Alejandro Peña Palacio

I.M., M.Sc., Ph.D.

Machine Learning & Financial Risk

Alejandro Peña is part of the academic staff at EAFIT University in the School of Business. He has a bachelor's degree in mechanical engineering, a Master's degree in Systems Engineering, a PhD in Engineering and a Postdoctoral Researcher focused on Machine Learning and Financial Risk. Mr Peña has developed several kinds of research and publications in advanced topics related to computational intelligence and machine learning, in fields such as financial risk, decision management, precision agriculture and other areas related to computer science.

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PERSONAL INFORMATION
Passport: AQ197904
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RAE - Legacy Award

Royal Academy of Engineering

Innovation Award

Antioquia Piensa en Grande
Concurso de Innovación

RESEARCH INTERESTS

Computational Modelling & Simulation, Financial Risk (Operational, Credit, Laundry Money), Stochastic Dynamic Systems, Computational Intelligence, Machine Learning & Business Analytics, Estimation Distribution Algorithms (EDA's), Neural Networks, Fuzzy Logic, Deep Learning, Precision AgTech-FINTECH.

EDUCATION

2018 **Postdoctoral Researcher – Royal Academy of Engineering (RAE)**

Institute for Artificial Intelligence – DeMontfort University, England
Postdoctoral Project: *Intelligence system for characterizing parametric risks in improving the sustainability of agricultural crops using multispectral aerial images (IAPP1/100130)* – *Royal Academy of Engineering Legacy Award*
Mentors: Mario Góngora (PhD) – Francisco Chiclana (PhD)

2009 **Pontifical Bolivarian University**

Philosophy Doctor in Engineering (Computational Modelling & Automation)
Ph.D. Thesis: *Lagrangian evolutionary maps to determine the spatio-temporal behavior of semi-physical models (PMx Pollutants)*
Magna Cum Laude Award
Areas: Computational Intelligence, Lagrangian Modelling, Inverse Problems, Estimation Distribution Algorithms (EDA's).

2004 **National University of Colombia**

Master of Science in Systems Engineering
Final Project: *EVOP surfaces construction for the characterization of systems using computational intelligence concepts (Precision Agriculture)*
Areas: Computational Intelligence Modelling, Evolutionary Algorithms.

1998 **National University of Colombia**

Mechanical Engineering
Final Project*: Use of non-recycled plastics in the production of thermal energy (Sustainability Energy)*.
Areas: Computational Modelling, Environmental Modelling Systems, Clean Energy, Project Evaluation.

EXPERIENCE

2021 - Current **Full Professor *& Researcher,* EAFIT University**

Full Professor
Information Management & Financial Risks – Business School
Courses: Credit Risk, Operational Risk, Decision Management, Intelligent Systems, Business Analytics, Computational Modelling, Artificial Intelligence

RESUME STRUCTURE

PROFESSIONAL EXPERIENCE

2002 - 2021 **Professor *& Researcher (Full Time),* EIA University** (link1, link2)
Head of the Research Group in Computational Intelligence & Automation
Philosophy Doctor in Engineering Program
Management, Finance and Computer Science Engineering
DEA in Big Data & Business Intelligence
Courses: Credit Risk, Operational Risk, Decision Management, Intelligent Systems, Business Analytics Computational Modelling

2015 – 2019 **Visiting Researcher, DeMontfort University**
Institute for Artificial Intelligence (IAI), Leicester, England.
Subjects: Machine Learning, Financial Risk, Precision Agriculture (link)

2012 - 2021 ***Professor (Partial Time),* University of Medellín**
Program: Master on Information and Knowledge Management
Subjects: Machine Learning & Business Analytics (Business Intelligence II)
Faculty of Engineering (link)

2010-2012 ***Professor (Partial Time),* Metropolitan Technological Institute- ITM**
Program: Master on Automation and Control Engineering
Subjects: Identification of Dynamical Systems, Advanced Control, Intelligent Control, Artificial Intelligence, Predictive Control.
Faculty of Engineering (link)

2002-2007 ***Professor & Researcher (Partial Time)*, EIA University**
Program: Mechatronics Engineering – Systems Engineering
Category: Associate Professor
Subjects: Credit Risk, Operational Risk, Decision Management, Intelligent Systems, Business Analytics Computational Modelling

2001-2007 ***Professor & Researcher (Full Time),* University of San Buenaventura - USB**
Program: Systems Engineering (link)
Category: Associate Professor
Subjects: Artificial Intelligence, Expert Systems, Design of Process and Product, Neural Networks and Fuzzy Logic, Evolutionary Computation, Programming (OOP)

2003-2004 ***Professor (Partial Time),* National University of Colombia**
Program: Mechanical Engineering
Subjects: CAD/CAM/CNC Systems (link)

2001–2003 ***Professor (Partial Time),* Colombian Polytechnic - Jaime Isaza Cadavid**
Program: Instrumentation and Control Engineering
Subjects: Artificial Intelligence, Control Engineering II, Intelligence Systems (link)

1999-2004 ***Professor (Partial Time),* National University of Colombia**
Science Faculty
Subject: Vectorial Geometry, Integral Calculus

DIRECTOR POSITIONS

2015 – 2021 ***Head of Research Group***, **EIA University**
Computational Intelligence and Automation (Category: A)
Science, Technology, and Innovation Minister of Colombia (link,link1, link2)

2014 – 2015 ***Head Project – Implementation PhD Engineering Program***
EIA University – Computer Science Department
National Accreditation Board – Ministry of National Education - Colombia

2005 - 2015 ***Head of Research Group***, **EIA University**
Computational Modelling and Simulation Research Group (Category: B)
Science, Technology, and Innovation Minister of Colombia

2009-2010 ***Head of Academic Area***, **EIA University**
Software Engineering, Hardware, and Networks Area
Systems Engineering and Computation, Mechatronics Engineering

2008–2009 ***Head of Research Group***, **EIA University**
Computational Intelligence and Robotics Research Group
Science, Technology, and Innovation Minister of Colombia

2004 ***Head of Academic Program,*** **EIA University**
Mechatronics Engineering Program

2005 ***Head of DEA Program,*** **University of San Buenaventura USB**
DEA in Computational Modelling and Simulation

2003–2006 ***Head of Research Group,*** **University of San Buenaventura - USB**
Computational Modelling and Simulation Research Group
Science, Technology, and Innovation Minister of Colombia

PAPERS IN PEER-REVIEWED JOURNALS

1. Leal, E. **Peña, A.** Sepúlveda, L. Carvalho, J. (2024) *Fuzzy electre model for the characterisation of aeronautical operational risks in the approach and landing phase,* Dutch Journal of Finance and Management 6(2), (https://doi.org/10.55267/djfm/14129).
2. Gonzalez-Ruiz,J.D., Marín-Rodríguez, N. **Peña, A.** (2024) *Board gender diversity and cost of debt financing: Evidence from Latin American and the Caribbean firms*, Corporate and Accounting Finance, (https://doi.org/10.1002/jcaf.22683).
3. Toro-Osaba, A. Tejada, J. Rúa, S. Nuñez, J.D. **Peña, A**. (2024) *Myoelectric Model Reference Adaptive Control with Adaptive Kalman Filter for a soft elbow exoskeleton*, Control Engineering Practice – 142, (https://doi.org/10.1016/j.conengprac.2023.105774).
4. Ramirez-Guerrero, T. Hernández, M. Tabares, M. Marulanda-Tobon,A. Villanueva, E. **Peña-Palacio, A.** (2023) *Agroclimatic and Phytosanitary Events and Emerging Technologies for Identification in Avocado Crops: A Systematic Literature Review,* Agronomy 13(8) (https://doi.org/10.3390/agronomy13081976)
5. **Peña, A.**, Puerta, A., Bonet, I., Caraffini, F., Gongora, M., Ochoa, I. (2023). *A Multispectral Image Classification Framework for Estimating the Operational Risk of Lethal Wilt in Oil Palm Crops*. In: Correia, J., Smith, S., Qaddoura, R. (eds) Applications of Evolutionary Computation. EvoApplications 2023. Lecture Notes in Computer Science, vol. 13989. Springer, Cham (https://doi.org/10.1007/978-3-031-30229-9_32).
6. **Peña, A.** Tejada, J. Gonzalez-Ruiz, J. Góngora, M. (2022) *Deep Learning to Improve the Sustainability of Agricultural Crops Affected by Phytosanitary Events: A Financial Risk Approach,* Sustainability 14 (11), (https://doi.org/10.3390/su14116668).
7. Bonet, I, **Peña, A.**, Lochmuller, Ch., Patiño, H., Chiclana, F., Góngora, M. (2021) *Applying fuzzy scenarios for the measurement of operational risk*, Applied Soft Computing (112) ISSN: 1568-49 (https://doi.org/10.1016/j.asoc.2021.107785).
8. **Peña, A.,** Patiño, A., Chiclana, Carafinni, F., J. Góngora, M., F. González, Duque, E. (2021) *Estimation of operational risk through the integration of multidimensional credibility concepts using a Fuzzy Convolutional Deep Learning Structure*, Applied Soft Computing Journal (107), ISSN: 1568-4946 (https://doi.org/10.1016/j.asoc.2021.107381).
9. Henao, A. Panesso, C. **Peña, A.** Patiño, A. Vidal da Carvalho, J. (2021) *Neural deep learning model to characterize the brand perception in insurance corporate advertising - Brand attributes to create travel insurance products based on sentiments,* Smart Innovation, Systems and Innovation, Springer, Verlag. ISSN: 2190-3026 (https://doi.org/10.1007/978-981-33-4260-6_37).
10. **Peña P.,A.** Mesias, J. Patiño, A. Vidal da Carvalho, J. Gómez, G. Ibarra, K. Bedoya, S. (2021) *PANAS-TDL: A Psychrometric Deep Learning Model for Characterizing Sentiments of Tourists against the COVID-19 pandemic on Twitter,* Smart Innovation, Systems and Innovation, Springer, Verlag. ISSN: 2190-3026 (https://doi.org/10.1007/978-981-33-4260-6_15).
11. Bonet, I. **Peña, A.** Lochmueller, Ch. Patino, A. Góngora, M. (2021) *Deep Clustering for Metagenomics,* Computational Intelligence Methods for Bioinformatics and Biostatistics, in: Lecture Notes in Bioinformatics, Lecture Notes in Computer Science, vol. 12313, pp. 335-347 Springer Verlag. ISSN: 0302-9743 (https://doi.org/10.1007/978-3-030-63061-4_29).
12. González, J. **Peña P., A.** Duque, E. Chiclana, F. Góngora, M. (2019) *Stochastic Logistic Fuzzy Maps for the Development of Integrated Multivariables Scenarios in the Financing of Infrastructure Projects,* Applied Soft Computing, Vol. 85, Elsevier. (https://doi.org/10.1016/j.asoc.2019.105818).

