Carlos Renato Vázquez

Education.

- **Ph.D. in Systems Engineering and Informatics**, Universidad de Zaragoza, Spain, 2011. Thesis: "On fluidization, controllability and control of timed continuous Petri nets".
- **Advance Studies Diploma** (DEA, Master degree level), at the Depto. de Ingeniería de Sistemas e Informática, Universidad de Zaragoza, Spain, 2008.
- **Science Master in Electrical Engineering, Specialty on Automatic Control**, CINVESTAV, Guadalajara, Mexico, 2006.
- **Mechanical-Electrical Engineering**, Universidad de Guadalajara, Guadalajara, Mexico, 2004.

Projects participation.

- *Research Project*. Distributed Supervisory Control of Large Plants" (DISC), Founded by the European Union, FP7-ICT2007-2. phD student participant. Zaragoza, Spain. 2008-2011.
- *Research Project*. Técnicas formales de análisis y diseño de sistemas de eventos discretos. Aplicación a sistemas de logística y tiempo real (Formal techniques for analysis and design of discrete event systems, application to logistics and real-time). Ministerio de Educación y Ciencia, España (Ministry of education and science), DPI2006-1539.Investigador en formación. Zaragoza, Spain. 2006-2009.
- *Engineering Project*. Control de motores eléctricos para vehículos autónomos en un sistema de transporte LINT (Control of electrical motors in autonomous vehicles, for a lean intelligent network transportation system, LINT), MODUTRAM – CINVESTAV GDL. Guadalajara, Mexico. Consultant. September 2011- February 2012.
- *Engineering Projects*. Design and construction of electromechanial equipments. Wood chopping machine, automatic paper elevator for a printing company, automatic paint canning system and *guayabate* (fruit sweet) molding machine. MAYKORP, mechanical design enterprise. Guadalajara, Mexico. 2002-2003.

Research stays.

- CWI, Amsterdam, The Netherlands, March-June, 2010, under the supervision of Profr. Jan van Schuppen. The research performed deals with the application of PWA control techniques for the control of continuous Petri nets, adopting both a centralized and a modular-coordinated control schemes.
- SYSTEMS group, Ghent University, Belgium, February-May, 2009, under the supervision of Profr. René Boél. The research performed deals with the application of hybrid Petri nets for modelling urban traffic systems.

Profesional experience.

- *Professor* at the CUValles, Universidad de Guadalajara, Mexico, 2012. Courses:
  -Diseño de elementos de máquinas (Elements in mechanical design).
  -Electroneumática (Electroneumatics).
  -Solidworks.

- *Lecturer*- CINVESTAV-GDL, Guadalajara, Mexico, September-December 2011. Master course: Probabilidad y procesos estocásticos (Probability and stochastic processes).
- *Consultant*- CINVESTAV-GDL, Guadalajara, Mexico, September 2011- February 2012, consultant in the project: Control of electrical motors in autonomous vehicles, for a lean intelligent network transportation system (LINT). Final client: MODUTRAM.
- *Research*- Departamento de Informática e Ingeniería de Sistemas of the Universidad de Zaragoza, Spain, July 2009- June 2011, as part of the project "Técnicas formales de análisis y diseño de sistemas de eventos discretos. Aplicación a sistemas de logística y tiempo real".
- *Industry*- Válvulas Urrea, Guadalajara, Mexico. November 2003- May 2004. Maintenance supervisor. Corrective and preemptive maintenance supervision: induction furnaces, sand molders, conveyors, electrical substation.
- *Industry*- Flow-Mexa, Guadalajara, Mexico. August-November 2003. Quoter - Drawer. Analysis of rack distribution in warehouses, drawing constructive details, selection of mechanical components, quotation.

Publications.

