

# Stanford

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## J. Christian Gerdes

Professor of Mechanical Engineering, Emeritus

### CONTACT INFORMATION

- **Alternate Contact**

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### Bio

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#### BIO

Chris Gerdes is a Professor of Mechanical Engineering at Stanford University and Co-Director of the Center for Automotive Research at Stanford (CARS). His laboratory studies how cars move, how humans drive cars and how to design future cars that work cooperatively with the driver or drive themselves. When not teaching on campus, he can often be found at the racetrack with students, trying out their latest prototypes for the future. Vehicles in the lab include X1, an entirely student-built test vehicle; Niki, a Volkswagen GTI capable of turning a competitive lap time around the track without a human driver; and Marty, our electrified, automated, drifting DeLorean. Chris' interests in vehicle safety extend to ethics and government policy, having helped to develop the US Federal Automated Vehicle Policy while serving as the first Chief Innovation Officer of the US Department of Transportation.

#### ACADEMIC APPOINTMENTS

- Professor Emeritus, Mechanical Engineering

#### ADMINISTRATIVE APPOINTMENTS

- Chief Innovation Officer, United States Department of Transportation, (2016-2017)

#### HONORS AND AWARDS

- Best Paper Award, 12th International Symposium on Advanced Vehicle Control (2014)
- Rudolf Kalman Award, ASME Dynamic Systems and Control Division (2013)
- Villa Ladenburg Fellowship, Daimler and Benz Foundation (2012-2014)
- Arch T. Colwell Merit Award, SAE International (2006)
- Rudolf Kalman Award, ASME Dynamic Systems and Control Division (2006)
- Ralph R. Teetor Educational Award, SAE International (2005)
- Samuel M. Burka Award, Institute of Navigation (2004)
- Best Paper Award, 6th International Symposium on Advanced Vehicle Control (2002)
- CAREER Award, National Science Foundation (2002)
- Presidential Early Career Award for Scientists and Engineers, National Science Foundation (2002)
- Frederick Emmons Terman Fellowship, Stanford University (1998-2001)

## PROGRAM AFFILIATIONS

- Center for Automotive Research at Stanford (CARS)

## PROFESSIONAL EDUCATION

- BSE, University of Pennsylvania , Mechanical Engineering and Applied Mechanics (1990)
- BSEcon, University of Pennsylvania , Entrepreneurial Management (1990)
- MS, University of Pennsylvania , Mechanical Engineering and Applied Mechanics (1992)
- PhD, UC Berkeley , Mechanical Engineering (1996)

## PATENTS

- J Switkes, J Gerdes. "United States Patent 10,732,645 Methods and systems for semi-autonomous vehicular convoys", Peloton Technology, Aug 4, 2020
- J Switkes, J Gerdes, E Berdichevsky. "United States Patent 10,481,614 Vehicle platooning systems and methods", Peloton Technology, Inc., Nov 19, 2019
- J Switkes, J Gerdes, E Berdichevsky. "United States Patent 10,281,927 Systems and methods for semi-autonomous vehicular convoys", Peloton Technology, Inc., May 7, 2019
- J Switkes, J Gerdes. "United States Patent 10,162,366 Methods and systems for semi-autonomous vehicular convoys", Peloton Technology, Inc., Dec 25, 2018
- J Switkes, J Gerdes. "United States Patent 10,042,365 Methods and systems for semi-autonomous vehicular convoys", Peloton Technology, Inc., Aug 7, 2018
- J Switkes, J Gerdes, E Berdichevsky. "United States Patent 9,665,102 Systems and methods for semi-autonomous vehicular convoys", Peloton Technology, Inc., May 30, 2017
- J Switkes, J Gerdes, D Lyons, S Boyd, E Berdichevsky. "United States Patent 9,645,579 Vehicle platooning systems and methods", Peloton Technology, Inc., May 9, 2017
- J Switkes, J Gerdes, E Berdichevsky. "United States Patent 9,582,006 Systems and methods for semi-autonomous conveying of vehicles", Peloton Technology, Inc., Feb 28, 2017
- J Switkes, J Gerdes, E Berdichevsky. "United States Patent 8,744,666 Systems and methods for semi-autonomous vehicular convoys", Peloton Technology, Inc., Jun 3, 2014
- S Joe, Y Deguchi, Y-H Hsu, S Laws, J Gerdes. "United States Patent 7,845,218 Tire state estimator and tire state estimation method", Nissan Motor Co., Ltd., Leland Stanford Junior University, Dec 7, 2010
- D Bevly, J Gerdes. "United States Patent 6,681,180 Determination and control of vehicle sideslip using GPS", Leland Stanford Junior University, Jan 20, 2004