13. **Peña P., A.** Bonet, I. Lochmueller, Ch. Tabares, M. Piedrahíta C. Sánchez, C. Giraldo, L. Góngora, M. Chiclana, F. (2018) *A Fuzzy ELECTRE structured methodology to assess big data maturity in healthcare SME's,* Soft Computing Journal, *Springer Verlag* (https://link.springer.com/article/10.1007%2Fs00500-018-3625-8).
14. **Peña P., A.** Bonet, I. Lochmueller, C. Chiclana, F. Góngora, M. (2018) *Fuzzy credibility model to estimate the operational value at risk using endogenous and exogenous databases of risk events.* Knowledge-Based Systems 159, Elsevier, (https://doi.org/10.1016/j.knosys.2018.06.007).
15. **Peña P., A.** Bonet, I. Lochmueller, C. Chiclana, F. Gongora, M. (2018) *Flexible inverse adaptive fuzzy inference model to identify the evolution of operational value at risk for improving operational risk management,* Applied Soft Computing Journal 65, 614-631. Elsevier, (https://doi.org/10.1016/j.asoc.2018.01.024).
16. **Peña P.**, A. Bonet, I. Lochmueller, C. Chiclana, F. Góngora, (2018) M. *An integrated inverse adaptive neural fuzzy system with MonteCarlo Structure sampling method for operational risk management,* Experts Systems with Applications 98, 2018, 11-26. Elsevier, (https://doi.org/10.1016/j.eswa.2018.01.001).
17. Sánchez, C. Giraldo, L. Piedrahita, C. Bonet, I. Lochmueller, Ch. Tabares, M. **Peña, P.A.** (2018) *Evaluation of models of decision trees and K-means models in the characterization or diagnosis of some diseases,* Espacios Journal 39(28), ISSN: 0798-1015 – (http://www.revistaespacios.com/a18v39n28/a18v39n28p21.pdf).
18. González R., J. **Pena P., A**. Jiménez, J. Patiño, A. Duque, E. (2017) *Methodological proposal financial modeling using dynamic scenarios from multivariable data tables*, International Journal of Technology Enhanced Learning 10(3), 161-184. ISSN: 1753-5255 – Elsevier (https://doi.org/10.1504/IJTEL.2018.092700).
19. Duque, E.A., González, J.D. **Pena P., A**, Patino, H.A., Restrepo, J.C. (2017) *Sustainable Energy in Latin America: Regional Development through the CMD,* Indian Journal of Science & Technology 10 (26), 1 – 7, ISSN: 0974-6846 (https://doi.org/10.17485/ijst/2017/v10i26/109775).
20. **Peña P.A.,** Hernández R., J.A. (2016) *Construction of Concentration Surfaces for PMx using Evolutionary Fuzzy Neural Models of Semiphysical Class,* Studies in Computational Intelligence 628, ISSN: 1860-9503 (https://link.springer.com/chapter/10.1007/978-3-319-28495-8_15).
21. **Peña P.A.**, Gómez F., F. Vélez, J.F. (2016) *Vectorial Model for progressive adaption for purchase and sale of shares using stock market indicators*, Journal of Information Systems and Software Engineering for Big Companies (IJISEBC) 3(2), 53-63 ISSN: 2387-0184 – (http://uajournals.com/ojs/index.php/ijisebc/issue/view/21).
22. Velasquez, E., Cardona A., **Peña P., A**. (2014) *Vector Model for the Inference of the Cognitive State in patients referred from coma,* Iberian Journal on Information Systems and Technologies Vol. 13. ISSN:1646-9895 (http://dx.doi.org/10.4304/risti.13.65-81).
23. Hernández, A. Vásquez, R. **Peña P., A.** (2014) *A proposal for modeling intersections in traffic systems using adaptive fuzzy Petri nets*, Journal of Engineering and Competitiveness. ISSN 0123-3033 (http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0123-30332014000100016).
24. Arango, J.E. Cárdenas, J. **Peña P., A.** (2013) *Rehabilitation System for Phantom Limb Syndrome using Brain-Computer Interface and Augmented Reality,* Iberian Journal on Information Systems and Technologies(11) ISSN:1646-9895.(http://dx.doi.org/10.4304/risti.11.93-106)
25. Dávila G., A. ***Peña P.,A.*** Delgado T., E. Ortiz V. P. (2013) *Stochastic or complex dynamics with incomplete information: a review from the control*, Iteckne 10 (1). ISSN:1692-1798 (http://www.scielo.org.co/scielo.php?pid=S1692-17982013000100013&script=sci_abstract&tlng=es).

26. Ardila, H. Lochmueller, Ch. **Peña, A**. (2013) *Analyzing inflation: Measurement problems and trends.* Journal of Postgraduate Solutions – EIA Vol. 10. 133-155, ISSN: 2811-3854 (https://repository.eia.edu.co/handle/11190/715).
27. Betancur B., D. Vélez, M. **Peña P., A.** (2013) *Automatic translation of dactylologic language through adaptive systems* Biomedical Engineering Journal 7 (13), ISSN:1909-9762 (http://www.scielo.org.co/scielo.php?script=sci_abstract&pid=S1909-97622013000100003).
28. Estrada V., I. Guarnizo L., C. **Peña P., A.** (2012) *Identification of small hydropower using predictive models* Journal of Postgraduate Solutions – EIA Vol. 9, ISSN: 2811-3854 (http://hdl.handle.net/11190/704).
29. Hermilson, A. Lochmueller, Ch. Márquez, J. **Peña A**. *Risk of Debt: The Sovereign Crisis and Possible Implications*. Journal of Postgraduate Solutions – EIA. Vol. 8. ISSN: 2811-3854 (https://revistas.eia.edu.co/index.php/SDP/article/view/358/351).
30. **Peña, P. A.** Palacio O., C. , Ramirez A., S, Lochmueller,C. (2012) *Estimate of Daily Ecopetrol performance by using estimation of distribution algorithms (EDAs) in the stock market,* Journal on Information Systems and Technologies, IEEE Explore, ISSN: 2166-0727 (https://ieeexplore.ieee.org/document/6263068).
31. **Peña, P. A.** Patino, P. A. Palacio O., C. Lochmueller, C., Ardila, H., Villa, S. (2012) *Adaptive fuzzy model for Operational Risk assessment in companies of the financial sector: Operational Risk (EDAs): Evolutionary computation,* Journal on Information Systems and Technologies, IEEExplore, ISSN: 2166-0727 (https://ieeexplore.ieee.org/document/6263091).
32. Arango D., C. Jiménez, R. **Peña P., A.** (2011) *Linking regional atmospheric circulation patterns and air quality in the Sogamoso Valley, Colombia* Geophysical Research Abstracts GRA, eISSN: 1607-7962 (link -https://ui.adsabs.harvard.edu/abs/2011AGUFM.A51C..08J/abstract)
33. **Peña, P. A.** Lochmueller, C. Pérez, M.A. Murillo, J.G. (2011) *Qualitative Mapping Model for Consumer and Regular Credit - Case Belen Credit Cooperative*. Medellin University Journal (10)19, ISSN:1692-3324 (http://www.scielo.org.co/scielo.php?script=sci_abstract&pid=S1692-33242011000200010&lng=es&nrm=iso&tlng=es) .
34. **Peña, P.A.**, Melo, C. Botero, A. (2011) *Fuzzy Model for the Evaluation of Adaptive Skills in Children with Cognitive Disabilities*, Journal on Information Systems and Technologies ISSN: 2166-0727, In: Conference on Research 2011 5-(5), Antioquia School of Engineering. ISSN: 2027-0313 (https://ieeexplore.ieee.org/abstract/document/5974167).
35. **Peña P. A.** Hernández R., J.A. Jiménez P. R. (2011) *Neural Classifier Systems for Identifying Pollutant Dispersion patterns in a study area*, Colombian Journal of Meteorology, 14, ISSN 0124-6984.
36. Patiño, A. **Peña, P.A.**, Lochmueller, Ch. Pérez, M.A. Murillo, J. (2010) *Intelligent Software for Credit Risk Assessment*, Systems and Information Technologies ISSN: 2166-0727, In: Conference on Research 2011 3-(3), Antioquia School of Engineering. ISSN: 2027-0313 (INSPEC: 12171144).
37. **Peña P.,A.** Hernández R., J.A. Toro, M. (2010) *Evolutionary Inverse lagrangian puff Model. In: Software and Data News,* Modeling Environment & Software 25(12), pp. 1890-1893. (https://doi.org/10.1016/j.envsoft.2010.04.013).
38. Ruiz, G.A. **Peña P., A.** Castro, C.A. et al. (2006) *Model of Software Quality Evaluation Based on Fuzzy Logic Applied Usability Metrics with the ISO / IEC 9126 Standard*. Informatics Advances Journal (3)-02, pp. 25-29. ISSN: 1657-7663 (Print), ISSN: 1909-0056 (https://www.redalyc.org/pdf/1331/133114988005.pdf).
39. **Peña P., A.** Hernández R.,J. (2004) *Emulation of Growth of Edible and Medicinal Mushrooms using an evolutionary algorithm with Cylindrical Genetic Operators. Colombian Journal of Computation (5) – 02*, pp. 69-85 ISSN: 1657-2831 (https://revistas.unab.edu.co/index.php/rcc/article/view/1075).