Journals-
- C.R. Vázquez & M. Silva, Stochastic continuous Petri nets: an approximation of Markovian net models, IEEE Transactions on Systems, an and Cybernetics Part A, vol. 42 (3), pp. 641-653, 2012.
- C.R. Vázquez & M. Silva, Timing and liveness in continuous Petri nets, Automatica, vol. 47(2), pp. 283-290, 2011.
- M. Silva, J. Júlvez, C. Mahulea & C.R. Vázquez, On fluidization of discrete event models: observation and control of continuous Petri nets, Journal of Discrete Event Dynamic Systems, vol. 21(4), pp. 427-497, 2011.
- J. Júlvez, C. Mahulea & C.R. Vázquez, SimHPN: a MATLAB Toolbox for simulation, analysis and design with hybrid Petri nets, Nonlinear Analysis: Hybrid Systems, vol. 6(2), pp. 806-817, 2012.
- C.R. Vázquez, A. Ramírez, L. Recalde & M. Silva. On Controllability of Timed Continuous Petri Nets. In M. Egerstedt and B. Mishra (Eds.), Hybrid Systems: Computation and Control, Lectures Notes in Computer Science, vol. 4981, Springer, pp. 528--541, 2008.

Book chapters-
- C.R. Vázquez, C. Mahulea, J. Júlvez & M. Silva, "Introduction to fluid Petri nets", Chapter 18, In Carla Seatzu, Manuel Silva & Jan H. van Schuppen Eds.: Control of Discrete-Event Systems: Automata and Petri net perspectives, Lecture Notes in Control and Information Sciences, vol. 433, pp. 365-386, ISBN978-1-4471-4275-1, Springer, 2012.
- C. Mahulea, J. Júlvez, C.R. Vázquez & M. Silva, "Continuous Petri nets: observability and diagnosis", Chapter 19, In Carla Seatzu, Manuel Silva & Jan H. van Schuppen Eds.: Control of Discrete-Event Systems: Automata and Petri net perspectives, Lecture Notes in Control and Information Sciences, vol. 433, pp. 387-406, ISBN978-1-4471-4275-1, Springer, 2012.
- J. Júlvez, C.R. Vázquez, C. Mahulea & M. Silva, "Continuous Petri nets: controllability and control", Chapter 20, In Carla Seatzu, Manuel Silva & Jan H. van Schuppen Eds.: Control of Discrete-Event Systems: Automata and Petri net perspectives, Lecture Notes in Control and Information Sciences, vol. 433, pp. 407-428, ISBN978-1-4471-4275-1, Springer, 2012.

Last conference papers-
- C.R. Vázquez & A. Ramírez, Structural and generic conditions for controllability of timed continuous Petri nets, to be presented in the 11th International Workshop on Discrete Event Systems (WODES), Guadalajara, Mexico, 2012.
- J. Júlvez, C. Mahulea & C.R. Vázquez, Analysis and simulation of manufacturing systems using SimHPN toolbox, In 7th IEEE Conference on Automation Science and Engineering, Trieste, Italy, 2011.
- C.R. Vázquez, J. van Schuppen, & M. Silva. A modular-coordinated control for continuous Petri nets. In 18th IFAC World Congress, Milano, Italy, 2011.
- C.R. Vázquez, H.Y. Sutarto, R. Boel & M. Silva. Hybrid Petri net model of a traffic intersection in an urban network. In IEEE Multi-Conference on Systems and Control, Yokohama, Japan, 2010.
- C.R. Vázquez & M. Silva. Timing-dependent boundedness and liveness in continuous Petri nets. In 10th International Workshop on Discrete Event Systems (WODES), Berlin, Germany, 2010.
- C.R. Vázquez & M. Silva. Piecewise Linear Constrained Control for Timed Continuous Petri Nets. In 48th IEEE CDC, Shanghai, China, 2009.
- C.R. Vázquez & M. Silva. Hybrid Petri nets as an approximation to Markovian PN. In 3rd IFAC Conference ADHS, Zaragoza, Spain, 2009.
- C.R. Vázquez & M. Silva. Performance Control of Markovian Petri Nets via Fluid Models: A Stock-Level Control Example. In 5th IEEE Conference on Automation Science and Engineering, Bangalore, India, 2009.

Technical courses.

SMC INTERNATIONAL (Guadalajara, Mexico, 2004)
- Applied neumatics.
- Applied electro-neumatics.

CAST – CONALEP (Guadalajara, Mexico, 2002)
- PLC (Siemmens 214, Allen Bradley).
- Power hydraulics.
- Control of electrical motors.
- Control and instrumentation.