Manuel Napoleón Cardona Gutiérrez

Expert in Automation, Robotics, Digital Transformation and Disruptive Technologies. Extensive knowledge in fourth industrial revolution, research, development and innovation, and robotic systems applications.

Education

2023 **Postdoctoral Research Stay in Rehabilitation Robotics**, *Universidad Politécnica de Madrid*, Madrid, Spain.

2017–2020 **PhD in Automation and Robotics**, *Universidad Politécnica de Madrid*, Madrid, Spain.

2012 **Postgraduate in Scientific Research**, *Universidad Evangélica de El Salvador*, San Salvador, El Salvador.

2009 **Postgraduate in Innovation Management**, *Leipzig University - ISEADE, FEPADE*, San Salvador, El Salvador.

2007 – 2008 **Master in Automation and Robotics**, *Universidad Politécnica de Madrid*, Madrid, España.

2004–2007 **Certificate of proficiency in English, CPE**, *Centro Cultural Salvadoreño Americano, CCSA*, San Salvador, El Salvador.

1998 – 2004 **Electrical Engineer**, *Universidad de Sonsonate*, Sonsonate, El Salvador.

Other Courses Attended

2011 **Robotics Research**, *Universidad Politécnica de Madrid*, Madrid, Spain..

2011 **Best Practices in Management of Higher Education Institutions**, *Universidad Centroamericana "José Simeón Cañas"*, San Salvador, El Salvador..

2008 **EUROHAPTICS**, *Universidad Politécnica de Madrid*, Madrid, Spain.

Experience

2022–Present **Research Director**, Universidad Don Bosco, San Salvador.

2016–Present **Consultant**, SPECIALIST, Fourth Industrial Revolution, Internet of Things, Digital Transformation, Robotics Systems, Computer Vision, Control Systems, Disruptive Technologies, Electronic Signature, Research and Innovation..

2014–Present **Professor & Researcher**, UNIVERSIDAD DON BOSCO, San Salvador.
Research Areas: Robotics, Automation, Control, Computer Vision and Artificial Intelligence.
Courses: Robotics, Digital Control, Mobile Robots, Flexible Manufacturing Systems, Production Lines, Industrial Instrumentation, MATLAB, Computer Vision.

2014–Present **Master Courses Professor**, UNIVERSIDAD DON BOSCO UNIVERSITY, San Salvador.
Courses: Application of Robotics in Manufacturing, Vision Systems in Manufacturing, Research Seminar.

2008–2014 **Professor & Research**, UNIVERSIDAD DE SONSONATE, Sonsonate.
Courses: Digital Systems, Electronics, Automation Control, Microcontrollers, Estatics, Dinamycs

2004 **Summer Intern**, AES CLESA & CIA, Sonsonate.
Power Meter Programmer, Measurement Systems Installation in Subestations

Awards

2023 Postdoctoral Stay Scholarship.
2020 PhD Cum Laude.
2016 Doctorate Degree Scholarship.
2015 IEEE Senior Member Elevation.
2008 Highest Grade on Master Thesis – MSc (Hons), Laudatur.
2007 Master Degree Scholarship.
2004 Highest Grade Bachelor Degree–BEE (Hons).

Languages

Self-assessment European Level CEFR (C2 maximum evaluation)

		Understanding		**Speaking**		**Writing**
		Listening	Reading	Interaction	Production	
Spanish	Mother Tongue	*C2*	*C2*	*C2*	*C2*	*C2*
English	Advance	*C1*	*C2*	*C1*	*C1*	*C1*

Professional Service & Affiliations

- IEEE Member 2009-Present, *Senior Member*
- IEEE Chair, El Salvador Section, 2022 - 2023
- Awards and Nomination Chair IEEE, El Salvador Section, 2017 - 2019
- Technical Activities Chair IEEE, El Salvador Section, 2016 - 2017