ISI PROCEEDINGS PAPERS – CONFERENCES

(Citation Index – Science (CpCI-S), ISI Web of Knowledge® Database – Scopus)

1. Peña, A., Carvalho, J.V., Gonzalez-Ruiz, J.D., Sepulveda, L. (2023). PANAS-TDL2: A Psychrometric Deep Learning Model for Characterising Post-COVID-19 Twitter Perceptions of Tourist Destinations. In: Carvalho, J.V., Abreu, A., Liberato, P., Peña, A. (eds) Advances in Tourism, Technology and Systems. Smart Innovation, Systems and Technologies, vol 345. Springer, Singapore. https://doi.org/10.1007/978-981-99-0337-5_47
2. Peña, A. et al. (2021). PANAS-TDL: A Psychrometric Deep Learning Model for Characterizing Sentiments of Tourists Against the COVID-19 Pandemic on Twitter. In: Abreu, A., Liberato, D., González, E.A., Garcia Ojeda, J.C. (eds) Advances in Tourism, Technology and Systems. ICOTTS 2020. Smart Innovation, Systems and Technologies, vol 209. Springer, Singapore. https://doi.org/10.1007/978-981-33-4260-6_15
3. Bonet, I. Caraffini, F. **Pena, A.** Puerta, A. Gongora, M. *Oil Palm Detection via Deep Transfer Learning,* IEEE World Congress on Computational Intelligence (WCCI - 2020). Glasgow, UK (https://doi.org/10.1109/CEC48606.2020.9185838).
4. Monsalve, S. Lotero, V. Peña, A. Patiño, A. *Neural Network Model to Re-Rate the Benefits System Entry of People in Colombia*, 2019 7th International Engineering, Sciences and Technology Conference (IESTEC), (doi: https://doi.org/10.1109/IESTEC46403.2019.00063)
5. Bonet, I. **Peña, A.** Lochmueller, Ch. Patino, A. Góngora, M. (2019) *Deep Clustering for Metagenomics,* Proceedings - CIBB 2019 16th. International Conference on Computational Intelligent Methods for Bioinformatics and Biostatistics, Bergamo, Italia (https://link.springer.com/chapter/10.1007/978-3-030-63061-4_29).
6. **Peña P., A.** Bonet, I., Manzur, D., Góngora, M., Carffini, F. (2019) *Validation of convolutional layers in deep learning models to identify patterns in multispectral images, units,* Proceedings of the Iberian Conference on Information Systems and Technologies – CISTI2019, IEEExplore, (https://doi.org/10.23919/CISTI.2019.8760741).
7. Giraldo, D., Soto A., M. **Peña P., A.** (2019) *Fuzzy cognitive maps , units to evaluate the influence of the infants about home buying decisions,* Proceedings of the Iberian Conference on Information Systems and Technologies – CISTI2018, IEEExplore, (https://doi.org/10.23919/CISTI.2019.8760887).
8. **Peña P.,A.** Patiño, A. Bonet, I. Góngora, M. (2018) *Fuzzy spatial maps to identify oil palm units,* Proceedings of the Iberian Conference on Information Systems and Technologies – CISTI2018, IEEExplore, (https://doi.org/10.23919/CISTI.2018.8399144)
9. Duque, F. Posada, V. Tobón, J. **Peña P., A.** Patiño, A. (2018) *Neural network model to re-rate and analyze consumer credit for Fintechs using Vector Support Machines,* Proceedings of Iberian Conference on information Systems and Technologies – CISTI2018, IEEExplore, (https://doi.org/ 10.23919/CISTI.2018.8399366)
10. **Peña P., A**. Patiño P., A. Jaramillo V., V. Góngora, M. (2017) *Intelligent system to identify oil palm crop units from multispectral aerial images: Identification of multispectral patterns,* In Proceedings of Iberian Conference on Information Systems and Technologies CISTI2017, IEEExplore, (https://doi.org/10.23919/CISTI.2017.7975991) .
11. Patiño P.,A. **Peña P.,A.** Warstki, V. Vélez F. (2017) *Radial inverse model to identify markets for assets exports: Inverse neural radial basis model,* In Proceedings of Iberian Conference on Information Systems and Technologies CISTI2017, IEEExplore, (https://doi.org/10.23919/CISTI.2017.7975931) .
12. Jaramilllo, E. , Gomez, V. , **Pena, A.** , Osuna, S. , Lopera, L. (2016) *Automatic identification of emotional patterns in audiovisual advertising by bioelectrical brain activity of an individual,* In Proceeding of Iberian Conference on Information Systems and Technologies CISTI2016, IEEExplore, (https://doi.org/10.1109/CISTI.2016.7521575).

13. **Pena, P.A.** , Gomez, F. , Velez, J.M. (2016) *Vectorial model for progressive adaptation for purchase and sale of shares using stock market indicators,* In Proceeding of Iberian Conference on Information Systems and Technologies CISTI2016, IEEExplore, (https://doi.org/10.1109/CISTI.2016.7521576)
14. **Peña P., A.** Bello V., C. Osuna R., S. (2015) *Identification of the affinity in audiovisual advertising by using adaptive vector models*, In Proceeding of Iberian Conference on Information Systems and Technologies CISTI2015, IEEExplore, (https://doi.org/10.1109/CISTI.2015.7170363).
15. **Peña P.**, A. Patiño P., A. Lochmueller, C. Murillo, J. (2015) *Takagi Sugeno Fuzzy model with structured evolution for determining a consumer credit score*, In Proceedings of Iberian Conference on Information Systems and Technologies CISTI2015, IEEExplore, (https://doi.org/10.1109/CISTI.2015.7170485).
16. **Peña P.**, A. Londoño A., S. Vásquez, N. (2014) *Remote control flying RC helicopter through natural user interface.* In Proceedings of Iberian Conference on Information Systems and Technologies CISTI2014, IEEExplore, (https://doi.org/10.1109/cisti.2014.6876893).
17. **Peña P.**, A. Bonet, I. Lochmueller, C. Patiño, A. N. (2014) *Fuzzy credibility for mixing different data sources in evaluating operational risk: Modelling operational risk,* In Proceedings of Iberian Conference on Information Systems and Technologies – CISTI2014, IEEExplore, (https://doi.org/10.1109/CISTI.2014.6877030).
18. Patiño P., A., **Peña P. A.**, Lochmueller, Ch. (2013) *Model for Operational Risk assessment using Fuzzy Petri Nets* In Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2013. ISI Web of Knowledge, ISBN:978-989-96247-9-5 (WOS: 000306937600045 - https://ieeexplore.ieee.org/document/6615779)
19. **Peña P. A.**, Patiño P., A. Palacio O., C. Lochmueller, Ch. Ardila, H. Villa, S. (2012) *Adaptive Fuzzy Model for Risk Assessment in Companies of the financial sector: Operational Risk* In: Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2012. ISI Web of Knowledge, (WOS: 000306937600045 - https://ieeexplore.ieee.org/document/6263091/).
20. **Peña P. A.**, Palacio O., C. Ramírez, S. Lochmueller, Ch. (2012) *Estimate Daily Ecopetrol Stock Performance by using Estimation of Distribution Algorithms (EDAs)* In Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2012. ISI Web of Knowledge, (WOS: 000306937600045 - https://ieeexplore.ieee.org/document/6263068)
21. **Peña, P.A.** Melo B., C. Botero L., A. (2011) *Fuzzy model for Assessing Adaptive Skills in Children with Cognitive Disabilities* In: Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2011. pp. 442-446. ISI Web of Knowledge,ISBN: 978-1-4244-7227-7 (https://ieeexplore.ieee.org/document/5974167).
22. **Peña, P.A.** Lochmueller, Ch. (2011) *Evolutionary model for Identification and tracking risk money laundering and terrorist financing* In: Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2011 (Doctoral Symposium). pp. 442-446. ISBN: 978-1-4244-7227-7.
23. **Peña, P.A.** Hernández R. J.A. (2010) *Evolutionary strategies to get forecast maps for spatial particulate matter concentration* PM_x In: Proceedings of Iberian Conference on Systems and Information Technologies – CISTI 2010. pp. 442-446. ISI Proceedings Papers Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore, ISBN: 978-989-96247-3-3.
24. **Peña P., A.** Hernández R., J. Toro G., M. (2009) *Evolutionary Model for Determining Space Temporal Behavior Concentration of Particulate Matter* PM_x *on a Study Zone.* In: Proceedings of Doctoral Symposium, Iberian Conference on Systems and Information Technologies – CISTI2009. pp. 11-17. ISI Proceedings Papers Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore ISBN: 978-989-96247-1-9
25. **Peña P., A.** Hernández R., J. Toro G., (2009) *Evolutionary Model for Spatial Characterization of Pollutant Dispersion* In: Proceedings of Iberian Conference on Systems and Information

Technologies – CISTI2009. pp. 657-661. ISI Proceedings Papers Conference Proceedings Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore ISBN: 978-989-96247-1-9

26. **Peña P.,A.** Hernández R.,J. (2007) *Decomposition of Digital Elevation Models (DEM) for Integrating Evolutionary Algorithms – TIN* In: Proceedings of 2nd. Iberian Conference on Systems and Information Technologies – CISTI2007 pp. 67-79. ISI Proceedings Papers Conference Proceedings Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore ISBN: 978-972-8830-88-5.

