




# Carlos FelipeAlcala Perez

Senior Research Engineer

## contact

507 E. Michigan St,  
Milwaukee, Wisconsin  
53202  
USA

 +1 (213) 863 5845  
 +1 (414) 426 6814  
 +1 (414) 524 5886

alcala21@gmail.com

## languages

spanish (native)  
english (fluent)

## programming

♥ R  
Python, Matlab,  
L<sup>A</sup>T<sub>E</sub>X, RMarkdown,  
VBA & C#

## 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

## experience

### Full Time

2011 – Now **Johnson Controls, Inc** Milwaukee, Wisconsin.  
*Senior Research Engineer*

- Developed data-driven methods for fault detection and diagnosis in connected chillers. A patent was filed.
- Developed a method for adaptive sampling of PID controllers. A patent was granted.
- Developed methods for monitoring the performance of PID controllers. A patent was filed.

### 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 the Fulbright scholarship to do my Masters at UT Austin.

## publications

### Patents

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. Salisbury

*US Patent App. 15/173,284, 2016*

Control system with response time estimation and automatic operating parameter adjustment

C.F. Alcala Perez, T.I. Salisbury

*US Patent App. 15/173,295, 2016*

Feedback control system with normalized performance indices for setpoint alarming

T.I. Salisbury, C.F. Alcala Perez, Michael J. Ajax

*Application number: US14961747, 2015*

Systems and methods for adaptive sampling rate adjustment

C.F. Alcala Perez, T.I. Salisbury

*US Patent App. 13/794,683, 2014*

### Journal Papers

A method for setpoint alarming using a normalized index

Carlos F. Alcala, Timothy I. Salisbury

*Control Engineering Practice 60.3 (2017) pp. 1–6. 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

## 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