

LEONARDO RODRÍGUEZ URREGO, Ph. D.

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Mechatronics Engineer with experience in the field of Industrial Automation and Renewable Energies Control Discrete Event Systems, Hybrid Systems Control Systems Diagnosis and Fault Recovery, Monitoring and Control Systems. High participation in R + D + I National, International and European with the Ministry of Education and the Ministry of Foreign Affairs of Spain, and Spanish and Colombian companies. Excellent leadership skills, planning, project management and teamwork.

Education:

Ph.D., Automation, Robotics and Computer Industrial

Polytechnic University of Valencia, Spain

Date: October 2012

Title of Thesis: Fault Diagnosis in Complex Systems based on Latent Nestling Method using Hybrid and Coloured Petri Nets.

M.Sc., Energy Technology for Sustainable Development. Specialty Renewable Energy

Polytechnic University of Valencia, Spain

Date: October 2012

Title of Thesis: Expert System for the Fault Diagnosis, Condition Monitoring and Supervision of an Off Shore Wind Farm.

M.Sc., Automation, Robotics and Computer Industrial.

Polytechnic University of Valencia, Spain

Date: January 2010

Title of Thesis: Fault diagnosis in Complex Systems based on Latent Nestling Method. Case study: (Cooling and Lubrication System of a Wind Turbine Gearbox).

B.Eng., Automation and Industrial Electronics. (Officially accredited)

Polytechnic University of Valencia, Spain

Date: February 2009

B.Eng., Mechatronics

San Buenaventura University. Bogotá, Colombia.

Date: December 2003

Professional Experience:

**Process Department Director December 2015 - Actually
Energy Program Director June 2015 – December 2015
Full Professor September 2014 – June 2015**

EAN University

Cra 11 No. 78 - . 47, (57 1) 593 6464 Ext 1497.

Web site: <http://www.ean.edu.co/seccion/inicio.html>

Bogotá, Colombia

CEO July 2012 - September 2014

INEL Colombia

Cra 15 No 119-11, (57) 311 8160592

Web site: <http://www.inelcolombia.com/> Bogotá, Colombia

INEL Colombia S.A.S. It is committed to improving the efficiency and quality of energy supply and consumption in local public and private sector. Its main objectives are the implementation and distribution of energy solutions based on sustainable, renewable and environmental policies that meet the needs of the country. To achieve these objectives INEL Colombia has a qualified and trained staff with over 25 year's experience in its parent company located in Valencia, Spain.

Researcher January 2007 – July 2012

Group Monitoring and Fault Diagnosis

Institute of Automatic and Industrial Informatics - ai2

Polytechnic University of Valencia

Web site: <https://sdf.ai2.upv.es/es/> Valencia, Spain

The research group Monitoring and Diagnosis in Automation and Control Systems is integrated into the Graduate Institute of Automatic Control and actively participates in the PhD in Automatic Control, one of the first with a quality award from the Ministry of education and Science. At this time, the research group has a total of 5 researchers, all doctors of the Department of Systems Engineering and Automation and a number of collaborators.

Academic Coordinator June 2013 – December 2014

Diploma Domóticos Integration Systems and Bogotá, Colombia

Building Automation

Piloto University

Web Site: <http://www.unipiloto.edu.co/>

Professor Academic Specialization September 2012 – June 2014

Process Modeling and Simulation

Academic Specialization in Industrial Process Automation

University of San Buenaventura. Bogotá, Colombia

Web Site: <http://www.usbbog.edu.co/>

Advisor - Expert May 2013 - September 2013

Project Development in Robotics, Industrial Computers and Renewable Energy
Fund for Science, Technology and Innovation.
Foundation for Education and Social Development - FES and Colciencias.
Web Site: <http://www.colciencias.gov.co/>

Assistant Professor January 2004 - October 2006

Mechatronics Engineering Program
University of San Buenaventura. Bogotá, Colombia
Web Site: <http://www.usbbog.edu.co/>

Assistant Professor January 2005 - October 2006

PLC programming, Mechatronics, Robotics Bogotá, Colombia
SENA Metal mechanical Center
Web Site: <http://www.sena.edu.co>

