John C. **Kegelman**

PH.D. CANDIDATE AT STANFORD UNIVERSITY

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Summary

I have investigated how highly-skilled human drivers control vehicles at the limits of handling. I can contribute a deep understanding of vehicle dynamics and controls with practical experience and a great appreciation that all models are wrong, but some are useful.

Education

Stanford University   *Stanford, CA*

PH.D. IN MECHANICAL ENGINEERING   *Apr. 2012–PRESENT*

- Thesis topic: Learning from Highly-Skilled Drivers to make Automated Vehicles Safer

Stanford University   *Stanford, CA*

M.S. IN MECHANICAL ENGINEERING   *Sep. 2009–Apr. 2012*

- Coursework focused on controls, advanced dynamics and simulation, and electromechanical design.

Johns Hopkins University   *Baltimore, MD*

B.S. IN MECHANICAL ENGINEERING   *Sep. 2005–May 2009*

- 4.0 GPA. Minored in Entrepreneurship and Management.

Experience

Dynamic Design Lab   *Stanford, CA*

GRADUATE RESEARCH ASSISTANT, PI: PROF. J. CHRISTIAN GERDES   *Sep. 2009–PRESENT*

- Collected, compiled, analyzed, and openly published vehicle dynamics data from highly-skilled professional race car drivers during live racing events to gain insights into vehicle control at the limits of handling. Compared human performance with autonomous vehicles to improve operating capabilities of active vehicle safety systems.
- Implemented autonomous vehicle control using drive-by-wire hardware and convex optimization software to operate at the handling limits while following a desired trajectory. Implemented and tested control algorithms on experimental vehicles using C and MATLAB.
- Pioneered a comprehensive, noninvasive vehicle instrumentation suite for vintage race cars with significant historical value.
- Developed a graphical user interface in MATLAB for vehicle data visualization and exploratory data analysis.
- Assembled and maintained an end-to-end solution from surveyed GNSS base stations to on-board integrated navigation systems enabling research vehicles to operate reliably with centimeter-level position measurement accuracy. Installed and operated a Linux-based NTRIP caster to broadcast Differential GNSS corrections from multiple servers to multiple clients.

Stanford Department of Mechanical Engineering   *Stanford, CA*

SENIOR TEACHING ASSISTANT — MECHANICAL SYSTEMS DESIGN, PROFS. MARK CUTKOSKY AND PAUL MITIGUY   *Jan.–Mar. 2016*

- Developed curriculum and coordinated team of five other teaching assistants.
- Led hands-on laboratory and tutorial sessions for course with 150 undergraduates exploring characteristics of machine elements.
- Advised design-project teams emphasizing the balance of physical and virtual prototyping based on engineering analysis.

Publications

JOURNAL ARTICLES

Insights into vehicle trajectories at the handling limits: analysing open data from race car drivers
    John C. Kegelman, Lene K. Harbott, J. Christian Gerdes
    Vehicle System Dynamics November (2016). 2016

Skills

Programming   MATLAB, Python, C
Software   MATLAB, Simulink, Office, Linux (Ubuntu), MoTeC i2