- Education Chapter Chair IEEE, El Salvador Section, 2016 - present
- Member of the IEEE Societies:
  - Aerospace and Electronics Systems (AESS)
  - Robotics and Automation (RAS)
  - Education(EdSoc)
  - Engineering in Medicine and Biology (EMB)
  - Electron Devices (EDS)
  - Women in Engineering (WIE)
  - Young Professionals (YP)
  - Special Interest Group on Humanitarian Technology (SIGHT)
- IEEE, Industry Applications (IAS), *Chapter Chair, El Salvador Section, 2012-2013*
- IEEE, Student Branch Counselor, *Universidad de Sonsonate, 2010 - 2016*
- IEEE, Student Branch Mentor, *Universidad Don Bosco, 2020 - present*
- IEEE RAS, Student Branch Counselor Advisor, *Universidad Don Bosco, 2014 - present*
- IEEE AESS, Student Branch Counselor Advisor, *Universidad Don Bosco, 2017 - present*

Publications

2023 F. Serrano, M. Cardona. Robust H-Infinity Control of Delta Parallel Robot With Disturbance and Parametric Uncertainties. *Latin American Congress on Automation and Robotics (LACAR 2023), Springer Verlag.*

2023 M. Cardona. Delta Robot Kinematics Analysis based on Multibody Formulation. *2023 International Conference on Machine learning and Applied Network Technologies (ICMLANT 2023).* DOI: 10.1109/ICMLANT59547.2023.10372985

2023 R. Garay, B. Martinez, L. Giron, D. Aguilar, M. Cardona, J. Ordoñez. Remote monitoring for critically ill patients. *2023 International Conference on Machine learning and Applied Network Technologies (ICMLANT 2023).* 10.1109/ICMLANT59547.2023.10372989

2023 P. Banegas, M. Cardona, M. Perdomo. State of the Art: Climate and Wave Monitoring Tools. *2023 International Conference on Machine learning and Applied Network Technologies (ICMLANT 2023).* DOI: 10.1109/ICMLANT59547.2023.10372972

2023 V. Garcia , M. Cardona, D. Aguilar, J. Luis Ordoñez. Design of a End Effector For Coffee Bean Quality Monitoring through IoT. *2023 International Conference on Machine learning and Applied Network Technologies (ICMLANT 2023).* DOI: 10.1109/ICMLANT59547.2023.10372992

2023 F. Serrano, M. Cardona, M. Flores. Fault Identification in Electrical Actuators by Autoregressive Models. *2023 IEEE 41th Central America and Panama Convention (CONCAPAN).*

2023 J. Caballero, J. Ordoñez, M. Cardona. Chatbot for validation of research topics for engineering students. *2023 IEEE 41th Central America and Panama Convention (CONCAPAN).*

2023 M. Cardona, F. Serrano. The Fourth Industrial Revolution and Disruptive Technologies. *2023 IEEE 41th Central America and Panama Convention (CONCAPAN).*

2023 O. Montes, M. Cardona, J. Ordoñez. Experimental Analysis of Soft Actuators to Compare their Curvatures with a Modular Base. *2023 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN60431.2023.10328437

2023 M. Cardona, F. Serrano, M. Flores. Identification of Natural Frequencies in Bearing Mechanical Vibrations by Wavelet Decomposition *2023 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN60431.2023.10328410

2023 M. Cardona, F. Serrano, C. García. Dynamic modeling and passivity based control of the RV-3SB Robot. *Actuators Journal.* DOI: https://doi.org/10.3390/act12090339

2023 M. Cardona, F. Serrano. Dynamic Output Feedback and Neural Network Control of a Non-Holonomic Mobile Robot. *Sensors Journal* DOI: https://doi.org/10.3390/s23156875

2023 Jose Cornejo, S. Barrera, et al. Industrial, Collaborative and Mobile Robotics in Latin America: Review of Mechatronic Technologies for Advanced Automation. *Emerging Science Journal* DOI: 10.28991/ESJ-2023-07-04-025

2022 J. Ordonez, M. Cardona, D. Aguilar, M. Ordonez, C. L. Garzón. A Novel Monitoring System for Contagious Diseases of Patients using a Parallel Planar Robot. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996485

2022 M. Perdomo, M. Cardona, D. Castro, W. MejÃa. Literature Review on Artificial Intelligence Implementation in the Honduran Agricultural Sector. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996484

2022 M. Cardona, H. Moreno, J. Ordonez, D. Aguilar, M. Ordonez. Wheels Statistical Analysis for Mobile Robots in Irregular Surface: Spring Stiffness Calculation. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996486

