Leobardo Camacho-Solorio | PhD candidate
University of California, San Diego – La Jolla, CA
✉ lcamacho@ucsd.edu • flyingv.ucsd.edu/Leobardo/ •

expertise: control and estimation algorithms

other interests: optimization, machine learning and statistics

Education

Ph.D. in Mechanical Engineering (Dynamic Systems and Control) — **San Diego, CA**
University of California, San Diego — *2014–Present*
Research topic: estimation and control of infinite-dimensional systems, in particular, state and parameter estimation for system described by partial differential equations using boundary data/measurements.
GPA – 4.0/4.0
Advisor: Miroslav Krstić

G.C. in Electric Drivetrain Technology — **Online**
University of Colorado (Colorado Springs and Boulder) — *2015–2016*
Program contact: Gregory L. Plett
GPA – 4.0/4.0

M.S. in Mechanical Engineering (Dynamic Systems and Control) — **San Diego, CA**
University of California, San Diego — *2014-2015*
GPA – 4.0/4.0

B.S. in Mechatronics Engineering — **Querétaro, México**
Tecnológico de Monterrey, Campus Querétaro — *2010–2014*
Mención Honorífica de Excelencia (with Highest Honors)
GPA – 97/100

Experience in Industry

Robert Bosch GmbH — **Sunnyvale, CA**
Controls Research Intern — *2018*
(3 months) State and parameter estimation for a thermal model of lithium-ion batteries; finite-time estimation, input estimation and robustness analysis

Robert Bosch GmbH — **Palo Alto, CA**
Controls Research Intern — *2017*
(3 months) Offline parameter estimation algorithms for electrochemical models of lithium-ion batteries via Orthogonal Distance Regression

Robert Bosch GmbH — **Palo Alto, CA**
Controls Research Intern — *2015*
(3 months) State and online parameter estimation algorithms for electrochemical models of lithium-ion batteries via Kalman Filter (KF,EKF,UKF)

Center for Technology and Projects Mabe — **Querétaro, México**
Electrical Engineering | Internship — *2014*
(5 months) 1. Modeling and identification of thermoelectric modules for energy harvesting
(3 months) 2. Design of an AC motor-drive circuit board with power factor correction

Nikan — **Querétaro, México**
Software Engineering | Internship — *2014*
(5 months) Microcontroller programming for educational circuit board

Experience in Academia

University of California, San Diego — **San Diego, CA**
Cymer Center for Control Systems and Dynamics | Graduate Researcher — *2014–Present*

State and parameter estimation for system described by partial differential equations using boundary data. Some PDEs studied include: diffusion-reaction, coupled diffusion-reaction systems, Markov swictching diffusion-reaction, spherical/radial diffusion reaction, coupled PDE-ODEs and PDE-PDEs. The main application is state of health and state of charge estimation for lithium-ion batteries.
Advisor: Miroslav Krstić

MINES ParisTech **Paris, France**
Centre Automatique et Syst èmes | Visiting Researcher *2018*
1. State and parameter estimation for thermoacoustic oscillation in the Rijke tube
2. Observer design for coupled ODE-PDE and PDE-PDE systems for well-bore and reservoir drilling models
Advisor: Florent Di Meglio

University of California, Berkeley **Berkeley, CA**
Energy, Controls, and Application Lab | Visiting Researcher *2017*
1. Boundary observer design for diffusion-reaction equations robust to measurement noise in the ISS sense.
2. Boundary observer design for radial diffusion equations with coefficients depending on the state spatial average
Advisor: Scott Moura

CINVESTAV **Querétaro, México**
Mathematics Department | Undergraduate Researcher, support from CONACYT *2012–2014*
Spectral parameter power series (SPPS) method for complex PT-Symmetric Sturm-Liouville problems.
Advisor: Vladislav Kravchenko

Tecnológico de Monterrey **Querétaro, México**
Mechatronics Department | Undergraduate Researcher *2012–2014*
Optimal control for DC motors and switched-mode power converters
Advisor: Aarón Sariñana Toledo

Awards

2018: Chateaubriand Fellowship | Embassy of France

2015-2019: UC MEXUS-CONACYT Doctoral Fellowship

2015: GATE fellowship | University of Colorado (Colorado Springs and Boulder)

