Curriculum Vitae: Prof. Dr. Carlos A. Cifuentes

Date of Birth: 30 April 1982

Present Position: Assistant Professor in Biomedical Engineering, (2016 - present): Department of Biomedical Engineering, Colombian School of Engineering Julio Garavito, Bogota, Colombia (Tel: +57 3042120032, Email: carlos.cifuentes@escuelaing.edu.co, Web: https://goo.gl/5GhiKj)

Previous Positions: 2015 (August) Post-Doctoral Researcher, Federal University of Espirito Santo, Brazil
2012-2015 (July) PhD Researcher, Federal University of Espirito Santo
2006-2011 Assistant Professor in Electronic Engineering, ECCI University

Qualifications: PhD in Electrical Engineering (Robotics), Federal University of Espirito Santo, 2015.
Master in Biomedical Engineering, National University of Entre Rios, 2011
Specialization in Project Management, Colombian School of Engineering Julio Garavito, 2006
BSc in Electronic Engineering, Colombian School of Engineering Julio Garavito, 2004.

Research interests and professional activities:

Carlos Andrés Cifuentes García is a Professor with the Department of Biomedical Engineering and Head of Center for Biomechatronics at Colombian School of Engineering Julio Garavito (ECIJG-Colombia). He has been Visiting Professor at Universidade Federal do Espírito Santo, University of Cauca and Plymouth University. Prior to that, he was a postdoc at Universidade Federal do Espírito Santo (UFES-Brazil). He is broadly interested in human-robot interaction and rehabilitation robotics in the context of developing countries.
He was born in Bogota, Colombia. In 2004, he received the BSc degree in Electronic Engineering from ECIJG, where he received the grade of honor, awarded to the highest GPA of his class. He received his Specialization in Project Management in 2006 at ECIJG. From 2006 to 2011 he worked as an entrepreneur and teaching assistant in the field of embedded systems. In 2011, he obtained his M.Sc. degree in Biomedical Engineering from Universidad Nacional de Entre Ríos, Argentina. His master's dissertation was lauded as one of "10 finalist at the Make It Challenge: Kinetis MCUs Americas" by Freescale semiconductors.
In 2012, he joined the Robotics and Industrial Automation Group at UFES to pursue the Ph.D. degree. He developed a part of his thesis at Automation Institute, (UNSJ-Argentina) and at Neural and Cognitive Engineering group, CAR, (UPM-CSIC-Spain). His Ph.D. thesis (2015), for which he received the Honorable Mention Award CAPES as one of the best theses in 2016 in Brazil, focused on development a multimodal human-robot interface that provides a means of testing and validating control strategies for robotic walkers for assisting human mobility and gait rehabilitation. In 2017 his work was lauded as one of "five history-changing ideas in Latin America" by History Channel.

Research Projects:

- 2018-20: Royal Academy of Engineering - Industry-Academia Partnership Programme Colombia/UK(IAPP1\100126), CASTOR: CompliAnt SofT Robotics.
- 2017-18: Royal Academy of Engineering - Frontiers of Engineering - Seed fund round 3 (FoESF1718\3\2), Development of an affordable hand prosthesis.
- 2018-20: Colciencias Colombia – Call for Science, Technology and Innovation in Health 2017 (122077758499), Development of an Adaptable Robotic Platform for Gait Rehabilitation and Assistance AGoRA
- 2018-20: Colciencias Colombia – Call for Science, Technology and Innovation in Health 2017 (277877758389), Evaluation of the impact of the intervention of a social robot on the cardiovascular responses of patients in the Cardiac Rehabilitation program of the Fundación Cardioinfantil-Instituto de Cardiología SORCAR

- 2016-18: Royal Academy of Engineering - Industry-Academia Partnership Programme Colombia/UK(IAPP\1516\137), Human-Robot Interaction Strategies for Rehabilitation based on Socially Assistive Robotics.
- 2016-18: Colombian School of Engineering Julio Garavito Research Funds, Project Eksowalker - Adaptive robotic platform for gait rehabilitation and assistance of based on the integration of an active exoskeleton and a robotic walker.
- 2016-18: Fostering international cooperation N°03/2016–SRI/PRPPG/UFES, (Federal University of Espiritu Santo - Colombian School of Engineering Julio Garavito) Human-Environment Interaction Strategies for Walker-Assisted Gait.
- 2016-19: Ibero-American Research Network (Cyted 216RT0504), Rehabilitation and assistance of patients with neurologicalimpairments by means of affordable robotic exoskeletons.
- 2017: Colombian School of Engineering Julio Garavito Research Funds, Evaluation of biomechanical parameters in walker assisted gait.
- 2017: Colombian School of Engineering Julio Garavito Research Funds, Development of a navigation interface for mobile assistance devices.
- 2017: Colombian School of Engineering Julio Garavito Research Funds, Evaluation of biomechanical parameters in exoskeleton assisted gait.
- 2015: FAPES-Brazil, Human-Robot Interaction Strategies for Assistive Locomotion.
- 2014-17: Spanish Council for Scientific Research, CPWalker: RoboticPlatform for Gait Rehabilitation and Training in Patients with Cerebral Palsy.
- 2013-15: CNPq-Brazil, Development of a Robotic Platform for Rehabilitation Based on Exoskeleton- Walker Fusion.
- 2012-15: FAPES-Brazil, Development of a ZigBee Sensor Network for Lower-Limb Rehabilitation Assessment.
- 2011: Freescale Semiconductor-USA, Sensor-based Biomechanical Kinematics Monitoring System for Physical Rehabilitation.