## LINKS

- <http://ddl.stanford.edu/>: <http://ddl.stanford.edu/>

## Teaching

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### COURSES

#### 2021-22

- Ethics and Equity in Transportation Systems: ME 267 (Win)

#### 2020-21

- Ethics and Equity in Transportation Systems: ME 267 (Aut)
- Vehicle Dynamics and Control: ME 227 (Spr)

#### 2019-20

- Ethics and Equity in Transportation Systems: ME 267 (Aut)
- Vehicle Dynamics and Control: ME 227 (Spr)

#### 2018-19

- Ethics and Equity in Transportation Systems: ME 267 (Aut)
- Feedback Control Design: ENGR 105 (Win)

- Vehicle Dynamics and Control: ME 227 (Spr)

## STANFORD ADVISEES

### Doctoral Dissertation Reader (AC)

Marsie Peterson

### Orals Chair

Soyeon Jung

### Postdoctoral Faculty Sponsor

Victor Fors

### Doctoral Dissertation Advisor (AC)

Rajan Aggarwal, Alaisha Alexander, John Alsterda, Nicholas Broadbent, Tushar Goel, Alessandra Napoli, Marsie Peterson, John Talbot, Trey Weber, Elliot Weiss

### Master's Program Advisor

Brian Dobkowski, Olaoluwa Shorinwa

### Doctoral (Program)

Rajan Aggarwal, Trey Weber

## Publications

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### PUBLICATIONS

- **Neural networks overtake humans in a racing game** *NATURE*  
Gerdes, J.  
2022; 602 (7896): 213-214
- **Long-Horizon Vehicle Motion Planning and Control Through Serially Cascaded Model Complexity** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Laurense, V. A., Gerdes, J.  
2022; 30 (1): 166-179
- **Neural Network Model Predictive Motion Control Applied to Automated Driving With Unknown Friction** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Spielberg, N. A., Brown, M., Gerdes, J.  
2021
- **Impacts of Model Fidelity on Trajectory Optimization for Autonomous Vehicles in Extreme Maneuvers** *IEEE TRANSACTIONS ON INTELLIGENT VEHICLES*  
Subosits, J. K., Gerdes, J.  
2021; 6 (3): 546-558
- **Game-Theoretic Planning for Self-Driving Cars in Multivehicle Competitive Scenarios** *IEEE TRANSACTIONS ON ROBOTICS*  
Wang, M., Wang, Z., Talbot, J., Gerdes, J., Schwager, M.  
2021; 37 (4): 1313-1325
- **Optimal Decision Making for Automated Vehicles Using Homotopy Generation and Nonlinear Model Predictive Control**  
Patterson, V. Z., Lewis, F. E., Gerdes, J., IEEE  
IEEE.2021: 1045-1050
- **On infusing reachability-based safety assurance within planning frameworks for human-robot vehicle interactions** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*  
Leung, K., Schmerling, E., Zhang, M., Chen, M., Talbot, J., Gerdes, J., Pavone, M.  
2020