Special Projects Advisor February 2003 - June 2005

Reflutec of Colombia - Rexroth Bosch Group Bogotá, Colombia
Web Site: <http://www.reflutec.com>

Major Projects:

Nazareth - Puerto Estrella (Colombian National Project with the IPSE entity linked to Ministry of Mines and Energy of Colombia) Design, implementation and operation of a photovoltaic solar hybrid system in a remote area in the Colombian Guajira desert. IPSE-CIS CONSORTIUM INEL-SUEL (€2'200.000) BOGOTÁ, COLOMBIA. From: 1/11/2012 until: 07/31/2014. <http://www.leonardorodz.com/#!/nazareth-project/c1b90>

EOLIA (European Project Cenit-Eolia) Software design to fault diagnosis and maintenance using artificial intelligence techniques for offshore wind turbines. Ingeteam Service - Acciona Energy (€ 542,200) Valencia, Spain. From: 1/1/2007 since: 1/1/2011 <http://www.leonardorodz.com/#!/en-blanco/c1nwx>

MICHEGER II Integrated systems of supervision with condition monitoring and fault diagnosis techniques for offshore wind turbines and marine current turbines. Funding: Ministry of Education and Science MEC (€193.600) From: 1/1/2011 until: 1/1/2014. Lead researcher: Emilio García Moreno. Number of researchers: 4 <http://www.micheger.upv.es/>

MICHEGER I Integrated systems of supervision with condition monitoring and fault diagnosis techniques for offshore wind turbines and marine current turbines. Funding: Ministry of Education and Science MEC (€12.100) From: 1/1/2010 until: 1/1/2011. Lead researcher: Emilio García Moreno. Number of researchers: 4 <http://www.micheger.upv.es/>

Fault detection and diagnosis, monitoring and control of quality in the industry of meat and dairy. Funding: Ministry of Foreign Affairs (€43.000) From 16/1/2010 until: 08/03/2011. Lead researcher: Emilio García Moreno. Number of researchers: 6

Intermittent fault diagnosis in hybrid and complex systems II. Funding: Ministry of Education and Science MEC (€ 46.342) From 1/10/2006 until: 1/10/2009. Lead researcher: Emilio García Moreno. Number of researchers: 4

Intermittent fault diagnosis in hybrid and complex systems I. Funding: Ministry of Education and Science MEC (€ 10.000) From 01/01/2009 until: 01/01/2010. Lead researcher: Emilio García Moreno. Number of researchers: 4

Mechatronics Project II Rexroth Bosch Group (Reflutec of Colombia) (€ 300,000) Design, installation and course for equipment Mechatronics, industrial communications systems and robotics (Standard Mechatronic System), (Turboscara SR4), (Ethernet, Profibus, OPC) Regional Sena Colombia. November 2004. <http://www.reflutec.com/index.php>

Mechatronics Project I Rexroth Bosch Group (Reflutec of Colombia) (€ 300,000) Design, installation and course for equipment Mechatronics, industrial communications systems and robotics (Standard Mechatronic System), (Turboscara SR4), (Ethernet, Profibus, OPC) Regional Sena Colombia. November 2003. <http://www.reflutec.com/index.php>

Courses:

Fronius Partner	Fronius Duration: (40 hours) Madrid, Spain Date: October 2012
Industrial Maintenance Systems	Polytechnic University of Valencia Duration: (20 hours) Valencia, Spain Date: June 2009
International School on Fault Detection and Diagnosis of Complex Systems	University of Seville Duration: (40 hours) Date: June 2008 Seville, Spain
Wind Energy:	Polytechnic University of Valencia Duration: (22 Hours) Valencia, Spain Date: July 2008
Monitoring Software WinCC	Siemens Duration: Until 15/03/2007 18/03/2008 Bogotá, Colombia