Selected publications:

- C Bayon, O Ramirez, JI Serrano, MD Del Castillo, A Prez-Somarriba, JM Belda-Lois, I Martnez-Caballero, S Lerma-Lara, **C Cifuentes**, A Frizera, E Rocon, Development and evaluation of a novel robotic platform for gait rehabilitation in patients with Cerebral Palsy: CPWalker. Robotics and Autonomous Systems, Volume 91, Issue 1, May 2017, Pages 101-114, ISSN 0921-8890.101.
- **Carlos A. Cifuentes**, Luis F. Aycardi, Marcela Múnera, Cristina Bayón, Oscar Ramirez, Eduardo Rocon, Anzelmo Frizera and Sergio Lerma. Biomechanical comparison of patients with CP with different levels of gait assistance using CPwalker. CLAWAR 2017: 20th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines p. 661-668 ISBN: 978-981-3231-03-0
- Juan S Lara, Jonathan Casas, Andres Aguirre, Marcela Munera, Monica Rincon-Roncancio, Bahar Irfan, Emmanuel Senft, Tony Belpaeme, **Carlos A Cifuentes**, Human-robot sensor interface for cardiac rehabilitation, International Conference on Rehabilitation Robotics (ICORR), 2017 p. 1013-1018 ISSN: 1945-7901
- Marcela Munera, Alexandra Marroquin, Laura Jimenez, Juan S Lara, Catalina Gomez, Sandra Rodriguez, Luis E Rodriguez, **Carlos A Cifuentes,** Lokomat therapy in Colombia: Current state and cognitive aspects, International Conference on Rehabilitation Robotics (ICORR), 2017 p. 394-399 ISSN: 1945-7901
- Alberto I Perez-Sanpablo, Juan M Ibarra-Zannatha, **Carlos A Cifuentes**, Luis E Rodriguez-Cheu, IEEE Colombian Conference on Robotics and Automation (CCRA), Implementation of a Shoulder and Elbow musculoskeletal model in musculoskeletal modelling and simulation software (MSMS), 2016 ISBN: 978-1-5090-3787-2
- **Carlos A. Cifuentes**, Anselmo Frizera, Human-Robot Interaction Strategies for Walker-Assisted Locomotion, *Springer Tracts in Advanced Robotics*, Springer, 2016. ISBN 978-3-319-34062-3
- **Cifuentes, C.A**; Rodriguez, C.; Frizera-Neto, A; Bastos-Filho, T.F.; Carelli, R., Multimodal Human–Robot Interaction for Walker-Assisted Gait, Volume: 10, Issue: 3, Sept. 2016, IEEE Systems Journal, p 933 – 943 ISSN: 1932-8184
- **Carlos A. Cifuentes**, Anselmo Frizera, Ricardo Carelli, Teodiano Bastos, Human–robot interaction based on wearable IMU sensor and laser range finder, Robotics and Autonomous Systems, Volume 62, Issue 10, October 2014, Pages 1425-1439, ISSN 0921-8890.
- Braidot, AA; **Cifuentes, C**.; Frizera Neto, A; Frisoli, M.; Santiago, A, "ZigBee Wearable Sensor Development for Upper Limb Robotics Rehabilitation," IEEE Latin America Transactions, vol.11, no.1, pp.408-413. ISSN: 1548-0992
- Maria Martins, Arlindo Elias, **Carlos Cifuentes**, Manuel Alfonso, Anselmo Frizera, Cristina Santos, Ramón Ceres, Assessment of walker-assisted gait based on Principal Component Analysis and wireless inertial sensors, Brazilian Journal of Biomedical Engineering, vol 30, no. 3. ISSN 1517-3151
- **C.A. Cifuentes**, M.J. Suarez, C.A. Rodriguez, L.E. Rodriguez and A. Frizera, Control of the Game Skills for a Robot Soccer from Global Vision System, International Journal of Applied Engineering Research (IJAES) vol. 9,n. 21 p. 11129-11142, ISSN: 0973-4562.