- 
- **Learning at the Racetrack: Data-Driven Methods to Improve Racing Performance Over Multiple Laps** *IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY*  
Kapania, N. R., Gerdes, J.  
2020; 69 (8): 8232–42
  - **Towards Automated Vehicle Control Beyond the Stability Limits: Drifting Along a General Path** *ASME Journal of Dynamic Systems, Measurement and Control*  
Goh, J. Y., Goel, T., Gerdes, J. C.  
2020; 142 (2)
  - **Opening New Dimensions: Vehicle Motion Planning and Control using Brakes while Drifting**  
Goel, T., Goh, J. Y., Gerdes, J., IEEE  
IEEE.2020: 560-565
  - **Robust Stabilization and Collision Avoidance through Minimizing Open-Loop Velocity Uncertainty**  
Brown, M., Gerdes, J., IEEE  
IEEE.2020: 259-264
  - **The Virtues of Automated Vehicle Safety - Mapping Vehicle Safety Approaches to Their Underlying Ethical Frameworks**  
Gerdes, J., IEEE  
IEEE.2020: 107-113
  - **On Infusing Reachability-Based Safety Assurance Within Probabilistic Planning Frameworks for Human-Robot Vehicle Interactions**  
Leung, K., Schmerling, E., Chen, M., Talbot, J., Gerdes, J., Pavone, M., Xiao, J., Kroger, T., Khatib, O.  
SPRINGER INTERNATIONAL PUBLISHING AG.2020: 561-574
  - **Vehicle control synthesis using phase portraits of planar dynamics** *VEHICLE SYSTEM DYNAMICS*  
Bobier-Tiu, C. G., Beal, C. E., Kegelman, J. C., Hindiyeh, R. Y., Gerdes, J.  
2019; 57 (9): 1318–37
  - **Neural network vehicle models for high-performance automated driving** *SCIENCE ROBOTICS*  
Spielberg, N. A., Brown, M., Kapania, N. R., Kegelman, J. C., Gerdes, J.  
2019; 4 (28)
  - **A Hybrid Control Design for Autonomous Vehicles at Uncontrolled Crosswalks**  
Kapania, N. R., Govindarajan, V., Borrelli, F., Gerdes, J., IEEE  
IEEE.2019: 1604–11
  - **Contingency Model Predictive Control for Automated Vehicles**  
Alsterda, J. P., Brown, M., Gerdes, J., IEEE  
IEEE.2019: 717-722
  - **Game Theoretic Planning for Self-Driving Cars in Competitive Scenarios**  
Wang, M., Wang, Z., Talbot, J., Gerdes, J., Schwager, M., Bicchi, A., KressGazit, H., Hutchinson, S.  
MIT PRESS.2019
  - **Contingency Model Predictive Control for Automated Vehicles** *American Control Conference*  
Alsterda, J. P., Brown, M., Gerdes, J. C.  
2019
  - **From the Racetrack to the Road: Real-Time Trajectory Replanning for Autonomous Driving** *IEEE Transactions on Intelligent Vehicles*  
Subsits, J. K., Gerdes, J. C.  
2019; 4 (2): 309-320
  - **Toward Closing the Loop on Human Values** *IEEE Transactions on Intelligent Vehicles*  
Thornton, S. M., Limonchik, B., Lewis, F. E., Kochenderfer, M. J., Gerdes, J. C.  
2019; 4 (3): 437-446
  - **Coordinating Tire Forces to Avoid Obstacles Using Nonlinear Model Predictive Control** *IEEE Transactions on Intelligent Vehicles*  
Brown, M., Gerdes, J. C.