BOOKS & CHAPTERS

1. Jiménez Benjumea, J.P., López Giraldo, L.I., **Peña Palacio, J.A.**, Ramirez-Guerrero, T. (2024). *Fuzzy Model for Risk Characterization in Avocado Crops for Index Insurance Configuration.* In: Tabares, M., Vallejo, P., Suarez, B., Suarez, M., Ruiz, O., Aguilar, J. (eds) Advances in Computing. CCC 2023. Communications in Computer and Information Science, vol 1924. Springer, Cham. (https://doi.org/10.1007/978-3-031-47372-2_22).
2. Larrea-Gomez, M., **Peña, A.**, Martinez-Vargas, J.D., Ochoa, I., Ramirez-Guerrero, T. (2024). *Modeling Detecting Plant Diseases in Precision Agriculture: A NDVI Analysis for Early and Accurate Diagnosis*. In: Tabares, M., Vallejo, P., Suarez, B., Suarez, M., Ruiz, O., Aguilar, J. (eds) Advances in Computing. CCC 2023. Communications in Computer and Information Science, vol 1924. Springer, Cham. (https://doi.org/10.1007/978-3-031-47372-2_24).
3. Vidal do Carvalho, J. Abreu, A. Liberato, P. **Peña, A.** (Editor) (2023) Advances in Tourism, Technology and Systems, Selected Papers of ICOTTS 2022 (International Conference on Tourism and Technologies 2022 Vol.1), Smart Innovation, Systems and Technologies Vol. 345 ISSN: 2190-3018 (https://link.springer.com/book/10.1007/978-981-99-0337-5).
4. Vidal do Carvalho, J. Liberato, P. **Peña, A.** (Editor) (2022) Advances in Tourism, Technology and Systems – Select Papers of ICOTTs (International Conference on Tourism and Technologies 2021 Vol.1), Smart Innovation, Systems and Technologies 284, Springer Nature, ISSN: 2190-3018 (https://link.springer.com/book/10.1007/978-981-16-9701-2).
5. Vidal do Carvalho, J. Reis da Rocha, A. Liberato, P. **Peña, A. (Editor in Chief)** (2021), Advances in Tourism, Technology and Systems – Proceedings of ICOTTs (International Conference on Tourism and Technologies 2020 Vol.1), Smart Innovation, Systems and Technologies Vol. 208, Springer Nature, ISSN: 2190-3018 (https://link.springer.com/book/10.1007/978-981-33-4256-9).
6. Gonzalez, J.D. Duque, E. **Peña P., A**. (2017) *Finance Simulation using Multivariables Tables*, *Finance and Modeling*, Vol. II, In: Finanzas, modelación y riesgos, University of Medellín, ISBN: 978-958-8815-84-8 (https://www.librosyeditores.com/ciencias-economicas-y-administrativas/10048-finanzas-modelacion-y-riesgos-9789588992914.html).
7. **Peña, P.A.** Hernández R., J.A. (2013) Optimization of Dispersal Patterns of Particulate Matter on a Study Zone In: *Optimization of Knowledge Engineering*. Faculty of Mines Publishing, National University of Colombia. Editors: Jesus Antonio Hernández R., pp. 113-117. ISBN: 978-958-761-433-6 (https://repositorio.unal.edu.co/handle/unal/20166).
8. **Peña P., A.** Hernández R., J. Jiménez P., R. (2011) *EDA's Classifier Systems for Identifying Patterns of Particulate Matter (PMx) Dispersion in a Study Area,* In J.C. Lin, Brunner, D. , Gerbig, C. *Lagrangian Modelling of the Atmosphere,* American Geophysical Union Chapman Conference (https://www.agu.org/-/media/Files/Meetings/AGU-Chapman-Conference-Advances-in-Lagrangian-Modeling-of-the-Atmosphere-Program.pdf).
9. **Peña, P.A.** Hernández R., J.A. Toro, M. (2010) Evolutionary Inverse Modelling for PM_{10} Pollutant Dispersion In: *Soft Computing Methods for Practical Environmental Solutions: Techniques and Studies*. Editorial IGI Global. Hershey (EEUU). Editors: Mario Gestal and Daniel Rivero, pp. 293-313. doi:10.4018/978-1-61520-893-7, ISBN-10: 1615208933, ISBN-13: 978-1615208937 (https://www.igi-global.com/chapter/evolutionary-lagrangian-inverse-modeling-pm10/43158).

PAPERS IN PEER-REVIEWED CONFERENCE PROCEEDINGS

1. Arango, S. **Peña, A.** Maturana, M. Lorena, R. (2017) *Emotional basic patterns identification in audiovisual advertising using adaptive vectorial models,* Sixth Engineering, Science and Technology Conference "Tendencies and Challenges in Engineering, Science and Technology" (ESTEC 2017), *KnE Engineering*, *3*(2), 574-584. https://doi.org/10.18502/keg.v3i1.1461. ISSN: 2518-6841
2. Patiño P.,A. **Peña P., A.** Ruiz R., L. (2017) *Fuzzy model to estimate the operational risk, International University Meeting Research*, Santo Tomas University, Pedagogic and Technological University of Colombia, Tunja, Colombia.
3. Cadavid, S. Atehortua, D., **Peña P., A.** (2015) *Adaptive neural models for risk assessment in placing consumer credits*, National Congress of students of industrial, administrative and production engineering – CONEIAP, Medellin, Colombia.
4. Bello, C. Villa, S. **Peña P., A.** (2014) *Vector model to identify patterns of brain activity given audiovisual advertising in personal care products*, X International Symposium on Energy Pascual Bravo Technological Institute, Medellín, Colombia. (ISBN: 978-958-99249-4-5)
5. **Peña P., A.**, Arboleda, I., Bustamante, D., Giraldo, N. **,** (2014) *Stochastic neural model for trading in Metatrader 5.0*, X International Symposium on Energy, Pascual Bravo Technological Institute, Medellín, Colombia. (ISBN: 978-958-99249-4-5).
6. **Peña P., A.,** Barco, C., Serna, A. Lozada, E.**,** (2014) *Modelling of real dynamic systems by integrating stochastic processes to the Euler Lagrange Equations*, X International Symposium on Energy Pascual Bravo Technological Institute, Medellín, Colombia. (ISBN: 978-958-99249-4-5).
7. **Peña P.,A.**, Mejía, M., Vazart, V.**,** (2014) *Effects of socioeconomic variables on the score of an applicant for a consumer credit using neural networks*, X International Symposium on Energy. Pascual Bravo Technological Institute, Medellin, Colombia. (ISBN: 978-958-99249-4-5).
8. **Peña P., A.** Hernández, J. Jiménez, R. (2013) *Constructing PMx Forecast Maps of using Stochastic Evolutionary Strategies.* Abstract In: Poster in my Pocket, Spatial Statistics Conference 2013. Columbus, USA.
9. **Peña P., A.** Hernández, J. Jiménez, R. (2013) *Construction of Concentration Surfaces for PMx using Fuzzy Neural models of Semiphysical Class.* Abstract In: Poster in my Pocket, Spatial Statistics Conference 2013. Columbus, USA.
10. González, A. **Peña P., A.** (2013) *Model for predicting the solar radiation using integrated neural models* 1st.Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.
11. Montoya, W. Ovalle, J. Pérez M., J., **Peña P., A.** (2013) *Neural systems as support of making decision in the allocation of consumer credit,* 1st. Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.
12. Cardona, A. Velasquez, E. **Peña P., A.** (2013) *Model to determine the cognitive state in comatose patients by recording brain bioelectrical activity* 1st. Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.
13. Arcila H., S. **Peña P., A.** (2013) *Implementation of artificial neural networks in hardware,* 1st. Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.
14. Colorado I., A. Carrasquilla Q., F. **Peña P., A.**, (2013) *Financial time series forecasting using neuroevolutionary models* 1st. Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.

15. Cardona D., D. **Peña P., A.** (2013) *Identification and Control of nonlinear and chaotic dynamical systems, 1st.* Technology and Engineering Meeting & IX International Symposium on Energy. Pascual Bravo Technological Institute, Medellín, Colombia. 2013.

16. **Peña, P. A.** Patino, P. A. Palacio O., C. Lochmueller, C., Ardila, H., Villa, S. (2012) *Adaptive fuzzy model for the assessment of operative risk in the financial sector,* In: EIA Research Conference 2012, ISSN: 2027-0313
17. Hernández, A. **Peña P., A.** Vásquez, R. (2012) *Intersections traffic model using adaptive fuzzy Petri nets.* Proceedings In: First International on Advanced Mechatronics Design and Manufacturing Technology AMDM_2012 (ISBN:978-958-722-159-6)
18. Vacca U., S. **Peña P., A.** (2012) *Identification of Individuals through voice recognition* In Proceedings: 3rd. Computational Intelligence Conference: Innovation and Energy, IIICIC-2012 (ISBN: 978-958-99249-4-5)
19. Santa, M. J. **Peña P., A.** *Recognition of tissues in CT images using neural networks* In Proceedings: III Computational Intelligence Conference: Innovation and Energy, IIICIC-2012 (ISBN: 978-958-99249-4-5)
20. Henao R., E. **Peña P., A.** *Self-adaptive home automation system (Domotic) based on artificial neural networks* In Proceedings: III Computational Intelligence Conference: Innovation and Energy, IIICIC-2012 (ISBN: 978-958-99249-4-5)
21. Peña J., L. Díaz G. J.C., Castro L., G. Tabares B., M. **Peña P., A.** (2011) *Defining components of an enterprise architecture using an Expert System* Proceedings in: 2nd. Colombian Congress on Computational Intelligence, Pascual Bravo Technological Institute, Medellín, Colombia, ISBN: 978-958-99249-2-1.
22. Morales G., C. **Peña P., A.** (2011) *Adaptive neural networks to identify parameters in dynamic systems* Proceedings in: II Colombian Congress on Computational Intelligence, Pascual Bravo Technological Institute, Medellín, Colombia, ISBN: 978-958-99249-2-1.
23. Arango D. C. Jiménez P., R. **Peña P. A.** (2011) *Meteorological control of air pollution in a complex topography (High altitude valley in tropical Andes),* American Geophysical Union - Fall Meeting 2011, (The Smithsonian/NASA Astrophysics Data) (abstract #A51C-08).
24. **Peña P., A.** Hernández R., J. Jiménez P., R. (2011) *EDA's Classifier Systems for Identifying Patterns of Particulate Matter (PMx) Dispersion in a Study Area,* Lagrangian Modelling of the Atmosphere – American Geophysical Union - AGU , Grindelwald, Switzerland
25. Patiño,P.A. Palacio, C. **Peña P., A.** Lochmueller, Ch. Murillo, J. Pérez, M.A. (2011) *Neurofuzzy model for risk assessment in placing consumer credits,* VIII International Colloquium of Statistics *"Applied Statistical Methods in Finance and Risk Management"*
26. **Peña P., A.** Hernández R., J.A. Jiménez P., R. (2011) *Correlation between atmospheric circulation patterns and air quality in the Sogamoso Valley* IX Colombian Meteorological Congress, Bogotá, Colombia.
27. **Peña P., A.** Hernández R., J.A. Jiménez P., R. (2011) *Neural Classifier Systems for Identifying patterns of dispersion of pollutants in an study area* IX Colombian Meteorological Congress, Bogotá, Colombia.
28. **Peña, P.A.** Hernández R., J.A. Toro, M. (2010) Evolutionary Strategies to determine the spatiotemporal behavior of *Particulate Matter Concentration* PM_{10} In: Proceedings of II Colombian Congress of Air Quality and Public Health. pp. 326-328. ISBN:978-958-6954-860.
29. **Peña P., A.** Hernández R., J. Toro G., (2009) *Asynchronous Evolutionary Inverse Modeling for* PM_{10} *Spatial Characterization* In: Proceedings of 18 th. IMACS CONGRESS MODSIM09. ISBN: 978-0-9758400-7-8 MODSIM09, in: News of the IMACS/Mathematics and Computer in Simulation (79)-7 doi: 10.1016/S0378-4754(09)00058-5.