2022 M. Cardona, F. Serrano. A Systematic Review of Control Strategies for Solar Tracking Systems. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996504

2022 M. Cardona, J. Ordonez, I. Magomedouva. The Effect of Adding a One Degree of Freedom to a Robotic Manipulator. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996535

2022 M. Cardona, F. Serrano. Robotics Platforms for Solar Tracking System: A Review. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996509

2022 M. Perdomo, M. Cardona, L. Romero, N. Barnica. State of the Art and Current Perception of Augmented Reality in Honduras. *2022 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)* DOI: 10.1109/ICMLANT56191.2022.9996462

2022 C. Villatoro, J. Ordonez, M. Cardona. Design of a Unmanned Surface Robot for Lakes Monitoring *2022 IEEE 40th Central America and Panama Convention (CONCAPAN).* DOI: 10.1109/CONCAPAN48024.2022.9997761

2022 M. Cardona, J. Cerrato, E. García. Mobile Robots for COVID-19 Pandemic: A State of the Art *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959722

2022 A. Rodríguez, K. Cornejo, R. Mejía, M. Cardona. Chatbots Analysis for the Creation of Automated Conversations in Real Time. *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959611

2022 W. Rivas, M. Cardona. Adaptive Robust Control Design for a Lower Limb Exoskeleton Robot *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959259

2022 J. Ordoñez, M. Perdomo, M. Cardona, C. Estevez, F. Bonilla, L. Pineda, A. Carrasco. Study Case: Fabrication of a Low-Cost Robotic Mobile Platform for Logistic Purposes *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959686

2022 M. Cardona, J. Cerrato, E. García. Design and Simulation of a Mobile Robot for Pipeline Inspection *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959592

2022 J. Alvarado, F. Ramos, J. Rosales, M. Cardona, C. Garzón. Digitization of electrical energy reading for residential users using IoT technology *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959629

2022 J. Ordoñez, A. Hernández, M. Cardona. Design of a Final Effector using Modular Molds for Soft Robotics *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959636

2022 G. Rivas, D. Guerrero, M. Cardona, C. Garzón. Design of the Automatic Grinding Process of Parts as a Productivity and Safety Strategy *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959450

2022 M. Cardona, J. Cerrato, E. García. Mobile Robots for Basic Education: Tools & Resources *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959330

2022 M. Cardona, F. Serrano. Autoregressive Model for Identification of Nonlinear Dynamics Systems With the GNU Octave Control Toolbox *2022 IEEE Central America and Panama Student Conference (CONESCAPAN).* DOI: 10.1109/CONESCAPAN56456.2022.9959679

2021 M. Cardona. Kinematics Solution of ALICE: An Exoskeleton Robot for Rehabilitation *2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT).* DOI: 10.1109/ICMLANT53170.2021.9690553

2021 H. Sasamoto, R. Velázquez, S. Gutiérrez, M. Cardona, A. Ghavifekr, P. Visconti. Modeling and Prototype Implementation of an Automated Guided Vehicle for Smart Factories *2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT).* DOI: 10.1109/ICMLANT53170.2021.9690543

2021 J. Avila, M. Ordoñez, D. Aguilar, M. Cardona. Propose Method for the Design of a Transtibial Prosthesis using Generative CAD/FEM Analysis and Additive Manufacturing *2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT).* DOI: 10.1109/ICMLANT53170.2021.9690535

2021 M. Cardona. Exoskeleton Robot for Rehabilitation ALICE: Jacobian and Workspace Analysis *2021 IEEE Fifth Ecuador Technical Chapters Meeting (ETCM).* DOI: 10.1109/ETCM53643.2021.9590800

2021 J. Cornejo, D. Huamanchahua, S. Huamán, D. Terrazas, J. Sierra, A. Janampa, J. González, M. Cardona. Mechatronic Exoskeleton Systems for Supporting the Biomechanics of Shoulder-Elbow-Wrist: An Innovative Review *IEMTRONICS 2021 (International IOT, Electronics and Mechatronics Conference).* DOI: 10.1109/IEMTRONICS52119.2021.9422660

2021 H. Ascencio, C. Peña, K. Vásquez, M. Cardona, S. Gutiérrez. Automatic Multiple Choice Test Grader using Computer Vision *Mexican Humanitarian Technology Conference, IEEE MHTC 2021, Puebla, Mexico.* DOI: 10.1109/MHTC52069.2021.9419920