2019; 5 (1): 21-31

- **Designing Automated Vehicles Around Human Values.** *Road Vehicle Automation 6. AVS 2019.*  
Gerdes, J. C., Thornton, S. M., Millar, J.  
edited by Meyer, G., Beiker, S.  
Springer.2019
- **Mind over motor mapping: Driver response to changing vehicle dynamics** *HUMAN BRAIN MAPPING*  
Bruno, J. L., Baker, J. M., Gundran, A., Harbott, L. K., Stuart, Z., Piccirilli, A. M., Hosseini, S., Gerdes, J., Reiss, A. L.  
2018; 39 (10): 3915–27
- **Mind over motor mapping: Driver response to changing vehicle dynamics.** *Human brain mapping*  
Bruno, J. L., Baker, J. M., Gundran, A. n., Harbott, L. K., Stuart, Z. n., Piccirilli, A. M., Hosseini, S. M., Gerdes, J. C., Reiss, A. L.  
2018
- **Value Sensitive Design for Autonomous Vehicle Motion Planning**  
Thornton, S. M., Lewis, F. E., Zhang, V., Kochenderfer, M. J., Gerdes, J., IEEE  
IEEE.2018: 1157-1162
- **Analysis of Feasible Tire Force Regions for Optimal Tire Force Allocation with Limited Actuation** *IEEE INTELLIGENT TRANSPORTATION SYSTEMS MAGAZINE*  
Park, H., Gerdes, J.  
2017; 9 (3): 75–87
- **Neural, physiological, and behavioral correlates of visuomotor cognitive load.** *Scientific reports*  
Hosseini, S. M., Bruno, J. L., Baker, J. M., Gundran, A., Harbott, L. K., Gerdes, J. C., Reiss, A. L.  
2017; 7 (1): 8866
- **Collision Avoidance and Stabilization for Autonomous Vehicles in Emergency Scenarios** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Funke, J., Brown, M., Erlien, S. M., Gerdes, J.  
2017; 25 (4): 1204–16
- **Incorporating Ethical Considerations Into Automated Vehicle Control** *IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS*  
Thornton, S. M., Pan, S., Erlien, S. M., Gerdes, J.  
2017; 18 (6): 1429–39
- **Safe driving envelopes for path tracking in autonomous vehicles** *CONTROL ENGINEERING PRACTICE*  
Brown, M., Funke, J., Erlien, S., Gerdes, J. C.  
2017; 61: 307-316
- **Insights into vehicle trajectories at the handling limits: analysing open data from race car drivers** *VEHICLE SYSTEM DYNAMICS*  
Kegelman, J. C., Harbott, L. K., Gerdes, J. C.  
2017; 55 (2): 191-207
- **Path-Tracking for Autonomous Vehicles at the Limit of Friction**  
Laurense, V. A., Goh, J. Y., Gerdes, J., IEEE  
IEEE.2017: 5586–91
- **A Synthetic Input Approach to Slip Angle Based Steering Control for Autonomous Vehicles**  
Subosits, J. K., Gerdes, J., IEEE  
IEEE.2017: 2297–2302
- **Design of Variable Vehicle Handling Characteristics Using Four-Wheel Steer-by-Wire** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Russell, H. E., Gerdes, J. C.  
2016; 24 (5): 1529-1540
- **A Sequential Two-Step Algorithm for Fast Generation of Vehicle Racing Trajectories** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*  
Kapania, N. R., Subosits, J., Gerdes, J. C.  
2016; 138 (9)

- **Shared Steering Control Using Safe Envelopes for Obstacle Avoidance and Vehicle Stability** *IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS*  
Erlien, S. M., Fujita, S., Gerdes, J. C.  
2016; 17 (2): 441-451
- **Simple Clothoid Lane Change Trajectories for Automated Vehicles Incorporating Friction Constraints** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*  
Funke, J., Gerdes, J. C.  
2016; 138 (2)
- **Predictive Haptic Feedback for Obstacle Avoidance Based on Model Predictive Control** *IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING*  
Balachandran, A., Brown, M., Erlien, S. M., Gerdes, J. C.  
2016; 13 (1): 26-31
- **Prescriptive and Proscriptive Moral Regulation for Autonomous Vehicles in Approach and Avoidance**  
Pan, S., Thornton, S. M., Gerdes, J., IEEE  
IEEE.2016
- **Motor learning affects car-to-driver handover in automated vehicles.** *Science robotics*  
Russell, H. E., Harbott, L. K., Nisky, I. n., Pan, S. n., Okamura, A. M., Gerdes, J. C.  
2016; 1 (1)
- **A SEQUENTIAL TWO-STEP ALGORITHM FOR FAST GENERATION OF VEHICLE RACING TRAJECTORIES**  
Kapania, N. R., Subosits, J., Gerdes, J., ASME  
AMER SOC MECHANICAL ENGINEERS.2016
- **Autonomous Driving - Technical, Legal and Social Aspects**  
edited by Maurer, M., Gerdes, J. C., Lenz, B., Winner, H.  
Springer.2016
- **Simultaneous Stabilization and Tracking of Basic Automobile Drifting Trajectories**  
Goh, J. Y., Gerdes, J., IEEE  
IEEE.2016: 597-602
- **Design of a feedback-feedforward steering controller for accurate path tracking and stability at the limits of handling** *VEHICLE SYSTEM DYNAMICS*  
Kapania, N. R., Gerdes, J. C.  
2015; 53 (12): 1687-1704
- **An analytical method for reducing combustion instability in homogeneous charge compression ignition engines through cycle-to-cycle control** *INTERNATIONAL JOURNAL OF ENGINE RESEARCH*  
Jungkunz, A. F., Ravi, N., Liao, H., Erlien, S. M., Gerdes, J. C.  
2015; 16 (3): 485-500
- **Designing Steering Feel for Steer-by-Wire Vehicles Using Objective Measures** *IEEE-ASME TRANSACTIONS ON MECHATRONICS*  
Balachandran, A., Gerdes, J. C.  
2015; 20 (1): 373-383
- **Autonomes Fahren - Technische, rechtliche und gesellschaftliche Aspekte**  
edited by Maurer, M., Gerdes, J. C., Lenz, B., Winner, H.  
Springer Vieweg.2015
- **Autonomous Vehicle Control for Emergency Maneuvers: The Effect of Topography**  
Subosits, J., Gerdes, J., IEEE  
IEEE.2015: 1405-10
- **Path Tracking of Highly Dynamic Autonomous Vehicle Trajectories via Iterative Learning Control**  
Kapania, N. R., Gerdes, J., IEEE  
IEEE.2015: 2753-58