PAPERS IN NEWSPAPERS & PODCASTS

1. Castaño, A. **Peña, P.** (2022): *PodCast: Artificial Intelligence, is a Programme Capable of Sensing?*. El Arranque, El Colombiano News Paper, ISSN:2248-5627 (link)
2. LISTEN: ARTIFICIAL INTELLIGENCE, IS A PROGRAMME CAPABLE OF SENSING?
3. Castaño, A. **Peña, P.** (2022) in Do chatbots dream of princes charming? The future is already here. El Colombiano News Paper, ISSN:2248-5627 (link)
4. Alcaraz, J. **Peña P.** (2021) in *Trends: artificial intelligence invisible ally in the fight against COVID-19*, El Colombiano News Paper, ISSN: 2248-5627 (link,link2).
5. Monsalve, R. **Peña P.** (2015) in *Students bet on a Colombia without landmines*, El Colombiano News Paper, ISSN: 2248-5627 (link, link2,link3)
6. **Peña P., A.** (2013) in *Analysis: Mass and impact of Information technologies (ICT) in Medellin*. El Colombiano Newspaper, ISSN: 2248-5627 (link1)
7. Aristizabal, C. **Arango, J.E. Cárdenas, J. Pena, A.** (2013) in *New Technology for Rehabilitation.* El Colombiano Newspaper, ISSN: 2248-5627 (link,link2,link3).
8. Dos Puntos Innovación. **Peña, Alejandro** (2012) in *Tecnnova, Contribution of the Committee UEE.* El Colombiano Newspaper, ISSN: 2248-5627 (link1).
9. **Peña P., A.** Betancur B., D. Vélez G., M. (2011) *Wireless Gloves for Reading Gestures.* El Colombiano Newspaper, ISSN: 0122-0802 (link,link2).

RESEARCH PROJECTS (link)

2021 – Current **Researcher – Strategic Program Research**
Project: *Augmented Intelligence Framework for the Configuration of Index Insurance in Agricultural Crops*
Topics: Precision Agriculture, Machine Learning, Deep Learning, Computational Intelligence Modelling, Financial Risk
Funding: EAFIT University, Zamorano University (Honduras), Institute for Artificial Intelligence (DeMonfort University).

2018 – 2020 **Researcher – Colombia Scientific Program (Consortium Energética 2030)**
Project: *Transformation of the consumer in the Colombian energy market towards an answer active demand, through comprehensive management and efficient use of energy as a source of resources distributed in the 2030 horizon*
Topics: Machine Learning, Computational Intelligence Modelling, Renewable Energies, SmartGrid Systems, Financial Risks
Funding: Inter-American Development Bank - National Program on Science Technology and Innovation in Energy and Mining – Science, Technology, and Innovation Minister of Colombia - Contract 210-2018 (https://www.energetica2030.co/p1-gestion-de-la-demanda/).

2019 – 2020 **Researcher – Internal Call**
Project: *Tool for early and automatic diagnosis of industrial compressors (HDTAC)*
Topics: Machine Learning, Automation & Industrial Control, Predictive Control
Funding: EIA University – Computational Intelligence and Automation Research Group (GIICA)

2018 – 2020 **Head of Project & *Researcher (*Royal Academy of Engineering - RAE)**

Project: *Intelligence system to improve the sustainability of oil palm crops through the construction of forecasting maps integrating adaptive vegetation indices from multispectral aerial views*

Topics: Computational Intelligence, Precision Agriculture, Deep Learning, Multispectral Images, Vegetation Indices, Financial Risks

Funding: Royal Academy of Engineering Award (RAE) – Newton Fund (IAPP 17/18) – UNIPALMA de los Llanos – DeMontfort University.

2018 – Current **Head of Project & Researcher – Internal Call**

Project: *Intelligent forecast mapping system with adaptive vegetation indices to improve the sustainability of oil palm crops*

Topics: Computational Intelligence, Precision Agriculture, Deep Learning, Multispectral Images, Vegetation Indices, Financial Risks

Funding: EIA University.- Newton Fund

2017 ***Researcher***

Project: *Integrated fuzzy model for the evaluation of operational risk in the granting of short-term consumer loans to SME's (Small & Medium Enterprises)*

Topics: Computational Intelligence, Operational Risk, Fuzzy Credibility, Machine Learning & Business Analytics

Funding: EIA University.

2017 ***Head of Project & Researcher***

Project: *Intelligent system to identify the differentiated behavior of oil palm cultivation units from dynamic vegetation indices*

Topics: Computational Intelligence, Precision Agriculture, Multispectral Images, Vegetation Indices, Financial Risks

Funding: EIA University.

2016 – 2018 ***Researcher***

Project: *Neurocognitive and Neurofunctional Characterization in Eutimic Patients with Bipolar Disorder Type I in treatment using Litihium Carbonate and Valproic Acid: Cross Section Study.*

Topics: Computational Modelling and Simulation, Computational Intelligence, Neurodegenerative Diseases, Big Data.

Funding: Engineering School of Antioquia, Las Americas Hospital.

2016 – 2017 ***Researcher***

Project: *Experimental adaptive identification to improve the enhanced of serial robot with 2-freedom degrees with flexible articulations supporting dynamics weights.*

Topics: Computational Intelligence, Robotics, Automation, Detection of Anomalies, Deep Learning, Active Suspensions, Intelligence Control.

Funding: EIA University.

2016 ***Researcher***

Project: *Automation of the palm assisted pollination process with multispectral aerial vision technology*

Topics: Computational Intelligence, Precision Agriculture, Multispectral Images, Vegetation Indices, Pollination, Parametric Insurances.

Funding: EIA University

2015 – 2016 ***Head of Project & Researcher***
Project: *Identification of emotional patterns in audiovisual advertising using multidimensional neural models.*
Topics: Computational Modelling & Simulation, Computational Intelligence, Neuromarketing, Emotional Patterns.
Funding: Engineering School of Antioquia.

2016 ***Head of Project – COLCIENCIAS Young Researcher Program***
Young Researcher*:* Juan Esteban Arango (I.MT)
Project: *Computational model for the automatic detection of neural networks in resting state in fMRI images for the diagnosis of early stage schizophrenia*
Topics: Computational Modelling and Simulation, Computational Intelligence, Biomedical Engineering, Deep Learning.
Funding: Science, Technology, and Innovation Minister of Colombia

2015 - 2017 ***Researcher***
Project: *Designing a Big Data Framework based on product lines to facilitate use of models, tools, guides and services for information management and knowledge in NoSQL databases in health sector in Colombia.*
Topics: Computational Modelling and Simulation, Computational Intelligence, Financial Risk, Credit Risk, Business Intelligence & Big Data.
Funding: Engineering School of Antioquia, University of Medellin, EAFIT University.

2014 – 2015 ***Researcher***
Project: *Evaluation model for credit applications through intelligent systems.*
Topics Computational Modelling & Simulation, Credit Risk, Operational Risk.
Funding: EIA-University

2013 - 2014 ***Researcher - Tax Benefits Program - COLCIENCIAS***
Project: *Adaptive fuzzy model for the evaluation of operational risk in financial sector entities. Partnership: PRAGMA – EIA University*
Topics: Computational Modelling and Simulation, Computational Intelligence, Financial Risk, Operational Risk, Adaptive Fuzzy Models
Funding: Science, Technology, and Innovation Minister of Colombia and PRAGMA Software Developers S.A.

2013 - 2014 ***Head of Project – COLCIENCIAS Young Researcher Program 2013***
Young Researcher: Hector Alejandro Patiño Pérez (I.MT)
Project: *Model for assessing operational risk using an adaptive discrete fuzzy system of Fuzzy Petri nets and .NET Technologies.*
Topics: Computational Modelling and Simulation, Computational Intelligence, Financial Risk, Operational Risk, Fuzzy Logic, Petri NETs.
Funding: Science, Technology, and Innovation Minister of Colombia.

2013 - 2014 ***Head of Project & Researcher***
Project: Adaptive c*omputational model for the classification of Alzheimer's patients through the default mode network from Neuro-functional magnetic resonance studies*
Topics: Computational Modelling and Simulation, Computational Intelligence, Biomedical Engineering, Deep Learning, Alzheimer disease
Funding: Science, Technology, and Innovation Minister of Colombia
(Contract 0697-2012).

2013 - 2014 ***Researcher***

Project: *Discrete fuzzy model for measuring operational risk using fuzzy Petri net structures.*

Topics: Computational Modelling and Simulation, Computational Intelligence, Financial Risk, Operational Risk, Fuzzy Logic, Petri NETs.

Funding: EIA University

2013 - 2014 ***Head of Project & Researcher***

Project: *The strategic prospective: modeling population dynamics with quantitative methods for decision making in the higher education*

Topics: Computational Modelling and Simulation, Computational Intelligence, Lagrangian Modelling, Decision Making

Funding: EIA University

2011 ***Researcher***

Project: *Fuzzy model for qualitative identification of processes to assess operational risk in Colombian companies*

Topics: Computational Intelligence, Operational Risk, Fuzzy Credibility, Machine Learning & Business Analytics.

Funding: EIA University.