2021 Cardona, M., Serrano, F., Martín, J.A., Rausell, E., Saltarén, R., García-Cena, C.E. 2020. El Exoesqueleto de Rehabilitación de la Marcha ALICE: Análisis Dinámico y Evaluación del Sistema de Control Utilizando Cuaternios de Hamilton. *Revista Iberoamericana de Automática e Informática industrial, [S.l.], v. 18, n. 1, p. 48-57, dic. 2020. ISSN 1697-7920.* DOI: https://doi.org/10.4995/riai.2020.12558

2020 M. Cardona, and C. García Cena. Actuation System Selection of ALICE Exoskeleton Robot Based on Dynamic Simulation. *2020 IEEE ANDESCON, Quito Ecuador, ISBN 978-1-7281-9365-6.* DOI: 10.1109/ANDESCON50619.2020.9272197

2020 M. Cardona, C. Garzón-Castro and S. Gutiérrez. Kinematics Solution of the RV-3SB Robot Using Successive Screws. *2020 IEEE ANDESCON, Quito Ecuador, ISBN 978-1-7281-9365-6.* DOI: 10.1109/ANDESCON50619.2020.9272167

2020 C. Garzón-Castro, M. Cardona, R. Velázquez and C. Del-Valle-Soto. Intelligent PI Controller for Microalgae Growth in a Closed Photobioreactor. *2020 IEEE ANDESCON, Quito Ecuador, ISBN 978-1-7281-9365-6.* DOI: 10.1109/ANDESCON50619.2020.9272007

2020 M. Cardona, F. Cortez, A. Palacios and K Cerros. Mobile Robots Application Against Covid-19 Pandemic. *2020 IEEE ANDESCON, Quito Ecuador, ISBN 978-1-7281-9365-6.* DOI: 10.1109/ANDESCON50619.2020.9272072

2020 M. Cardona, A. Palma and J. Manzanares. COVID-19 Pandemic Impact on Mobile Robotics Market. *2020 IEEE ANDESCON, Quito Ecuador, ISBN 978-1-7281-9365-6.* DOI: 10.1109/ANDESCON50619.2020.9272052

2020 M. Cardona, M. Destarac, C. García. *Robotics for Rehabilitation: A State of the Art*, Chapter from the Book: Exoskeleton Robots for Rehabilitation and Healthcare Devices. Springer International Publishing, 2020, ISBN 978-981-15-4731-7, DOI 10.1007/978-981-15-4732-4.

2020 M. Cardona, J. Yudice, F. Huguet, et al. *Gait Capture Systems*, Chapter from the Book: Exoskeleton Robots for Rehabilitation and Healthcare Devices. Springer International Publishing, 2020, ISBN 978-981-15-4731-7, DOI 10.1007/978-981-15-4732-4.

2020 M. Cardona, D. Marroquín, B. Salazar, et al. *Explosive Gas Detection and Alert System Using Internet of Things*, Chapter from the Book: Research in Intelligent and Computing in Engineering. Springer International Publishing, 2020, ISBN 978-981-15-7526-6, 10.1007/978-981-15-7527-3.

2020 J.C. Durón, S. Gutiérrez, M. Cardona and V. Solanki. *Street Lamp Monitoring Using IoT Based on Node-Red*, Chapter from the Book: Research in Intelligent and Computing in Engineering. Springer International Publishing, 2020, ISBN 978-981-15-7526-6, 10.1007/978-981-15-7527-3.

2020 J. Romo, S. Gutiérrez, P. Rodrigo, M. Cardona, and V. Solanki. *Smarter Pills: Low-Cost Embedded Device to Elders*, Chapter from the Book: Research in Intelligent and Computing in Engineering. Springer International Publishing, 2020, ISBN 978-981-15-7526-6, 10.1007/978-981-15-7527-3.

2020 M. Cardona; C. García; F. Serrano. ALICE: Conceptual Development of a Lower Limb Exoskeleton Robot Driven by an On-Board Musculoskeletal Simulator. Sensors 2020, 20, 789. https://doi.org/10.3390/s20030789.