- **Cooperative Collision Avoidance via Proximal Message Passing**  
Ong, H., Gerdes, J., IEEE  
IEEE.2015: 4124–30
- **Creating Predictive Haptic Feedback For Obstacle Avoidance Using a Model Predictive Control (MPC) Framework**  
Balachandran, A., Brown, M., Erlien, S. M., Gerdes, J., IEEE  
IEEE.2015: 31–36
- **Prioritizing Collision Avoidance and Vehicle Stabilization for Autonomous Vehicles**  
Funke, J., Brown, M., Erlien, S. M., Gerdes, J., IEEE  
IEEE.2015: 1134–39
- **Optimal tire force allocation for trajectory tracking with an over-actuated vehicle**  
Park, H., Gerdes, J., IEEE  
IEEE.2015: 1032–37
- **Implementable Ethics for Autonomous Vehicles** *Autonomes Fahren*  
Gerdes, J. C., Thornton, S. M.  
edited by Maurer, M., Gerdes, J. C., Lenz, B., Winner, H.  
Springer Vieweg.2015
- **A Controller Framework for Autonomous Drifting: Design, Stability, and Experimental Validation** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*  
Hindiye, R. Y., Gerdes, J. C.  
2014; 136 (5)
- **Hybrid Model Predictive Control of Exhaust Recompression Hcci** *ASIAN JOURNAL OF CONTROL*  
Widd, A., Liao, H., Gerdes, J. C., Tunestal, P., Johansson, R.  
2014; 16 (2): 370-381
- **Incorporating Non-Linear Tire Dynamics into a Convex Approach to Shared Steering Control** *American Control Conference*  
Erlien, S. M., Funke, J., Gerdes, J. C.  
IEEE.2014: 3468–3473
- **THE VIRTUAL WHEEL CONCEPT FOR SUPPORTIVE STEERING FEEDBACK DURING ACTIVE STEERING INTERVENTIONS**  
Balachandran, A., Erlien, S. M., Gerdes, J., ASME  
AMER SOC MECHANICAL ENGINEERS.2014
- **Low Friction Emulation of Lateral Vehicle Dynamics Using Four-Wheel Steer-by-Wire** *American Control Conference*  
Russell, H. E., Gerdes, J. C.  
IEEE.2014: 3924–3929
- **Multicylinder HCCI Control With Coupled Valve Actuation Using Model Predictive Control** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*  
Erlien, S. M., Jungkunz, A. F., Gerdes, J. C.  
2013; 135 (5)
- **Model Predictive Control for Vehicle Stabilization at the Limits of Handling** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Beal, C. E., Gerdes, J. C.  
2013; 21 (4): 1258-1269
- **Staying within the nullcline boundary for vehicle envelope control using a sliding surface** *VEHICLE SYSTEM DYNAMICS*  
Bobier, C. G., Gerdes, J. C.  
2013; 51 (2): 199-217
- **Control of recompression HCCI with a three region switching controller** *CONTROL ENGINEERING PRACTICE*  
Liao, H., Widd, A., Ravi, N., Jungkunz, A. F., Kang, J., Gerdes, J. C.  
2013; 21 (2): 135-145