2011 ***Head of Project***

Project: *Adaptive model for monitoring and measuring the risk of money laundering and terrorism financing - SARLAFT.*

Antioquia Governor Award – (Antójate de Antioquia Program)

Topics: Computational Modelling and Simulation, Computational Intelligence, Evolutionary Computation, Estimation Distribution Algorithms (EDA's)

Funding: Antioquia School of Engineering – *Antioquia Big Thinking* Award

2010 ***Head of Project & Researcher***

Project: *Evolutionary strategies to determine the temporal behaviour of the concentration of particulate matter – PMx*

Topics: Computational Modelling and Simulation, Computational Intelligence, Evolutionary Computation, Estimation Distribution Algorithms (EDA's), Particulate Matter (PMx).

Funding: EIA University – Bolivarian Pontifical University

2008 - 2010 ***Researcher***

Project: *Credit assignment model: and intelligent system application. NeuroScore model*

Topics: Computational Modelling and Simulation, Computational Intelligence, Financial Risk, Credit Risk, Machine Learning, Clustering.

Funding: EIA University, University of Medellín, Financial Cooperative of Belén.

RESEARCH FELLOWSHIPS

2018 **Royal Academy of Engineering – DeMonfort University**
IAPP Legacy Award - (https://www.raeng.org.uk/global/international-partnerships/engineering-x/transforming-systems-through-partnership/case-studies-previous-awardees)
International Newton Fund, Leicester, England

2017 **Newton Fund Researcher Links Travel Grants**
British Council – DeMonfort University (Postdoctoral Research)
Leicester, England (link)

2016 **Linking Worlds Fellowship**
Government of Medellin – DeMontfort University
Fellowship to improve the research process in Colombian Universities

2007 **Center for Energy, Environmental and Technological Research - CIEMAT**
Environmental Modelling Group – Environmental Modelling and Software Line
Madrid, Spain.

DIRECTOR OF PHD AND MASTER'S THESES

1. **Patiño, A., J.** (2017 - Current) *Spatio Temporal Optimization of the relationship consume/generation of energy in an intelligent network integrating photovoltaic and eolic power sources*, PhD Engineering program, EIA University.
2. **Patiño, P.A.** (2015 - 2016) *Integrated fuzzy model to assess the operational risk in the granting of credits to SME's*, Master of Science on Engineering Management, Faculty of Mines, National University of Colombia.
3. **Ayazo, E.** (2016- 2017) *Semiautomatic system to identify fractures of difficult visualization at level of forearm level form Digital X-Ray Images,* Magister on Biomedical Engineering, EIA University.
4. **Román, S.** (2013 - 2014) *Optimization for Reinsurance Model applied to the fire line in general insurance – Suramericana Insurances S.A.* Master of Science on Control and Industrial Automation - Master Thesis.
5. ***Gutiérrez, P.A.*** *(2012 – Inactive) Construction of evolutionary forecast maps to determine the water resource consumption behavior in metropolitan area of Medellín.* Pontifical Bolivarian University – Antioquia School of Engineering (PhD Thesis)
6. ***Guerrero, O***. (2012 - 2013) *Development of a methodology to assess the spatial coverage of the Monitoring Air Quality Network in Bogotá, Colombia. Meteorology Master Program (Master Thesis)* National University of Colombia (Codirector – 2012 -2013)
7. ***Hernández A.***. (2012) *Adaptive Fuzzy Petri nets to control of vehicular traffic*.
   Master on Automation and Industrial Control - Metropolitan Technological Institute of Medellín (Master Thesis).
8. ***Luna R.*** (2013) *Control of stochastic processes by using variables activation functions*. Master on Automation and Industrial Control. Metropolitan Technological Institute of Medellin (Master Thesis).
9. ***Dávila M. A.*** (2013) *Identification and control of stochastic systems with incomplete observations and different types of disturbances*. Master on Automation and Industrial Control. Metropolitan Technological Institute of Medellin (Master Thesis).

DIRECTOR - FINAL DEGREE WORKS

1. Arango, M.J. Martínez, M.C. (2021) *Analysis of the impact of digital marketing on Monte Rojo's engagement,* EIA University (**Honour Mention**) (link)
2. Molina, S. Villegas J. (2021) *Deep Learning model for estimating the export potential of non-mining-energy products in Colombia*, EIA University (link)
3. Osorio, A. Franco, S. (2021) *Neural network model for the determination of liquidity risk in SMEs,* EIA University, (link)
4. Echeverry, L. Martínez, N. (2020) *Neural Deep learning model to characterize the internal influences in the decision to drink beer*, EIA University, (***Honour Mention – Final Degree***).
5. Naranjo, M. (2020) *Neuromarketing as a tool for sentiment-driven brand perception.* EIA University (link)
6. Panesso, C. Henao, A. (2019) *Characterization of the brand perception of Suramericana Insurances S.A. in terms of emotional patterns and brand attributes,* EIA University (**Honour Mention** – Final Degree) (link).
7. Solis, C. (2019) *Constructing operational risk matrices from organizational business process using fuzzy AHP method*. EIA University. (**Public Mention** – Final Degree) (link).
8. Giraldo, D., Soto, M. (2019) Fuzzy cognitive map to assess the influence level of infants on the purchasing decisions of their parents. EIA University, (**Public Mention** – Final Degree) (link).
9. Fernández, A. (2019) *Methodological proposal for the creation and implementation in production of a credit granting model using alternative variables in a financial institution,* EIA University (link)
10. Duque, M. Marín, J. (2018) *Fuzzy neural model: its utility for the estimation of the IRR in investment projects with variable rates*, EIA University (link).
11. Giraldo, D. Soto, M. (2018) *Fuzzy neural model to assess the influence level of infants on the purchasing decisions of their parents,* EIA University (**Honour Mention**) (link).
12. Fernandez P., Andrés (2018) *Methodological proposal for the creation and implementation in production of a credit granting model using alternative variables in a financial entity,* Bancolombia, EIA University (Final Degree) (link).
13. Marin, J.D. Castaño, D. (2018) *Multidimensional vector support machine for currency trading in the Forex market*, Management Engineering, EIA University (Final Degree) (link).
14. Correal, Santiago (2018) *Investment strategy on a fuzzy neural model focused on structuring portfolios in real time,* Financial Engineering, EIA University (link).
15. Franco, N. Pérez, S. (2018) *Hierarchical process model to estimate the non-performing loan ratio in a financial institution for SME and micro SME loans in Colombia.* EIA University (link)
16. Arango C., S. (2017) *Scoring model for granting mortgage loans based on the price behavior of housing prices in the Medellín City.* Management Engineering, EIA University (link).
17. Ruiz, C. Maturana, M. (2017) *Brain activation model for the identification of sensations in audiovisual advertising based on the construction of emotional audiovisual patterns*, EIA University (link)
18. Escobar, J. Gonzalez, E. (2016) Precision positioning of drones through visual feedback, Mechatronics Engineering, EIA University (Final Degree Work).
19. Vélez, J.F. Warstki, V. (2016) *Adaptive Model for Market Intelligence as support for the decision making of exports non energy products in Colombia*, EIA University – Iberian Conference on Information Systems and Technologies CISTI-2016 (link).
20. Gómez J., V. Jaramillo, P.E. (2015) *Identification of emotional patterns in broadcast advertising from the cerebral bioelectrical activity of a consumer* Administrative Engineering (Final Degree), School of Engineering of Antioquia (**Honour Mention**) (link)

21. Saldarriaga, D. Serna, A. (2015) Drone for detecting and detonating landmines, Mechatronics Engineering Program, EIA University (Final Degree Work).
22. Aristizabal, A. Sánchez, S. (2015) *Multipurpose Remote Control to improve flight stability in making precision aerial photography using UAVs,* Mechatronics Engineering EIA University (Final Degree Work).
23. Gómez, S. F. Vélez P., J.M. (2015) *Modelo Vectorial como apoyo a la compra y venta de acciones del Mercado de la bolsa de valores de Colombia*, Management Engineering EIA University (Final Degree Work) (link).
24. Villegas M., A. Tobón A., S. (2014) *Neuroevolutionary unit product model based on the structure of the stochastic oscillator for the trade in the forex market,* EIA University (Final Degree Work) (link)
25. Machado A., C. Sánchez M., L. (2014) *A Quadcopter RC control using encephalographic brain signals through a computer interface,* Mechatronics Engineering EIA University (Final Degree Work).
26. Arcila, S. (2014) *Analog circuit for adaptive control based on artificial neural networks,* Mechatronics Engineering, EIA University (Final Degree Work).
27. Bello V., C. Villa, S. (2014) *Model to identify patterns of brain activation to broadcast advertising in personal care products,* Management Engineering EIA University (Final Degree Work - **Honour Mention**) (link).
28. González, A. (2013) *Model for prediction the solar radiation using neural models,* Mechatronics Engineering, EIA University (Final Degree Work) (link).
29. Cardona, A. Velasquez, E. (2013) *Model to determine the cognitive state in comatose patients by recording brain bioelectrical activity,* Mechatronics Engineering EIA University (Final Degree Work) (link).
30. Colorado I., A. Carrasquilla Q., F. (2013) *Financial time series forecasting using neuroevolutionary models.* Mechatronics & Management Engineering, EIA University (Final Degree Work) (link).
31. Cardona D., D. (2013) *Identification and Control of non Linear and Chaotic Dynamical Systems,* Mechatronics Engineering, EIA University (Final Degree Work) (link).
32. Gaviria, E. (2013) *Intelligent systems in automated trading strategies for the Forex market*. Management Engineering, EIA University (Final Degree Work) (link).
33. *Henao R. Esteban.* (2013) *Design of a self-adaptive home automation system based on artificial neural networks*. Mechatronics Engineering, EIA University (Final Degree Work) (link).
34. *Juris C., Juris M.* (2013) *Model for measuring operational risk in Colombian financial institutions by using the Montecarlo Markov Chain Method.* Systems & Management Engineering, EIA University (link).
35. *Arango, J.E. Cárdenas M., J. (2012) BIM for reconstructing the two dimensional movement of an arm using non invasive EEG*. Mechatronics & Biomedical Engineering EIA University (Final Degree Work - **Honour Mention**) .
36. *Santa M., J.L. (2012) Recognition of tissues in Images obtained by computational tomographic using neural networks* Mechatronics Engineering, EIA University (Final Degree Work) (link).
37. *Vásquez H., N. Londoño A., S. (2012) Flight control of a RC helicopter through a natural user interface (Windows Kinect).* Mechatronics Engineering EIA University (Final Degree Work).
38. *Palacio, C. Ramírez, S.* (2011) *Model for the daily performance of Ecopetrol piece of Market using Evolutionary Computation*. Mechatronics & Management Engineering EIA University (Final Degree Work - **Honour Mention**).