2019 M. Cardona and C. G. Cena, "Direct Kinematics and Jacobian Analysis of Exoskeleton Robots using Screw Theory and Simscape Multibody, *2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), ISBN 978-1-7281-0883-4.* DOI: 10.1109/CONCAPANXXXIX47272.2019.8977008

2019 S. Gutiérrez, L. Islas, F. Martín, M. Cardona, et al. Wireless Ammeter Based on ZigBee for Continuous Monitoring of Induction Motors., *2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), ISBN 978-1-7281-0883-4.* DOI: 10.1109/CONCAPANXXXIX47272.2019.8977048

2019 M. Cardona, V. Romo, S. Gutiérrez, et al. Wireless Temperature Monitoring System through IoT for Domestic Solar Water Heaters., *2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), ISBN 978-1-7281-0883-4.* DOI: 10.1109/CONCAPANXXXIX47272.2019.8977014

2019 S. Gutiérrez, G. Contreras, H. Ponce, M. Cardona, et al. Development of Hen Eggs Smart Incubator for Hatching System Based on Internet of Things., *2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), ISBN 978-1-7281-0883-4.* DOI: 10.1109/CONCAPANXXXIX47272.2019.8976987

2019 S. Gutiérrez, I. Martínez, J. Varona, M. Cardona, et al. Smart Mobile LoRa Agriculture System based on Internet of Things., *2019 IEEE 39th Central America and Panama Convention (CONCAPAN XXXIX), ISBN 978-1-7281-0883-4.* DOI: 10.1109/CONCAPANXXXIX47272.2019.8977109

2019 M. Cardona and C. García. Musculoskeletal Modeling as a Tool for Biomechanical Analysis of Normal of Pathological Gait, *"VIII Latin American Conference on Biomedical Engineering and XLII National Conference on Biomedical Engineering, IFMBE Proceedings Book Series, Springer.vol. 75, pp. 955-963, October 2019*. DOI: 10.1007/978-3-030-30648-9_124

2019 M. Cardona and C. García. Biomechanical Analysis of the Lower Limb: A Full-Body Musculoskeletal Model for Muscle-Driven Simulation, *IEEE ACCESS, DOI 10.1109/ACCESS.2019.2927515.*

2018 M. Destarac, J. García, M. Cardona, et al. ORTE Exoskeleton: Kinematic Analysis and Dynamic Modeling, *2018 IEEE 38th Central America and Panama Convention (CONCAPAN XXXVIII), ISBN 978-1-5386-6122-2.* DOI: 10.1109/CONCAPAN.2018.8596581

2018 S. Gutiérrez, E. Barrientos, J. Alvarez, M. Cardona. An Integrated Architecture for Monitoring and Control the Temperature of Different Platforms Based on Internet of Things, *2018 IEEE 38th Central America and Panama Convention (CONCAPAN XXXVIII), ISBN 978-1-5386-6122-2.* DOI: 10.1109/CONCAPAN.2018.8596403

2018 O. Martínez, M. Cardona. State of the Art and Future Trends on Unmanned Aerial Vehicle, *2018 International Conference on Research in Intelligent and Computing in Engineering (RICE), ISBN 978-1-5386-2599-6.* DOI: 10.1109/RICE.2018.8509091

2018 M. Cartagena, C. Bonilla, J. Menéndez, M. Cardona. Design and Development of a Modular Robotic Kit **CubeBot** for Educational Purposes, *2018 International Conference on Research in Intelligent and Computing in Engineering (RICE), ISBN 978-1-5386-2599-6.* DOI: 10.1109/RICE.2018.8509071

2018 F. Serrano, B. Rodríguez, M. Cardona. Obtención de un Modelo Dinámico para un Robot 3RRR Basado en Teoría de Screws, *Revista Iberoamericana de Automática e Informática Industrial, mar. 2018. ISSN 1697-7920.* DOI: 10.4995/riai.2018.8725

2017 R. Espinoza, M. Destarac, M. Cardona, J. Montaño, et. al. ORTE Exoskeleton: Actuation System Dimensioning and Selection, *Proc. of IEEE 37th Edition of the Central America and Panama Convention (CONCAPAN XXXVII), Managua, Nicaragua.* DOI: 10.1109/CONCAPAN.2017.8278493

