JOSE OSWALDO CEBALLOS PÉREZ

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PhD in Renewable Energy focused on the numerical simulation of PEM Fuel Cells using OpenFOAM. My research interests include modeling of transport phenomena and data analysis of fuel cells and Perovskite Solar Cells.

EDUCATION

2021-2025 Ph.D. in Renewable Energy, Centro de Investigación Científica de Yucatán
Thesis Numerical simulation of a PEM Fuel Cell: Theoretical study of mass transport phenomena for effective diffusion

- *Construction of PEMFC polarization curves using OpenFOAM*
- *Modeling PEM Fuel Cells with new diffusion models*
- *Design 3D models of different flow channels*
- *Participate in seminars, lectures, and international congresses*

2018-2020 MEng in Materials and Energy Engineering, Universidad Autónoma del Carmen
Thesis Numerical simulation of perovskite solar cells: Theoretical study of the hysteresis phenomenon

- *Compute polarization curves of Perovskite Solar Cells*
- *Modeling thin film solar cells using SCAPS-1D*
- *Participate in local conferences and workshops*

2004-2009 BSc in Mechanical Engineer, Universidad Autónoma del Carmen

- *Synthesis and characterization of polymeric membranes for the separation of nitrogen from the surrounding air*
- *Operation of the Guarded Hot Plate Apparatus to measure the thermal conductivity of polymeric membranes*
- *Assist in the laboratory for undergraduate students*

JCR PUBLICATIONS

2024 J.O. Ceballos, L.C. Ordoñez, J.M. Sierra (2024). Numerical analysis on the liquid saturation at the cathode side of a PEM fuel cell with different flow paths. Ionics (Kiel). https://doi.org/10.1007/s11581-024-05780-2.

2024 J.O. Ceballos, L.C. Ordoñez, J.M. Sierra (2024). Water saturation distribution in a PEMFC at the cathode side using OpenFOAM. Renew. Energy. 222 (2023) 119882. https://doi.org/10.1016/j.renene.2023.119882

2022 J.O. Ceballos, L.C. Ordoñez, J.M. Sierra (2022). Numerical simulation of a PEM fuel cell: Effect of tortuosity parameters on the construction of polarization curves. Int. J. Hydrogen Energy (2022); 47:30291–302. https://doi.org/10.1016/j.ijhydene.2022.03.112

Book chapters:

2025 CEBALLOS-PÉREZ, José; ORDÓÑEZ-LÓPEZ, Luis; SIERRA-GRAJEDA, Juan. Thermal analysis of a single-cell PEM-type fuel cell with a coil as flow field

architecture and its impact on cathode water formation (2025). Chapter 7, pag. 67-75, “Handbook T-I Innovative Applications in Sustainable Energy and Environment”. ISBN: 978-607-8948-51-2. https://doi.org/10.35429/H.2024.13.67.75

2023 CEBALLOS-PÉREZ, José; ORDÓÑEZ-LÓPEZ, Luis; SIERRA-GRAJEDA, Juan. Analysis of Flow Direction Effects in a Single-Channel Serpentine Geometry for PEM Fuel Cells at the Cathode Side (2023). Chapter 6, pag. 60-66, "Engineering and Applied Sciences Handbooks T-I”. ISBN: 978-607-8948-09-3. https://doi.org/10.35429/H.2023.6.60.66

2022 CEBALLOS-PÉREZ, José; ORDÓÑEZ-LÓPEZ, Luis; SIERRA-GRAJEDA, Juan. Numerical simulation of a PEM Fuel Cell: Theoretical study of transport phenomena in the cathode (2022). Chapter 1, pag. 1-9, "Ingeniería y Materiales Aplicados al Medio Ambiente Handbooks T-II”. ISBN: 978-607-8695-94-2. https://doi.org/10.35429/H.2022.10.1.9

Articles in popular science magazines:

2024 Ceballos-Pérez, J. O. & Ordóñez López, L.C. (2024). Modelamiento matemático de celdas de combustible tipo PEM: Beneficios de las herramientas de código abierto. Revista de Ciencia Básica, Humanidades, Arte y Educación, 2(6), 4-11.

2024 Oswaldo-Ceballos J, Ordoñez López LC. 2024. Combustible obtenido del agua. Revista Ciencia y Naturaleza (1097).

2023 José Oswaldo Ceballos. “Fuel Cells that use hydrogen and oxygen: technology of the future”. Gaceta SIIDETEY, year 11, No. 68, August 2023.

