

EDUCATION

- 2012 -** **University of California, Los Angeles (UCLA)**, Ph.D. Candidate, Electrical Engineering,
GPA: 4.00/4.00, Expected Graduation: Spring 2017, Advisor: Prof. Paulo Tabuada
Ph.D. Thesis: “Contributions to the Design of Correct Cyber-Physical Systems”
Recipient of *Preliminary Exam Departmental Fellowship* for ranking first out of 50 students in
Ph.D. preliminary examination in signals & systems area.
- 2010 - 2012** **University of California, Los Angeles**, M.S., Electrical Engineering
GPA: 4.00/4.00, M.S. Project: “State of Charge Estimation in a Behavioral Setting”
- 2006 - 2010** **Middle East Technical University, Ankara, Turkey**, B.S., Electrical Engineering,
GPA: 3.84/4.00, graduated 5th out of 191 students with high honors, ranked 253rd among 1.5
million students in the nationwide university entrance exam.
Minor in Operations Research, Industrial Engineering
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EXPERIENCE

- June 2016 -** **Software Modeling Intern**
Medtronic Diabetes, Northridge, CA
· Conducted detailed analysis of data from over 345,000 patients who use Medtronic insulin pumps. Through this, gained key insights on how users interact with different features of the pump, and proposed design simplifications for the next generation product. The proposed modifications will lead to less development/training costs and a more user-friendly pump interface.
· Designed and modeled a smart alarm notification module for the next generation insulin pump using Simulink. The new module improves the usability of the pump by reducing the number of non-actionable alarms displayed to the user.
- Sept 2010 -** **Graduate Student Researcher**
University of California, Los Angeles, CA
· Developed and implemented a novel algorithm to automatically generate software for complex dynamical systems (e.g. autonomous robots/vehicles) from given design specifications. Led a team of engineers to ensure that it was correctly and efficiently applied to the design of an adaptive cruise control system. Via industry standard car simulators, the algorithm was shown to effectively eliminate the need for verification and validation of the controller software.
· Created a data driven framework to assess the stability of dynamical systems that are difficult to model.
· Developed an algorithm for data driven state of charge estimation for electric/hybrid vehicle batteries.
- Summer 2016** **Teaching Assistant**
University of California, Los Angeles, CA
· Prepared and led discussions for “Principles of Feedback Control” undergraduate junior level class of 79 students. Was nominated for 2015-2016 *Henry Samueli Excellence in Teaching Award* with the recommendations of the course instructor and the students.
- Winter 2014 & Summer 2015** **Model Based Development Co-op**
Toyota Technical Center, Gardena, CA
· Developed a novel approach to automatically identify bugs in the control algorithms deployed in Toyota vehicles as a member of the model-based design team. This approach was implemented as a software tool that can be used by the engineers in Toyota in the context of verification & validation.
- Summer 2009** **Engineering Intern**
FIAT Group Automobiles, Turin, Italy
· Constructed the state flow diagrams for implementation and testing of the vehicle functions for the soft-top module of Fiat 500/Cabrio as a part of the electrical and electronic systems group.
- Summer 2008** **Engineering Intern**
Advanced Car Technology Systems, Aschaffenburg, Germany
(2nd biggest car crash center in Europe)
· Designed and implemented an electronic interface between a pressure-sensing mat and the data acquisition device to improve the crash data collection system.

SKILLS MATLAB/Simulink, Mathematica, Python, C/C++, R, Excel

PENDING PATENTS

- 2015 **Balkan A.**, Deshmukh J., Kapinski J., Jin X., Tabuada P., (**pending**) Patent Application No:15/093,975 “*Systems and Methods for Testing Convergence of Closed-loop Control Systems*”
- 2014 **Balkan A.**, Deshmukh J., Kapinski J., (**pending**) Patent Application No:14/462,218 “*Simulation-guided Incremental Stability Analysis*”
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PUBLICATIONS

- 2016 **Balkan A.**, Vardi M., Tabuada P., “*Mode-Target Games: Reactive Synthesis for Control Applications*”, (submitted to) IEEE Transactions on Automatic Control
- 2016 **Balkan A.**, Tabuada P., Deshmukh J., Jin X., Kapinski J., “*Underminer: A Framework for Automatically Identifying Non-converging Behaviors in Black Box System Models*”, ACM SIGBED International Conference on Embedded Software, EMSOFT 16’ (**Best Paper Award**)
- 2016 Nilsson P., Hussien O., **Balkan A.**, Chen Yuxiao, Ames A., Grizzle J., Ozay N., Peng H., Tabuada P., “*Correct-By-Construction Adaptive Cruise Control: Two Approaches*”, IEEE Transactions on Control Systems Technology
- 2016 DeCastro J. A., Rüedieger E., Rungger M., **Balkan A.**, Tabuada P., Kress-Gazit H., “*Automated Generation of Dynamics-Based Runtime Certificates for High-Level Control Control*” (under revisions for publication in) Discrete Event Dynamic Systems
- 2015 **Balkan A.**, Vardi M., Tabuada P., “*Controller Synthesis for Mode-Target Games*” Proceedings of 5th IFAC Conference on Analysis and Design of Hybrid Systems
- 2015 **Balkan A.**, Deshmukh J., Kapinski J., Tabuada P., “*Simulation-Guided Contraction Analysis*”, 1st Indian Control Conference, ICC 15’ (**Best Student Paper Award**)
- 2014 Nilsson P., Hussien O., Chen Y., **Balkan A.**, Rungger M., Ames A., Grizzle J., Ozay N., Peng H., Tabuada P., “*Preliminary Results on Correct-by-Construction Control Software Synthesis for Adaptive Cruise Control*” 53rd IEEE Conference of Decision and Control, CDC ’14
- 2012 Tabuada P., **Balkan A.**, Caliskan S. Y., Shoukry Y., Majumdar R., “*Input-Output Robustness for Discrete Systems*” Proceedings of the 10th ACM International Conference on Embedded Software, EMSOFT ’12
- 2011 **Balkan A.**, Gao M., Tabuada P., He L., “*A Behavioral Algorithm for State of Charge Estimation*”, 26th Electrical Vehicle Symposium
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EXTRA *Audio Storytelling.* <http://dailybruin.com/author/ayca-balkan>

Film Photography. <http://aycabalkan.tumblr.com>

Music. Avid piano player since 1996 (attended several group and solo recitals, played in 4 musical theatre productions, vice music director of “The Company” musical theater club from 2009-2010.)