- M. J. Suarez, K. E. Salinas, **C. A. Cifuentes** and J. C. Suárez, Applying Ontologies for Web Text Mining Using Heterogeneous Information, International Journal of Information Processing and Management (IJIPM), vol. 5, n. 4, p 18-27, November 2014.
- **Carlos A Cifuentes**, Cristina Bayon, Sergio Lerma, Anselmo Frizera, Luis Rodriguez, Eduardo Rocon, Wearable Robotic Walker for Gait Rehabilitation and Assistance in Patients with Cerebral Palsy, Converging Clinical and Engineering Research on Neurorehabilitation II, Springer International Publishing, 2016, pp 1451-1455, ISBN 978-3-319-46668-2
- Diego Casas, Marcela Gonzalez Rubio, Miguel Montoya, Wilson Sierra, Luis Rodriguez, Eduardo Rocon, **Carlos A Cifuentes**, Bioinspired Hip Exoskeleton for Enhanced Physical Interaction, Converging Clinical and Engineering Research on Neurorehabilitation II, Springer International Publishing, 2016, pp 1497-1501, ISBN 978-3-319-46668-2
- Noelia Chia Bejarano, Serena Maggioni, Laura De Rijcke, **Carlos A. Cifuentes**, David J. Reinkensmeyer, Robot-Assisted Rehabilitation Therapy: Recovery Mechanisms and TheirImplications for Machine Design, Emerging Therapies in Neurorehabilitation II, Springer International Publishing Switzerland, 2016, p. 197-223, ISBN 978-3-319-24899-8.
- Anselmo Frizera-Neto, Arlindo Elias-Neto, **Carlos Cifuentes**, Camilo Diaz, Teodiano Freire Bastos-Filho and Ricardo Carelli, Smart Walkers: Advanced Robotic Human Walking-Aid Systems. Springer Tracts in Advanced Robotics. 1ed.: Springer International Publishing, 2015 , p. 103-131. ISBN 978-3-319-12921-1.
- Anselmo Frizera-Neto, Arlindo Elias-Neto, **Carlos Cifuentes**, Carlos Valadão, Valmir Schneider-Junior, Camilo Diaz, Teodiano Freire Bastos-Filho and Ricardo Carelli, Walkers, Devices for Mobility and Manipulation for People with Reduced Abilities (Rehabilitation Science in Practice Series). 1ed, CRC Press, 2014, v. 1, p. 141-166. ISBN 978-1466586451
- Anselmo Frizera, Ramón Ceres, José María Azorín, **Carlos A. Cifuentes**, Teodiano Freire Bastos, Eduardo Rocon, Alejandro Clemotte y Eduardo Iáñez, Interfaces multimodais, A Interação de Pessoas com Deficiência com o Computador, 1ed, CYTED, 2014, v. 1, p. 147-172. ISBN 978-8415413288
- Anselmo Frizera, **Carlos A. Cifuentes**, Teodiano Freire Bastos, Motion Capture System Based on the Integration of 3D Accelerometer in a Wireless Inertial Measurement Unit, Accelerometers: Principles, Structure and Applications, 1ed, Nova Publishers, v. 1, p. 55-77. ISBN 978-1628081114
- Anselmo Frizera, Ramón Ceres, José María Azorín, **Carlos A. Cifuentes**, Teodiano Freire Bastos, Eduardo Rocon, Alejandro Clemotte y Eduardo Iáñez, Interfaces multimodales, La Interacción de Personas con Discapacidad con el Computador: Experiencias y Posibilidades en Iberoamérica, 1ed, CYTED, 2013, v. 1, p. 147-168. ISBN 978-8415413226
- **Carlos A. Cifuentes**, Ariel Braidot, Melisa Frisoli, Alfonso Santiago, Anselmo Frizera, Juan Moreno, Evaluation of IMU ZigBee Sensors for Upper Limb Rehabilitation, Converging Clinical and Engineering Research on Neurorehabilitation Biosystems & Biorobotics, Springer Berlin Heidelberg, Volume 1, 2013, pp 461-465 ISBN 978-3-642-34546-3
- **Carlos A. Cifuentes**, Luis E. Rodriguez, Análisis Biomecánico de la Marcha basado en Acelerómetros sobre una Red ZigBee, IFMBE Proceedings. 1ed.: Springer Berlin Heidelberg, 2013, v. , p. 802-805. ISBN 978-3-642-21197-3
- **Carlos A Cifuentes,** Cristina Bayon, Sergio Lerma, Anselmo Frizera, Eduardo Rocon, Human-Robot interaction strategy for overground rehabilitation in patients with Cerebral Palsy, 2016 6th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), p. 729-734, 26-29 June 2016, ISSN: 2155-1782, Singapur, Singapur
