training a machine learning algorithm to detect failures." **Submitted on Sep 2024**.

[2] S. Lespinats and C. Cárdenas-Bravo, "A method for determining a single-diode model for a photovoltaic array." **Submitted on Dec 2023 under N° EP23307170.3**.