FELLOWSHIPS, AWARDS, AND DISTINCTIONS

2025 Graduated with Honors, 1st Class *(2021-2025)*

2025 CONAHCYT Doctorate Scholarship No. 789267 *(2021-2025)*

2025 CONAHCYT-Sustentabilidad Energética Grant 254667 *(2021-2025)*

2025 Mexican Hydrogen Society Student-Membership *(2023-2025)*

2020 CONAHCYT Master Scholarship No. 719512 *(2018-2020)*

CONFERENCE PARTICIPATION

2023 "Effect of different geometric flow field designs on the liquid saturation at the cathode side of a PEM Fuel Cell using OpenFOAM" at the XXIII International Congress of the Mexican Hydrogen Society, Veracruz, MX *(Sept 25-Sept 29)*

2022 "Numerical study of liquid water saturation distribution at the cathode side of PEM fuel cells" at the XXII International Congress of the Mexican Hydrogen Society, Tabasco, MX *(Sept 28-Sept 30)*

2021 "Numerical simulation of PEM Fuel Cell: Theoretical study of mass transport phenomena for an effective diffusion" at the XXI International Congress of the Mexican Hydrogen Society, Yucatán, MX *(Sept 20-Sept 24)*

Invited talks and lectures

2024 "Simulation of liquid water distribution in PEMFCs" at the Encuentro de Modelamiento de Celdas de Combustible CIMAT-CICY-GEO, oral presentation at the Centro de Investigación en Matemáticas, Yucatán, MX *(Nov 28)*

2024 "Generation of clean energy with water and sunlight" at the CICY Casa Abierta 2024, experimental demonstration at the Centro de Investigación Científica, Yucatán, MX *(Nov 24)*

2024 "Thermal analysis of a serpentine monocell PEMFC and its impact on water formation at the cathode" at the 1er Coloquio de Investigación en Ingeniería de Materiales y Energía3, oral presentation at the Universidad Autónoma del Carmen, Campeche,MX *(Nov 24)*

2023 "Generating energy from water through the use of an electrolyzer" at the CICY Casa Abierta 2023, experimental demonstration at the Centro de Investigación Científica, Yucatán, MX *(Nov 9)*

2023 "Generating energy from water through the use of an electrolyzer" at the CICY Casa Abierta 2023, experimental demonstration at the Centro de Investigación Científica, Yucatán, MX *(Nov 9)*

2023 "Analysis of Flow Direction Effects in a Single-Channel Serpentine Geometry for PEM Fuel Cells at the Cathode Side" at the 5th Master Students Colloquium at the Universidad Autónoma del Carmen, Oral presentation, Campeche, MX *(Ago 28)*

2022 "Numerical simulation of a PEM Fuel Cell: Theoretical study of transport phenomena in the cathode" at the 4th Master Students Colloquium at the Universidad Autónoma del Carmen, Oral presentation, Campeche, MX *(Nov 8)*

PROFESSIONAL EXPERIENCE

2015-2016 Safety Specialist, Jr., Ovarro Seguridad Funcional Operativa OSFO
Apply CONOCER Standard EC0217 to training courses. Create procedures, formats, and documentation to establish a Quality System based on ISO 9001:2008. Perform audits to ensure the accomplishment of Mexican standards.

2011-2015 Roustabout, Atlantic Marine Services AMS
Involved in drilling and lifting activities with a 50-ton Linkbelt Crane to install equipment, perform maintenance, and load transfer from boats. General housekeeping. Support to all áreas: shale shakers, mud pits, pump rooms, chemical room, rig floor.

2009-2011 MWD Field Operator, Halliburton de México
Obtain geological data from directional tools (Gamma, surveys, temperature, depth, pump rate, RPMs, hydrostatic pressure, sonic tools). Assembly and test MLWD tools for every run. Generate run reports, stage, and failure reports. Export data to LAS, ASCII, and TXT format. Create, maintain, and build the main database. Plot drilling logs to send to the client.

LANGUAGE

English Level B2 MCER, TOEFL ITP Score 587.

INTERESTS

Numerical simulations, Transport phenomena modeling, OpenFOAM, Ansys, Data analysis, Python, R, SQL