- **Carlos A. Cifuentes**, Anselmo Frizera, Eduardo Rocon, Human-Robot Interface for Enhanced Physical Interaction Performance in Walker-Assisted Gait, Full-day Workshop Human-Robot Interfaces for Enhanced Physical Interactions, International Conference on Robotics and Automatio, ICRA 2016, May 16th.
- **C. Cifuentes**, C. Rodríguez, A. Frizera, T. Bastos, Sensor Fusion to Control a Robotic Walker Based on Upper-Limbs Reaction Forces and Gait Kinematics, 2014 5th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), p. 1098-1103, 12-15 August 2014, ISBN: 9781479931279, São Paulo, Brazil
- L. Tausel, **C. Cifuentes**, C. Rodríguez, A. Frizera, T. Bastos, Human-Walker Interaction on Slopes Based on LRF and IMU Sensors, 2014 5th IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), p. 227-232, 12-15 August 2014, ISBN: 9781479931279, São Paulo, Brazil
- Martins, M, **Cifuentes C**, Dias A, Schneider V, Frizera A, Santos C, Assessment of walker-assisted human interaction from LRF and wearable wireless inertial sensors, International Congress on Neurotechnology, Electronics and Informatics. Neurotechnix 2013, p 143-151, 18-20 September 2013, ISBN: 978-989856580-8, Vilamoura, Algarve; Portugal
- Bastos, T.; Frizera, A; Borges, G.; Caicedo, E.; Rodriguez, C.; Bortole, M.; **Cifuentes, C.**, "Motor and bioelectric evaluation of human movements through inertial and myoelectric sensors," Biosignals and Biorobotics Conference (BRC), 2013 ISSNIP, 18-20 Feb. 2013, ISBN 978-1467330237, Rio de Janeiro, Brasil
- Valadao, C. ; Schneider junior, V. A. ; **Cifuentes, C**. ; Frizera Neto, A. ; Bastos Filho, T. F, "Development of a Smart Walker to Assist Human Mobility," Biosignals and Biorobotics Conference (BRC), 2013 ISSNIP, 18-20 Feb. 2013, ISBN 978-1467330237, Rio de Janeiro, Brasil
- Camilo Rodrıguez, **Carlos A Cifuentes**, Pamela Catrinque, Anselmo Frizera Neto, Teodiano Bastos, Metodologia para obtenção de comandos de navegação de um andador robótico através de sensores de força e laser, XI Simpósio Brasileiro de Automação Inteligente, ISSN 2358-4483 Outubro 13-17, 2013 Fortaleza, Brasil
- C. Rodríguez, **C. Cifuentes**, L. Tausel, A. Frizera, T. Bastos, Estimação de Velocidade Linear em Marcha Assistida por Andador Utilizando Varredura Laser, VII Congreso Iberoamericano de Tecnologías de Apoyo a la Discapacidad, p. 145-151, Noviembre 28-29 2013, ISBN 978-9945-00-959-9 Santo Domingo, República Dominicana.
- Carlos Valadão; **Carlos Cifuentes**; Anselmo Frizera; Ricardo Carelli; Teodiano Bastos, Development of a Smart Walker for People with Disabilities and Elderlies, XV Reunión de Trabajo en Procesamiento de la Información y Control, p. 977-982, Septiembre 16-20 2013, ISBN: 978-987-27739-7-7, San Carlos de Bariloche, Argentina.
- Teodiano Bastos, Carlos Valadão, **Carlos Cifuentes**, Anselmo Frizera and Ricardo Carelli, A Smart Walker to Improve the Gait of People with Disabilities and Elderlies, V Congreso Internacional de Diseño, Redes de Investigación y Tecnología para todos, 23- 25 de septiembre de 2013, ISBN: 978-84-88934-24-6, Madrid, España.
- **Carlos A Cifuentes**, Anselmo Frizera Neto, Teodiano Bastos, Human mobility support based on the integration of robotic devices and wearable sensors, 6th IEEE RAS Summer School on Robot Vision and Applications, December 3-7, 2012, Santiago, Chile.
- Ariel Andrés Antonio Braidot, **Carlos Cifuentes**, Anselmo Frizera Neto, Melisa Frisoli, Alfonso Santiago, Desarrollo de un Sistema de Sensores Portables ZigBee para Rehabilitación Robótica de Miembro Superior, IEEE ArgenCon 2012, 13 al 15 de Junio de 2012, p. 1-6, 2012. ISBN: 9789875720763, Cordoba, Argentina