2017 M. Cardona, M. Destarac, C. García. Exoskeleton Robots for Rehabilitation: State of the Art and Future Trends, *Proc. of IEEE 37th Edition of the Central America and Panama Convention (CONCAPAN XXXVII), Managua, Nicaragua.* DOI: 10.1109/CONCAPAN.2017.8278480

2017 M. Cardona. State and Future Trends of Industrial Robots in Latin America, *Reportero Industrial, Vol. 85, Ed. 4. pp. 12-15, 2017.*

2016 M. Cardona. Kinematics and Jacobian Analysis of a 6UPS Stewart-Gough Platform, *Proc. of IEEE 36th Edition of the Central America and Panama Convention (CONCAPAN XXXVI), Heredia, Costa Rica.* DOI: 10.1109/CONCAPAN.2016.7942377

2016 M. Cardona. Sugar Crystals Characterization for Quality Control Inspection Using Digital Image Processing, *Proc. of IEEE 36th Edition of the Central America and Panama Convention, Heredia, Costa Rica.* DOI: 10.1109/CONCAPAN.2016.7942378

2015 M. Cardona. A new Approach for the Forward Kinematics of General Stewart-Gough Platforms, *Proc. of IEEE 35th Edition of the Central America and Panama Convention(CONCAPAN XXXV), Tegucigalpa, Honduras.* DOI: 10.1109/CONCAPAN.2015.7428478

2015 L. Villalobos, K. Pimentel, O. Rivera, M. Cardona. Forward Kinematics Analysis of Mitsubishi RV-2AJ Robot via Screws Theory, *IEEE, CONESCAPAN XXXIV, El Salvador.*

2015 I. López, R. Argueta, G. López, J. Gálvez, M. Cardona. Software Development for Features Extraction of Sugar Crystals using Artificial Vision, *2015 CHILEAN Conference on Electrical, Electronics Engineering, Information and Communication Technologies (CHILECON)*, pp. 835-840. DOI: 10.1109/Chilecon.2015.7404669

2015 R. Argueta, G. Lṕez, J. Gálvez, I. López, M. Cardona. Statistical Analysis for Quality Control of Sugar using Machine Vision, *IEEE, CONESCAPAN XXXIV, El Salvador.*

2015 M. Cardona. Dimensional Synthesis of 3RRR Planar Paralell Robots for Well-Conditioned Workspace, *IEEE Latin America Transactions.* DOI: 10.1109/TLA.2015.7055557

2014 M. Cardona. Similarity Law for the Design and Workspace Optimization of 3RRR Planar Parallel Robots,*Proc. of IEEE 34th Edition of the Central America and Panama Convention (CONCAPAN XXXIV), Panamá.* DOI: 10.1109/CONCAPAN.2014.7000438

2013 M. Cardona. Kinematic Analysis of the RV-3SB Mitsubishi Robot via Screws Theory, *Proc. of IEEE 33th Edition of the Central America and Panama Convention (CONCAPAN XXXIII), Guatemala.*

2013 R. Velasco, L. Zeledón, R. Acevedo, M. Cardona. License Plate Recognition System Using Neural Networks in MATLAB, *IEEE CONESCAPAN XXXII, San JosÃ©, Costa Rica.*

2012 M. Cardona. Solution of Forward Kinematics for Serial Robots using Successive Screws, *Proc. of IEEE 32th Edition of the Central America and Panama Convention(CONCAPAN XXXII), Managua, Nicaragua.*

2012 M. Cardona and O. Ordonñez. Development of a Low Cost SCADA System for Electrical Subestations, *Proc. of IEEE 32th Edition of the Central America and Panama Convention (CONCAPAN XXXII), Managua, Nicaragua.*

2012 M. Cardona. A New Methodology for the Forward Kinematics Analysis of the Delta Parallel Robot, *Proc. of IEEE 32th Edition of the Central America and Panama Convention(CONCAPAN XXXII), Managua, Nicaragua.*

2012 L. Zeledón, R. Velasco, M. Cardona. A Review of Advancements in Space Robotics, *IEEE CONESCAPAN XXXI, Tegucigalpa, Honduras.*