39. *Bonilla G., C. Fernández M., M.* (2012) *Neurofuzzy assessment of controllers saturation applied to a gyro stabilized platform (GSP)*. Mechatronics Engineering (Final Degree) EIA University (Final Degree Work).
40. *Betancur B., D. Vélez G., M.* (2011) *Translator wireless glove of dactylology alphabet of Def people* Mechatronics Engineering, EIA University (Final Degree Work – ***Telefonica Ability Awards***).
41. *García, C. Henao, J.* (2012) A*lgorithm for reducing waste in cutting leather*. Mechatronics Engineering, EIA University (Final Degree Work).
42. *Patiño P., A. (2010) Computational model to assess the money laundering and terrorist financing in Colombia*. Mechatronics Engineering, EIA University (Final Degree Work).
43. *Gómez H., D. Zuluaga, D.* (2010) *Identification of optimal temperature and speed patterns for extraction of avocado oil – EVOP Model*. Mechatronics Engineering, EIA University (Final Degree Work - **Honour Mention**).
44. *Chará, D.A.* (2010) *Forecasting the change of PM_{10} Surface Concentration* Mechatronics Engineering, EIA University (Final Degree Work - **Public Mention**).
45. *Puerta G. S.* (2009) *Active noise cancellation with neurogenetics algorithms*, Mechatronics Engineering, EIA University (Final Degree Work).
46. *Castaño B.,A. Morales, C.A.* (2009) *Designing a Solar Power Plant for Power Generation*, Mechatronics Engineering, EIA University (Final Degree Work - **Public Mention**).
47. *Fernández J.,A.* (2009) *Development of a model of actuarial analysis using computational intelligent systems*. Mechatronics Engineering, EIA University (Final Degree Work - **Public Mention**).
48. *Gutiérrez, S.* (2009) *Adaptive Control based on Neural Networks: Application to Nonlinear Dynamic Processes*. Mechatronics Engineering, EIA University (Final Degree Work).
49. *Melo E.,C. Botero L., A.* (2009) *Fuzzy Model for Evaluating Adaptive Skills in Children with Cognitive Disabilities*. Biomedical Engineering, EIA University (Final Degree Work - Public Mention).

SOFTWARE PRODUCTS

2018 **Software – Big Data Maturity Models**
Fuzzy Electre Model (v1.2). Software to assess the big data maturity in health organizations (Software License: 1-2017-43479).

2017 **Software – Credit Risk Modelling**
Softcredel(v1.0). Software to assess the credit risk using fuzzy input information (Software License: 1-2017-19612) – Rapicredit Platform – FINTECH Industries.

2014 **Software – Computational Modelling**
CIToolbox(v1.5), Computational Intelligence Solutions. (Software License: 1-2014-42861).

2013 **Software – Computational Modelling**
PragmaCero, Fuzzy model to estimate the Operational Risk using Advanced Measurement Techniques. (https://www.riesgoscero.com/) – FINTECH & INSURTECH Industries. Funding: Science, Technology, and Innovation Minister of Colombia.

2012 **Software – Computational Modelling**
Credit NeuroScore, Neural model to evaluate the credit risk in the placing of consumer credits – FINTECH Industries. (Software License: 200-294275).

2010 **Software – Computational Modelling**
CEPuff Computational evolutionary model to determine the spatiotemporal behavior of particulate matter concentration PM_x. (Software License: 1-2010-13156).

2010 **Software – Computational Modelling**
NeuroLaft: Adaptive neuronal model for monitoring and identification of money laundering and terrorism financing (SARLAFT) – Antioquia Big Thinking Award – FINTECH Industries.

SPEAKER

2019 14th. Iberian conference on systems and information technologies CISTI2019
Iberian Association on Systems and Information Technologies, AISTI
Coimbra, Portugal

2018 13th. Iberian conference on systems and information technologies CISTI2018
Iberian Association on Systems and Information Technologies, AISTI
Caceres, Spain

2017 12th. Iberian conference on systems and information technologies CISTI2017
Iberian Association on Systems and Information Technologies, AISTI
Lisbon, Portugal

2016 11th. Iberian conference on systems and information technologies CISTI2016
Iberian Association on Systems and Information Technologies, AISTI
Palmas de Gran Canaria, Spain

2015 10th. Iberian conference on systems and information technologies CISTI2015
Iberian Association on Systems and Information Technologies, AISTI
Oporto, Portugal

2014 9th. Iberian conference on systems and information technologies CISTI2014
Iberian Association on Systems and Information Technologies, AISTI
Barcelona, Spain

2013 Spatial Statistics Conference 2013
Ohio State University – Elsevier, Columbus, Ohio.
http://www.spatialstatisticsconference.com/ (link)

2012 3rd. Colombian Congress on Computational Intelligence
Pascual Bravo Technological Institute, Medellín, Colombia.

2012 Research Conference EIA - 2012
School of Engineering of Antioquia, Envigado, Colombia.

2012 7th. Iberian conference on systems and information technologies, CISTI2012
Iberian Association on Systems and Information Technologies, AISTI
ISI Proceedings Papers Conference Proceedings Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore, ISBN: 978-989-96247-4-0. Madrid, España.

2011 2nd. Colombian Congress on Computational Intelligence
Pascual Bravo Technological Institute, Medellín, Colombia.

2011 Research Conference EIA - 2011
School of Engineering of Antioquia, Envigado, Colombia.

2011 6th. Iberian conference on systems and information technologies, CISTI2011
Iberian Association on Systems and Information Technologies, AISTI
ISI Proceedings Papers Conference Proceedings Citation Index
Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore, ISBN: 978-989-96247-4-0. Chaves, Portugal

2011 IX Colombian Congress on Meteorology
Neural classifier systems for identifying patterns of dispersion of pollutants in an area of study. Bogota, Colombia

2010 1st. Colombian Congress on Computational Intelligence
Evolutionary strategies to get forecast maps for particulate matter concentration of PMx. (Nodo IEEE). Medellín, Colombia.

2010 5th. Iberian conference on systems and information technologies, CISTI2010
Iberian Association on Systems and Information Technologies, AISTI
ISI Proceedings Papers Conference Proceedings Citation Index – Science (CPCI-S), ISI Web of Knowledge© Database IEEE Explore, ISBN: 978-989-96247-3-3, Santiago de Compostela, España.

AWARDS & GRANTS

2023 **Royal Academy of Engineering – Distinguished International Associates**
Configuration of augmented intelligence platforms (AIPs) to improve the environmental and financial sustainability of small and medium (SME's) in agricultural crops, Distinguished International Associates Award (https://raeng.org.uk/dia)

2018 **Royal Academy of Engineering – IAPP Legacy Award**
Intelligent system to improve the sustainability of oil palm crops through the construction of forecasting maps integrating adaptive vegetation indices from multispectral aerial views
Industry-Academia Partnership Program - IAPP
(https://www.raeng.org.uk/global/international-partnerships/engineering-x/transforming-systems-through-partnership/case-studies-previous-awardees)

2016 **Innovantioquia Award – First Prize**
Intelligent system for multispectral aerial view analysis to support the sustainability of oil palm plantations at small and medium scale – Antioquia Big Thinking Award, Antioquia State of Colombia - Productivity and Competitiveness Secretary (link1, link2).

2016 **Innovantioquia Award - Prize**
Unmanned aerial vehicle for detection and detonation of anti-personnel mines – Antioquia Big Thinking Award, Antioquia State of Colombia - Productivity and Competitiveness Secretary (link,link2,link3).

2016 ***Best Paper Award***
Iberian Conference on Information Systems and Technologies CISTI2016
Adaptive progressive model to buy and sell shares using stock indicators
Scopus – IEEExplore Event – Palmas de Gran Canaria, 2016.

2015 **Newspaper Report – El Colombiano Newspaper**
Students are betting on a Colombia without mines – Head of Final Degree Work
Students: Alejandro Serna (I.MT) – Daniel Saldarriaga (I.MT) (link, link2,link3)

2013 ***Best Paper Award*** – Spatial Statistics Conference 2013
Constructing PMx Forecast Maps of using Stochastic Evolutionary Strategies
Elsevier – Ohio State University, USA (link).

2013 **Newspaper Report - El Colombiano Newspaper**
Technology for Medical Rehabilitation. (link,link2,link3).

2011 ***Telefónica ability awards,***
Colombian students develop a wireless glove that interprets sign language.
Publishing: Spain, November 18, 2011 (link)

2011 **Antioquia Goverment Distinction**, *Antójate de Antioquia Program*
First place in Research and Development Category
NeuroLaft: Neural model for money laundering and terrorism financing
Medellín, Colombia - Productivity and competitiveness secretary (link)

2010 ***Nomination awards for solidarity and science***
Alejandro Ángel Escobar Fundation. Education Minister of Colombia
Bogotá, Colombia.

2010 ***Coimbra Scolarships – Internacional Grant.***
Coimbra Universities Group.
European, Union. Bruseles, Bélgica

2009 **PhD Tesis, Magna Cum Laude Grade**
Pontifical Bolivarian University
Medellín, Colombia.

2009 ***2nd. Place – Automation and Robotics Category***
Automatic bender shirts. Cares Worlds.
Technologic Park – Explora Park Scientific Institution,
Medellin Public Enterprises

2005 ***PhD National Grants 2005***
Science, Technology and Innovation Administrative Department - COLCIENCIAS
Republic of Colombia.
Bogotá, Colombia.