Course Foundations of Vocational Training Center	SENA Metal Mechanical center Comprehensive Competency Based Bogotá, Colombia Duration: (40 Hours)
Course PLC'S Bosch Rexroth Bosch Group Turboscara Robots	SENA Metal Mechanic Center Duration: (120 Hours) Bogotá, Colombia Date: June 2003
Machines and tools, CNC	Central Technical Institute Computer (CNC). Bogotá, Colombia Duration: (100 hours) Date: 2002

Journal Publications and Book Chapters:

- Beltrán, A., Gracia-León, H., Rodríguez-Urrego, D. and Rodríguez-Urrego, L., Design and calculation of a hybrid solar-hydraulic power station in Gran Canaria. DYNA, 85(206), pp. 250-257, September 2018.
- Caquimbo-Medina Lorena, Rodríguez-Urrego Leonardo. "Sustainable procurement with Coloured Petri Nets. Application and extension of the proposed model". Expert Systems with Applications, Volume 114, 2018, Pages 467-478, ISSN 0957-4174,
- D Rodríguez-Urrego, L Rodríguez-Urrego, Photovoltaic energy in Colombia: Current status, inventory, policies and future prospects, Renewable and Sustainable Energy Reviews, Volume 92, September 2018, Pages 160-170, ISSN 1364-0321, <https://doi.org/10.1016/j.rser.2018.04.065>.
- Rojas A.E., Mejía-Moncayo C., Rodríguez-Urrego L. "Smart Block EAN: Ten Scalable Initiatives for a Smart City". In: Gervasi O. et al. (eds) Computational Science and Its Applications – ICCSA 2018. ICCSA 2018. Lecture Notes in Computer Science, vol 10964, Julio 2018. Springer, Cham ISBN 978-3-319-95173-7 DOI https://doi.org/10.1007/978-3-319-95174-4_7
- Guevara., L.M.; Rodríguez., L. "Model the Green Procurement based Coloured Petri nets" DYNA, Vol 84, N 203, p. 177-183, 2017. ISSN electrónic 2346-2183. ISSN 0012-7353. Dec 2017
- L. Rodríguez-Urrego et al., "Propuesta de mejora energética para una planta de producción de clinker," Investig. e Innovación en Ing., vol. 5, no. 2, pp. 10–24, Nov. 2017.
- Rodríguez. L.; Valencia, J.; Rodríguez., D.; Martínez., A. "Design, implementation and operation of a solar hybrid system in a remote area in the Colombian Guajira desert." WIT Transactions on Ecology and The Environment, Vol 195, pp. 427-438. ISBN: 978-1-84564-944-9 ISSN: 1743-3541. 2015

- Guevara., L.M.; Rodríguez., L.; Gomez., D.; Chenet., J.G. “Green procurement model using petri nets: a perspective developed from the models applied to the supply chain” WIT Transactions on Ecology and The Environment, Vol 195, pp. 267-277. ISBN: 978-1-84564-944-9 ISSN: 1743-3541. 2015
- Rodríguez., L.; García., E.; Quiles., E. Correcher., A. Morant., F.; & R. “Diagnosis of Intermittent Faults in IGBTs Using the Latent Nestling Method with Hybrid Coloured Petri Nets,” Mathematical Problems in Engineering. doi: 10.1155/2629, ISSN: ISSN: 1563-5147 January 2015.
- Rodríguez., L.; García., E.; Morant., F.; Correcher., A. & Quiles., E. " Hybrid Analysis in the Latent Nestling Method Applied to Fault Diagnosis" IEEE Transactions on Automation Science and Engineering. vol.10, no.99, pp.1-16, 0 doi: 10.1109/TASE.2012.2229706, ISSN: 1545-5955.
- Correcher., A. García., E.; Morant., F.; Quiles., E. & Rodríguez., L. "Intermittent Failure Dynamics Characterization" IEEE Transactions on Reliability, Elsevier. vol. PP, no. 99, p. 1, 2012 ISSN : 0018-9529.
- Rodríguez., L.; García., E.; Morant. “Application on a Chemical Process of the Latent Nestling Method for Fault Diagnosis” Ingenium Journal. Bogotá, Colombia. Vol 24. p. 22-32 December 2011 ISSN: 0124 – 7492.
- Rodríguez., L. “GEMMA: A universal tool for automation process” Ingenium Journal. Bogotá, Colombia. Vol 23. p. 80-96 Junio 2011 ISSN: 0124 – 7492.
- Rodríguez., L.; García., E.; Morant., F.; Correcher., A. & Quiles., E. "Fault diagnosis for complex systems using Coloured Petri Nets" Chapter Book, Petri Nets Theory and Applications, IN-TECH Vienna, Austria. Marzo 2010 ISBN 978-953-307-047-6
- Correcher.,A.; García., E.; Morant., F.; Quiles., E. & Rodríguez., L. “Diagnosis of Intermittent Faults and its dynamics”. Chapter Book, Factory Automation, IN- TECH Vienna, Austria. Marzo 2010. ISBN 978-953-7619-42-8.
- Rodríguez., L.; García., E.; Morant. “Emerging behavior simulation of a mobile robot using fuzzy control in motivation and opportunity factors” Ingenium Journal. Bogotá, Colombia. Vol 22. p. 46-52 December 2010 ISSN: 0124 – 7492.
- Rodríguez., L.; García., E.; Llanes., Orestes.; Prieto., Alberto.; Morant., F. “Diagnóstico de Fallos en Sistemas Híbridos Usando el Método de Anidamiento Latente” Electronic, Automatic and Communications Journal. La Habana, Cuba. Vol 1 N 3, January 2010 ISSN 0258-5944.