2011 M. Cardona. Kinematics Analysis of a Delta Parallel Robot, *Proc. Proc. of IEEE 32th Edition of the Central America and Panama Convention (CONCAPAN XXXI), San Salvador, El Salvador.*

2011 M. Urdaneta, C García, , R. Saltaren, M. Cardona. Application Oilfield Pipelines Inspection Prototype Robot, *Proc. of IEEE 31th Edition of the Central America and Panama Convention (CONCAPAN XXXI), San Salvador, El Salvador.*

2011 I. Bankfield, , R. Saltaren, L. Puglisi, C. García, R. Aracil, M. Cardona. Design of a Hydraulic 6UPS Mechanism for Experimental Researh, *Proc. of IEEE 31th Edition of the Central America and Panama Convention (CONCAPAN XXXI), San Salvador, El Salvador.*

2011 I. Ordoñez, S. Guzmán, R. Hernández, M. Cardona. Development of a Real Time Monitoring System for Electrical Substations using LabVIEW®, *Proc. of IEEE 31th Edition of the Central America and Panama Convention (CONCAPAN XXXI), San Salvador, El Salvador.*

2011 M. Cardona. An Algorithm for the Forward Kinematics of 3RRR Parallel Planar Robots for Real Time Applications. *Proc. of IEEE XVIII International Conference of Electrical Engineering, Electronics and Allied Systems (IEEE INTERCON), Lima Perú.*

2010 M. Cardona. Singularity Analysis of 3RRR Planar Paralell Robots using a Condition Index of the Jacobian Matrix. *Proc. of IEEE 30th Edition of the Central America and Panama Convention (CONCAPAN XXX), San José, Costa Rica.*

2010 M. Cardona. Trends in Service Robotics for Defense, Rescue and Safety Applications. *National Congress of Mechanical, Electrical and Industrial Engineering (CONIMEIRA XIV), San Salvador, El Salvador*

2009 M. Cardona. Kinematics Analysis of 3RRR Parallel Planar Robots. *Proc. of IEEE 29th Edition of the Central America and Panama Convention (CONCAPAN XXIX), San Pedro Sula, Honduras.*

2009 S. Guadrón, M. Garrizano, G. Morán, M. Cardona. An Integrated Development Environment (IDE) for Microcontroller Programming. *IEEE CONESCAPAN XXVIII, San Salvador, El Salvador.*

Books

2021 M. Cardona, V. Solanki, C. García *Internet of Medical Things: Paradigm of Wearable Devices*, Taylor and Francis, 2020. ISBN 9780367272630

2020 Kumar, R., Quang, N.H., Kumar Solanki, V., Cardona, M., Pattnaik, P.K. *Research in Intelligent and Computing in Engineering. Select Proceedings of RICE 2020*, Springer International Publishing, 2020. ISBN 978-981-15-7527-3

2020 M. Cardona, V. Solanki, C. García *Exoskeleton Robots for Rehabilitation and Healthcare Devices*, Springer International Publishing, 2020. ISBN 978-981-15-4731-7, DOI 10.1007/978-981-15-4732-4

2019 V.K. Gunjan, V. Garcia Diaz, M. Cardona, V.K. Solanki, K.V.N. Sunitha *ICICCT 2019-System Reliability, Quality Control, Safety, Maintenance and Management*, Springer International Publishing, 2019. ISBN 978-981-13-8460-8, DOI 10.1007/978-981-13-8461-5

2017 I. Chang, J. Baca, H. Moreno, I. Carrera and M. Cardona, *Advances in Automation and Robotics Research in Latin America*, Springer International Publishing, 2017, ISBN 978-3-319-54376-5. DOI 10.1007/978-3-319-54377-2

Research Editorial Work

Reviewer

2022–Present Actuators, MDPI. *JCR Q2*

2022–Present Sensors, MDPI. *JCR Q1*

2022–Present Applied Science, MDPI. *JCR Q3*

2022–Present Journal of Field Robotics, WILEY. *JCR Q1*

2022–Present Nuclear Engineering and Technology, Elsevier. *JCR Q3*

2020–Present IEEE Access. *JCR Q1*

2021–Present ASME Journal of Engineering and Science in Medical Diagnostics and Therapy. *ISSN: 2572-7958*

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ha superado en diciembre de 2020 los estudios conducentes al TÍTULO universitario oficial de

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