2014-2017: **Powell Fellowship** | University of California, San Diego

2014: CENEVAL National Award

2010-2014: Telmex Foundation Scholarship

2010-2014: Academic Talent Scholarship | Tecnológico de Monterrey

2011: Comisión Nacional de Energía Atómica Scholarship | Balseiro Institute in Argentina (declined)

Graduate Coursework

Control and Dynamic Systems: Control of Distributed Parameter Systems (A), Parametric System Identification (A), Linear Systems Theory (A+), Optimal Estimation (A), Nonlinear Systems (A+), Linear Control Design (A+), Mathematical Analysis for Applications (A+), Optimal Control (A+), Nonlinear Control (A+), Real Analysis for Applications (A+)

Mathematics: Partial Differential Equations [I] (A), Mathematical Statistics (S), Mathematics of Finance (S)

Electrical Engineering: Modeling, Simulation, and Identification of Battery Dynamics (A), Power Electronics for Electric Drive Vehicles (A), Battery Management and Control (A), Adjustable-Speed AC Drives (A), Statistical Learning(S).

Economics: Intertemporal Asset Pricing Theory (S)

Coding Languages

Matlab, Mathematica, and Python

Publications and Talks

Journal:
S. Tang,L. Camacho-Solorio, Yebin Wang, M. Krstic, "State-of-Charge Estimation from a Thermal-Electrochemical Model of Lithium-Ion Batteries", Automatica 83 (2017): 206-219.

L. Camacho-Solorio, R. Vazquez, and M. Krstic, "Boundary Observers for Coupled Diffusion- Reaction Systems with Prescribed Convergence Rate", in preparation.

L. Camacho-Solorio, I. Karafyllis, M. Krstic, ""State Estimation of Diffusion-Reaction Equations via a Pair of Observers and Delayed Measurements", in preparation.

Conference:

L. Camacho-Solorio and A. Sarinana-Toledo "I-LQG Control of DC-DC Boost Converters", International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE), 2014.

L. Camacho-Solorio, R. Klein, A. Mirtabatabaei, M. Krstic and S. Moura, "State Estimation for an Electrochemical Model of Multiple Material Lithium-Ion Batteries" , ASME Dynamic Systems and Control Conference (DSCC), 2016.

L. Camacho-Solorio, R. Vazquez and M. Krstic "Boundary Observer Design for Coupled Reaction-Diffusion Systems with Spatially-Varying Coefficients", American Control Conference (ACC), 2017.

S. Koga, L. Camacho-Solorio, and M. Krstic "State Estimation for Lithium-Ion Batteries with Phase Transition Materials" ASME Dynamic Systems and Control Conference(DSCC), 2017

L. Camacho-Solorio, S. Moura and M. Krstic, "Boundary Observer Design for Radial Diffusion Equations with Coefficients Depending on the State Spatial Average", American Control Conference (ACC) 2018

L. Camacho-Solorio and M. Krstic, "Boundary Observers for the Expected Value of a Randomly Switching Reaction-Diffusion PDE", Conference on Decision and Control (CDC) 2018

L. Camacho-Solorio, N. Velmurugan, F. Di Meglio and M. Krstic, "Observer Design for a Coupled ODE-PDE System from a Wellbore Reservoir Drilling Model", submitted

Talks and Presentations:

L. Camacho-Solorio, "Spectral Parameter Power Series for complex PT-Symmetric Sturm-Liouville problems", Undergraduate Research Project, CINVESTAV, 2014

S. Tang, L. Camacho-Solorio, Y. Wang, M. Krstic, "State-of-Charge Estimation of Lithium-ion Batteries Modeled by a Coupled PDE-ODE System", SIAM Conference on Control and Its Applications (CT17), 2017

L. Camacho-Solorio, R. Vazquez and M. Krstic, "Boundary Observers for Coupled Reaction-diffusion Systems with Applications to Lithium-ion Batteries", SIAM Conference on Control and Its Applications (CT17), 2017

L. Camacho-Solorio, S. Moura and M. Krstic, "Boundary Observer Design for Radial Diffusion-Reaction Equations in the Presence of Measurement Noise", 33th Southern California Control Workshop, 2017

Review Service

Automatica, IEEE Transactions on Automatic Control, International Journal of Control, International Journal of Adaptive Control and Signal Processing, IEEE Control and Systems Technology, American Control Conference