Carlos FelipeAlcala Perez

Principal Research Engineer

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languages

spanish (native)
english (fluent)

programming

♥ R
Python, Matlab,
LaTeX, RMarkdown,
VBA & C#

applications

Git, Github,
Simulink, Dymola,
RStudio

education

2007–2011 **Doctor of Philosophy** in Chemical Engineering
University of Southern California. Los Angeles, California.

2005–2007 **Master of Science** in Chemical Engineering
The University of Texas at Austin. Austin, Texas.

1999–2004 **Bachelor of Science** in Chemical Engineering
Technological Institute of Ciudad Madero. Ciudad Madero, Mexico
Summa Cum Laude.

research interests

Multivariate Statistical Fault Detection and Diagnosis, Data Analysis, Machine Learning, Tuning and Monitoring of PID Controllers, Technology Transfer from Research to Development

experience

Full Time

2017 – Now **Johnson Controls, Inc** Milwaukee, Wisconsin.
Principal Research Engineer.
- I am involved in the development and transfer of research projects into products and applications.
- Helped development of methods to reject pressure disturbances in control valves. A patent was filed.

2015 – 2017 **Johnson Controls, Inc** Milwaukee, Wisconsin.
Senior Research Engineer
- Developed methods for monitoring the performance of PID controllers. A patent was filed.
- Developed a method to detect steady state operation in HVAC equipment.
- Developed method to reduce energy consumption in wireless thermostats while keeping acceptable comfort standards. A patent was filed.

2013 – 2015 **Johnson Controls de México** Mexico City, Mexico.
Senior Research Engineer
- Developed data-driven methods for fault detection and diagnosis in connected chillers. A patent was filed.

2011 – 2013 **Johnson Controls, Inc** Milwaukee, Wisconsin.
Senior Research Engineer
- Developed a method for adaptive sampling of PID controllers. A patent was granted.

Internships

2010 **The Dow Chemical Company** Freeport, Texas
Summer Research Intern
Developed an Excel application for multivariate statistical monitoring of continuous and batch processes.

2009 **Capstone Technology** Seattle, Washington
2007 *Summer Engineering Intern*
2006
- Developed a multivariate image analysis application to monitor combustion efficiency in furnaces.
- Developed a PLS application for statistical modeling of chemical processes.
- Developed a PCA application for detection and diagnosis of sensor and process faults.

2008 **NMC North Microelectronics** Beijing, China
Summer Engineering Intern
- Developed a PCA application for monitoring the operation of a semiconductor manufacturing process.

awards

2015 **1st Place at the 2015 BE TechChallenge** Building Efficiency, Johnson Controls Inc.
I won the annual company-wide innovation competition at JCI.

2007 **Roberto Rocca Education Program Fellowship** University of Southern California
I was awarded a fellowship to do my PhD at USC.

2005 **Fulbright Scholarship** University of Texas at Austin
I was awarded a Fulbright scholarship to do my Masters at UT Austin.

publications

Patents

Building management system with predictive diagnostics
C.F. Alcala Perez, S.F. Hamilton
US Patent App. 15/188,824, 2017

Building management system with voting-based fault detection and diagnostics
C.F. Alcala Perez
US Patent App. 14/744,761, 2016

Control system with response time estimation
C.F. Alcala Perez, T.I. Salsbury
US Patent App. 15/173,284, 2016

Control system with response time estimation and automatic operating parameter adjustment
C.F. Alcala Perez, T.I. Salsbury
US Patent App. 15/173,295, 2016

Feedback control system with normalized performance indices for setpoint alarming
T.I. Salsbury, C.F. Alcala Perez, Michael J. Ajax
US Patent App. 14/961,747, 2015

Systems and methods for adaptive sampling rate adjustment
C.F. Alcala Perez, T.I. Salsbury
US Patent App. 13/794,683, 2014

Journal Papers

A method for setpoint alarming using a normalized index
Carlos F. Alcala, Timothy I. Salsbury
Control Engineering Practice *60.3 (2017) pp. 1–6. 2017*

An extremum-seeking control method driven by input–output correlation
Timothy I Salsbury, John M House, Carlos F Alcala, Yaoyu Li
Journal of Process Control *58 (2017) pp. 106–116. Elsevier, 2017*

Analysis and generalization of fault diagnosis methods for process monitoring
Carlos F. Alcala, S. Joe Qin
Journal of Process Control *21.3 (2011) pp. 322–330. 2011*

Generalized reconstruction-based contributions for output-relevant fault diagnosis with application to the tennessee eastman process
Gang Li, Carlos F. Alcala, S. Joe Qin, Donghua Zhou
Control Systems Technology, IEEE Transactions on *19.5 (Sept. 2011) pp. 1114–1127. 2011*

Reconstruction-based contribution for process monitoring with kernel principal component analysis
Carlos F. Alcala, S. Joe Qin
Industrial & Engineering Chemistry Research *49.17 (2010) pp. 7849–7857. 2010*

Reconstruction-based contribution for process monitoring
Carlos F. Alcala, S. Joe Qin
Automatica *45.7 (2009) pp. 1593–1600. 2009*

Conference Papers

Model Selection for Predicting the Return Time from Night Setback
John E Seem, John M House, Carlos F Alcala
International High Performance Buildings Conference, 2016

Two new normalized EWMA-based indices for control loop performance assessment
Timothy I. Salsbury, Carlos F. Alcala
American Control Conference (ACC), 2015

Monitoring of dynamic processes with subspace identification and principal component analysis
Ricardo Dunia Carlos F. Alcala, S. Joe Qin
Proceedings of the 8th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes, 2012, Mexico City, Mexico

Unified analysis of diagnosis methods for process monitoring
Carlos F. Alcala, S. Joe Qin
Proceedings of the 7th IFAC International Symposium on Fault Detection, Supervision and Safety of Technical Processes, 2009, Barcelona, Spain

Unification of contribution analysis for process monitoring
Carlos F. Alcala, S. Joe Qin
Proceedings of the 2008 AIChE Annual Meeting, 2008, Philadelphia, USA

Reconstruction-based contribution for process monitoring
Carlos Alcala, S. Joe Qin
Proceedings of 17th IFAC World Congress, 2008, Seoul, Korea