Conferences:

- Rodríguez., L.; Valencia., J.; Rodríguez., D.; Martinez., A. “Design, implementation and operation of a solar hybrid system in a remote area in the Colombian Guajira desert.” WESSEX Institute - 6th International Conference on Energy and Sustainability, Medellín, Colombia, September 2-4 2015.
- Guevara., L.M.; Rodríguez., L.; Gomez., D.; Chenet., J.G. “Green procurement model

using petri nets: a perspective developed from the models applied to the supply chain” WESSEX Institute - 6th International Conference on Energy and Sustainability, Medellín, Colombia, September 2-4 2015.

- Rodríguez, L.; García, E.; Morant, F.; Correcher, A.; Quiles, E. “Hybrid Latent Nesting Method: A Fault Diagnosis case study in the Wind Turbine Subsets” IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Budapest, Hungary, July 3-7 2011.
- Rodríguez, L.; García, E.; Morant, F.; Correcher, A.; Quiles, E. “Coloured and Hybrid Petri Nets applied to Fault Diagnosis based on Latent Nesting Method” IEEE/SDEMPED International Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives, Bologna, Italy September 5-8 2011.
- Rodríguez, L.; García, E.; Morant, F.; Correcher, A.; Quiles, E. “Formalización del Método de Anidamiento Latente para el Diagnóstico de Fallos en Sistemas Híbridos” XIV Congreso Latinoamericano de Control Automático, Santiago de Chile, Agosto 2010.
- Rodríguez, L.; Aldana, V.; Correcher, A. “Técnicas para el Diagnóstico de Fallos en Aerogeneradores de Alta Potencia”. VI Conferencia Internacional de Energía Renovable, Ahorro de Energía y Educación Energética, La Habana, Cuba, 2009.
- Rodríguez, L., García, E., Llanes, O., Prieto, A., Morant, F. Fault Diagnosis in Hybrid Systems through Latent Nestling Faults, 13th International Convection and Fair Informatics, La Habana, Cuba, February 2009
- Rodríguez, L.; García, E.; Morant, F.; Correcher, A.; Quiles, E. & Fluixà, V. Método de Anidamiento Latente de Fallos usando RdPC aplicado a los subsistemas de un Aerogenerador XIII Congreso Latinoamericano de Control Automático / VI Congreso Venezolano de Automatización y Control, Mérida, Venezuela, 2008
- García, E.; Rodríguez, L.; Morant, F.; Correcher, A.; Quiles, E. & Fluixà, V. “Método de Diagnóstico Mediante Anidamiento Latente de Fallos con Redes de Petri Coloreadas” XIII Congreso Latinoamericano de Control Automático / VI Congreso Venezolano de Automatización y Control, Mérida, Venezuela, 2008
- Trigos, M.; García, E. & Rodríguez, L. Modelado Y Diagnóstico De Fallos Por Medio De Redes De Petri De Un Sistema De Envasado De Líquidos XIII Congreso Latinoamericano de Control Automático / VI Congreso Venezolano de Automatización y Control, Mérida, Venezuela, 2008
- E. García, L. Rodríguez, F. Morant, A. Correcher, E. Quiles, R. Blasco. “Latent Nestling Method: A new fault diagnosis methodology for complex systems”, Proceedings of IECON08, Orlando, Florida, USA, Noviembre 2008.
- Rodríguez, L.; García, E.; Morant, F.; Correcher, A. & Quiles, E. “Application of Latent Nestling Method using Coloured Petri Nets for the Fault Diagnosis in the Wind Turbine Subsets” Proceedings of ETFA'08, Hamburg, Germany, September 2008
- Rodríguez, L.; García, E.; Morant, F.; Correcher, A.; Quiles, E. & Fluixà, V. Aplicación del Método de Anidamiento Latente de Fallos usando Redes de Petri Coloreadas para el Diagnóstico de Fallos en el Sistema de Refrigeración y Lubricación de un Aerogenerador XXIX Jornadas de Automática, Tarragona, España, Septiembre 2008

