

# Joshua Philip Switkes

965 Roble Ave, Menlo Park, CA 94025

(650) 387-6428

[josh@switkes.com](mailto:josh@switkes.com)

## OVERVIEW

Experienced proven technical contributor and leader in automotive research and development with strong analytical and practical background.

## EDUCATION

**Stanford University, Stanford CA.** Ph.D. in Mechanical Engineering under Professor J. Christian Gerdes, January 2007. Master of Science January 2003.

- Developed, implemented and tested lateral vehicle control system on steer-by-wire and electric vehicles. Included theory and hardware and software implementation.
- Coursework focus on Dynamic Systems and Control, Vehicle Dynamics and Optimization. National Science Foundation Graduate Fellowship

**Harvey Mudd College, Claremont CA.** B.S. in Engineering, May 2001 with Distinction and Departmental Honors, Harry Williams award in Mechanics, DePietro Fellowship.

## AREAS OF EXPERTISE

### *Theory*

Vehicle Dynamics and Control  
Powertrain Control  
Linear, Nonlinear and Hybrid Control  
Driver Assistance Systems  
System Identification, State Estimation  
Convex Optimization

### *Application*

Mechatronics  
Real-Time Operating Systems  
Machining and Fabrication  
Digital and Analog Electronics  
Matlab, Simulink, xPC  
Powertrain testing/evaluation methods

## EXPERIENCE

**Tula Technology, Santa Clara, CA.**

***Member of Technical Staff*** June 2008 - Present

- Led mechanical engineering group from day one for VC-funded startup
- Built team to prototype novel combustion engine control method
- Delivered alpha prototype in 4 months and full prototype in 10months
- Technical leadership and personal contribution in control algorithms, signal processing, system modeling, testing methodologies

**Volkswagen Electronics Research Lab, Palo Alto, CA.**

***Senior Staff Engineer*** Fall 2007 – June 2008

***Senior Engineer*** Fall 2006 - Fall 2007

***Visiting Scholar, Stanford*** Fall 2007 – Fall 2008

- Developed production Driver Assistance System for Audi vehicle. As project manager, managed US budget for project, communication with Germany. Multiple patents in process
- Researched and transferred new sensing, estimation and control technology to Audi Series Development systems (stability control, collision avoidance, etc.) Multiple patents in process

- As project Manager, managed project with Stanford University, VW Research and Audi Development. Managed team of 5 in Palo Alto.
- Scouted novel Silicon Valley technologies for German Volkswagen vehicle group. Responsible for the Driver Assistance portion of a team for "Driver Information and Technology Concepts", including budget and manpower allocation
- Responsible for intern hiring program, including recruiting, interviewing, and mentoring.

**Dynamic Design Lab, Stanford University.** Developed active lanekeeping assistance for automotive applications. Fall 2001-Fall 2006. National Science Foundation Graduate Fellowship

- Implemented and demonstrated real-time path tracking using GPS/INS and Steer-by-wire
- Developed, validated model of vehicle and handwheel for steer-by-wire force feedback.
- Designed and Implemented handwheel force feedback hardware for steer-by-wire in Corvette test vehicle and in immersive driving simulator.

**Toyota Technical Center, Torrance CA.** Analyzed, modeled, and tested various vehicle components for their effect on overall noise and vibration in Noise Vibration and Harshness department. Summer 2001

**General Motors Powertrain, Ypsilanti MI.** Developed improved Finite Element Analysis and experimental methods of friction material pressure profile determination for torque converter clutches. Awarded General Motors Scholar Summer 1999.

## SELECTED PUBLICATIONS

J.P. Switkes, E.J. Rossetter, J.C. Gerdes. *A Performance Guarantee for Active Lanekeeping Assistance with force Feedback* submitted to Journal of Dynamic Systems Measurement and Control.

J.P. Switkes, J.C. Gerdes. *Guaranteeing Stable Lanekeeping Near the Friction Limits Using Computed Polynomial Lyapunov Functions.* Submitted to IEEE Transactions on Automatic Control.

D. Langer, J.P. Switkes, A. Stoschek, B. Huhnke. *Environment Perception in the 2007 Urban Challenge: Utility for Future Driver Assistance Systems.* Workshop Fahrerassistenzsysteme, Walting, Germany, April 2008.

J.P. Switkes, J.C. Gerdes, G.F. Schmidt, M. Kiss. *Driver Response to Steering Torque Disturbances: A User Study on Assisted Lanekeeping.* IFAC Advances in Automotive Control Conference, Monterey, CA, August 2006.

J.P. Switkes, E.J. Rossetter, J.C. Gerdes. *Handwheel Force feedback for Lanekeeping Assistance: Combined Dynamics and Stability,* Journal of Dynamic Systems Measurement and Control, September 2006, v.128, no. 3, p. 532-542.

J.P. Switkes, I.A. Coe, J.C. Gerdes. *Using MEMS Accelerometers to Improve automobile Handwheel State Estimation for Force Feedback,* International Mechanical Engineering Congress and Exposition, Anaheim CA, Nov 2004.