MEMBER OF RESEARCH GROUPS AND NETWORKS

2018 - Current ***Institute for Artificial Intelligence – DeMontfort University***
Faculty of Technology, Business Castle School
ISSN: 1646-9895. https://www.dmu.ac.uk/research/research-faculties-and-institutes/technology/cci/centre-of-computational-intelligence.aspx
Chief: Mario Góngora – Francisco Chiclana

2013 - Current ***Spatial Statistics Society***
The Spatial Statistics Society is currently an informal and open society, that focuses on analyzing and understanding spatial and spatio-temporal data, by modelling and predicting it. http://www.spatialstatistics.info/home

2010 - Current ***Iberian Association on Systems and Information Technologies (AISTI)***
Scientific Committee: Systems and Technologies Information Journal
ISSN: 1646-9895. http://www.aisti.eu/risti/index.php/es/consejo-cientifico
Chief: Álvaro Reis Rocha

2010 - Current ***Modelling and Simulation Society Member (MSSANZ)***
IMACS: International Association for Mathematics and Computers in Simulation New Zeeland - Chief: Anthony Jackeman.

2009 - Current ***Research Gate – Scientific Network***
Director: Dr. Ijad Madisch, Dr. Sören Hofmayer
Working Area: Natural Computing. Place & Institution: Register HR Hannover B 202837 VAT-ID: DE258434568

2008 - Current ***Head of Research Group in Computational Intelligence and Automation***
Director: Alejandro Peña P. (PhD)
Investigation Line: Computational Modelling.
Place & Institution: School of Engineering of Antioquia
(COLCIENCIAS – Level C), Envigado, Colombia.

2007 ***Head of Research Group in Computational Modelling and Simulation (GIMSC)***
Working Area: Computational Intelligence and Flexible Manufacturing Systems Coordinator, Computational Modelling
University of San Buenaventura (COLCIENCIAS – Level C).

2007-2010 ***Member of research group***
Instrumentation, control and robotic research Group (ICARO)
Head Group: Luis Eduardo Garcia (M.Sc.)
Working Area: Automation and Control Research Line
Place & Institution: Politécnico Colombiano Jaime Isaza Cadavid.

MEMBER OF SCIENTIFIC COMMITTEES AND PUBLISHING

2021 **Peer Reviewer**
Applied Soft Computing Journal
https://www.scimagojr.com/journalsearch.php?q=18136&tip=sid

2019 ***General Chair***
International Conference on Tourism Technology and Systems (ICOTTs2020)
Iberian Association on Information Systems and Technologies - AISTI
https://www.icotts.org/

2017 ***Design of Centre for Artificial Intelligence – Colombian Government***
Ministry of Information Technologies & Communications (MINTIC)
EIA University – BIOS Center for Bioinformatics and Computational Biology

2011- Current ***Member of Scientific Committee***
RISTI – Iberian Journal on Information Systems and Technologies
Iberian Association on Information Systems and Technologies
ISSN: 1646-9895, Indexed SCOPUS – ISI Thomson Reuters – IEEExplore
CiteScoreRank: Computer Science #65/195 – Percentile 68 th.

2010 - Current ***Member of Scientific Committee***
Iberian Conference on Information Systems and Technologies – CISTI
Iberian Association on Systems and Information Technologies – AISTI,
Oporto, Portugal, http://cisti.eu/index.php?lang=es

2015 - Current ***Science, Technology and Innovation Minister of Colombia***
Advisor & Consultant Staff - Research and Development in Engineering
Scientific Recognized Peer - Bogotá, Colombia

2014 - Current **National Accreditation Council - CNA**
High-Quality Accreditation Programs – Systems Engineering Program
Ministry of National Education – Engineering Board
Bogotá, Colombia (link)

2015 - Current ***Member of Scientific Committee***
Research Projects – Peer Reviewer – Technological and Innovation Office
Technical University of Pereira

2015 - Current ***Member of Scientific Committee***
Research Projects – Peer Reviewer – Research and Innovation Office
Francisco José de Caldas - District University
Bogotá, Colombia

2015 - Current ***Member of Scientific Committee***
Research Projects – Peer Reviewer Teaching Career
University of Quindío – Research and Innovation Department
Armenia, Colombia

2015 ***Member of Scientific Committee***
Research Projects – Peer Reviewer Teaching Career
University of the Valley – Research and Innovation Office
Cali - Colombia

2014 **University of Liberators**
Peer Reviewer - Quality Standards in Engineering (CNA Board)
Systems Engineering Program – Engineering Academic Office
Bogotá, Colombia

2014 ***Member of Scientific Committee***
Program: ¿Who is measured? – *Antioquia Big Thinking Program*
Government of Antioquia, Medellin, Colombia.

2014 M***ember of Scientific Committee*** – ***Peer Reviewer***
Book: Finance – Modelling and Strategy, Vol. I.
Engineering Faculty, University of Medellin

2014 ***Member of Scientific Committee***
Explore Park – Discover Worlds
Medellín, Colombia – http://www.parqueexplora.org/

2013 ***Member of Scientific Committee – Linking World Program*** *(Fifth Edition)*
Program of the mayor of Medellin to fund graduate studies and internships abroad Medellin, Colombia. http://www.enlazamundos.org/.

2012 ***Peer Reviewer – H2020 European Program***
Tattoo FP7 Project – Tagging Tool base on a Semantic Discovery Framework
European Community's Seventh Framework Program (2007-2013)

2012 ***Peer Reviewer Journal***
Journal of the Faculty of Engineering, University of Antioquia
ISSN 0120-6230 – Scopus CiteScore rank #196/270 – Percentile 27th
Medellín, Colombia

2012 ***Peer Reviewer Journal***
Journal of Technologies – Metropolitan Technological Institute – ITM
Medellin, Colombia. ISSN: 0123-7799.

2012 ***Peer Reviewer Journal***
Tecnnura Journal - Francisco José de Caldas University.
Bogotá, Colombia. ISSN: 0123-921X

2012 ***Member of Scientific Committee***
A&E-2012 National Conference on Electronics, Mechatronics, Systems and Telecommunications – Metropolitan Technological Institute (ITM)

2012 ***Peer Reviewer Conference***
V CIBELEC 5th. Latin-American Congress of Students on Electrical Engineering
Electric Engineering School, Los Andes University, Venezuela.

2011 ***Member of Scientific Committee,* 2nd, Congress on Computational Intelligence**
Pascal Bravo Institute of Technology – IEEE Xplore Node
Medellin, Colombia.

2011 ***Peer Reviewer,* International Journal of Environmental & Analytical Chemistry**
Taylor and Francis Corporation – ISSN:0306-7319
Journal Indexed in SCOPUS & ISI Thomson Reuters
CiteRank score – Water Science and Technology #83/191 – h-index: 56.

2010 **Peer Reviewer *Research Projects,* University of Medellin**
Engineering Research Department
Faculty of Engineering – Medellín, Colombia.

2012 ***Member of Scientific Committee***
1st. Colombian Congress on Computational Intelligence
Technological Institute Pascual Bravo – IEEE Xplore Node
Medellín, Colombia

2010 ***Peer Reviewer Journal***
Journal on Advances in Systems and Informatics
Faculty of Mines, National University of Colombia
ISSN: 1657-7663

2010 **Project Reviewer Research Projects**
CODI Projects, Faculty of Engineering
University of Antioquia

ADVISOR & CONSULTING

2018 **Technological Surveillance**
Design of the Center of Excellence in Artificial Intelligence
Topics: Artificial Intelligence Applied in Enterprises, FINTECH Services
Ruta N – Business and Innovation Center (link)

2017 **Design of the Center for Artificial Intelligence**
Minister of ICT Technologies – Viva Digital
Topics: Technological Megatrends
Government of Colombia

2016 **Los Libertadores University**
Activities: Preparation of documents for high quality accreditation
Systems Engineering Program
Bogotá – Colombia.

2015 **Konrad Lorenz University**
Activities: Preparation of documents for high quality accreditation
Systems Engineering Program
Bogotá – Colombia.

EXTENSION COURSES

2020 Decision Support Systems in Energy Markets
Ph.D. Engineering Program – Faculty of Engineering
EIA University

2017 Workshop on Accelerated Development of Patents
CAF- Development Bank of Latin America
Medellin, Colombia

2014 *Construction Questions Workshop – Saber Pro National Tests*
ICFES – Colombian Institute for the Promotion of Higher Education
Systems Design Modules – University of Envigado (20 Hours)

2013 *Assessor training*
National Council for Accreditation of Colombia - CNA
University of Medellin (8 Hours.).

2012 *Enterprises with high growth potential and difference from research results*
Entrepreneurship Park (University of Antioquia – Mayor of Medellín).
Medellín, Colombia. (40 Hours.).

2011 *Active Learning in Engineering – Teaching being competent*
Antioquia School of Engineering Medellín, Colombia (30 Hours)

2011 *B-Learning - Course*
Metropolitan Technological Institute of Medellín.
Medellín, Colombia. (30 Hours).

2011 *Digital Photography – Nivel I*
Antioquia School of Engineering Medellín, Colombia (32 Hours)

2010 *As mobilize international grants*
Antioquia School of Engineering
Envigado, Colombia. (16 Hours).

2010 *Conceptual Maps*
Antioquia School of Engineering
Envigado, Colombia. (20 Hours).

KNOWLEDGE OF COMPUTER TOOLS

Metatrader 5.0
Trading Platform for Forex, Stocks, Futures,CFD
Level: Advanced

Microsoft C# .NET
Level: Advanced

Microsoft SQL Server – Data Tools
Level: Advanced

MatLAB & Simulink Platform
Level: Advanced

R-R Studio - Neurolab
Level: Advanced

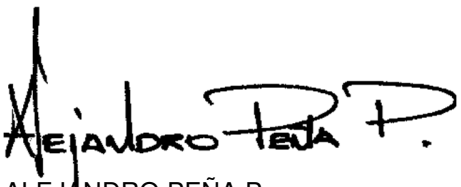
R-Rattle Data Mining
Level: Advanced

Python – librosa (Voice Processing)
Level: High

Python – Keras & TensorFlow & Colab Research
Level: High

Orange – Data Mining Fruitful & Fun
Level: Advanced

JAVA SE
Level: High



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