- E. García, L. Rodríguez, F. Morant, A. Correcher, E. Quiles, R. Blasco. “Fault Diagnosis with Coloured Petri Nets Using Latent Nestling Method”, Proceedings of ISIE08, Cambridge, UK, June 2008.
- Rodríguez, L. Diagnóstico de fallos para sistemas de energía eólica Off-Shore Congreso Internacional de Ingeniería Mecatrónica y Electrónica CIIME Universidad de San Buenaventura sede Bogotá, Colombia, Octubre 2008.
- Rodríguez, L.; “Docencia, Teoría de Sombras” , ACOFI, Cartagena, Colombia, Septiembre 2005
- Sistemas de Comunicaciones Industriales VIII Semana Bonaventuriana de la Ingeniería y la Tecnología Bogotá, Septiembre 12 al 16 de 2005
- Rodríguez, L.; Chaves C. “Problemas en el Desarrollo de una Didáctica Adecuada para el Manejo de Líneas y Procesos Industriales” , ACOFI, Cartagena, Colombia, Septiembre 2003
- Sistemas didácticos en Mecatrónica I Seminario Tendencias de la Ingeniería Mecatrónica. UNAB, Bucaramanga, Colombia octubre 29-31 del 2003.

Awards:

Outstanding Mention

M.Sc., Automation, Robotics and Computer Industrial.
Polytechnic University of Valencia, Spain
Date: January 2010
Title of Thesis: Fault diagnosis in Complex Systems based on Latent Nestling Method. Case study: (Cooling and Lubrication System of a Wind Turbine Gearbox).

Outstanding Mention

M.Sc., Energy Technology for Sustainable Development.
Specialty Renewable Energy
Polytechnic University of Valencia, Spain
Date: October 2012
Title of Thesis: Expert System for the Fault Diagnosis, Condition Monitoring and Supervision of a Off Shore Wind Farm.

Honorable Mention

Colombian Association of Engineering Faculties
Date: November 2003 Hotel La Fontana - Bogotá,
Colombia
National Engineering Award Students

Participation in international committees:

Organizing committee

Polytechnic University of Valencia, Spain
Date: July 2012 Valencia, Spain
V International Summer on Fault Diagnosis of Complex Systems
Web site: <http://www.school-diagnosis-2012.upv.es/>

Session Chair

Proceedings of ETFA'08 Helmut Schmidt University
September 2008 Hamburg, Germany
Institute of Electrical and Electronics Engineers (IEEE)
Track 4 - S7 and Computer Control Systems
Web site: http://www.etfa2008.org/ETFA_2008/

Scientific Committee

2º Interamerican conference of climate change
March 2016, Mexico City
Web site:
<http://www.congresocambioclimatico.org/Comitecientifico.html>