- **MULTI-CYLINDER HCCI CONTROL WITH CAM PHASER VARIABLE VALVE ACTUATION USING MODEL PREDICTIVE CONTROL** *5th Annual Dynamic Systems and Control Division Conference / 11th JSME Motion and Vibration Conference*  
Erlien, S. M., Jungkunz, A. F., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2013: 823–831
- **SIMPLE CLOTHOID PATHS FOR AUTONOMOUS VEHICLE LANE CHANGES AT THE LIMITS OF HANDLING** *ASME Dynamic Systems and Control Conference (DSCC)*  
Funke, J., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2013
- **USING A PATH-FITTING ALGORITHM TO ANALYZE THE RACING TECHNIQUES OF A SKILLED DRIVER** *ASME Dynamic Systems and Control Conference (DSCC)*  
Mejia, J. P., Theodosis, P. A., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2013
- **NONLINEAR OPTIMIZATION OF A RACING LINE FOR AN AUTONOMOUS RACECAR USING PROFESSIONAL DRIVING TECHNIQUES** *5th Annual Dynamic Systems and Control Division Conference / 11th JSME Motion and Vibration Conference*  
Theodosis, P. A., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2013: 235–241
- **Modeling and Control of Exhaust Recompression HCCI SPLIT FUEL INJECTION FOR CYLINDER-INDIVIDUAL COMBUSTION CONTROL** *IEEE CONTROL SYSTEMS MAGAZINE*  
Ravi, N., Liao, H., Jungkunz, A. F., Song, H. H., Gerdes, J. C.  
2012; 32 (4): 26-42
- **Model predictive control of HCCI using variable valve actuation and fuel injection** *IFAC Symposium on Advanced Control of Chemical Processes (ADCHEM)*  
Ravi, N., Liao, H., Jungkunz, A. F., Widd, A., Gerdes, J. C.  
PERGAMON-ELSEVIER SCIENCE LTD.2012: 421–30
- **Sliding Surface Vehicle Envelope Control: A Cooperative Design Between Controller and Envelope** *American Control Conference (ACC)*  
Bobier, C. G., Gerdes, J. C.  
IEEE COMPUTER SOC.2012: 6521–6526
- **Nonlinear optimization of a racing line for an autonomous racecar using professional driving techniques**  
Theodosis, P., Gerdes, J. C.  
2012
- **Modeling and control of exhaust recompression HCCI: split fuel injection for cylinder-individual combustion control** *IEEE Control Systems Magazine*  
Ravi, N., Liao, H., Jungkunz, Adam, F., Song, H. H., Gerdes, J., Christian  
2012; 4 (32): 26-42
- **Multi-Cylinder HCCI Control with Cam Phaser Variable Valve Actuation Using Model Predictive Control**  
Erlien, S., Jungkunz, A., Gerdes, J., Christian  
2012
- **Autonomous vehicle control at the limits of handling** *International Journal of Vehicle Autonomous Systems*  
Kritayakirana, K., Gerdes, J., Christian  
2012; 4 (10): 271-296
- **Using the center of percussion to design a steering controller for an autonomous race car** *Vehicle System Dynamics, 50 (Supplement)*  
Kritayakirana, K., Gerdes, J., Christian  
2012: 33-51
- **Analysis of Measured Racing Lines: A Path Primitive Based Curve Fitting Approach**  
Koch, G., Kegelman, John, C., Gerdes, J., Christian  
2012
- **Up to the Limits: Autonomous Audi TTS** *IEEE Intelligent Vehicles Symposium (IV)*  
Funke, J., Theodosis, P., Hindiyeh, R., Stanek, G., Kritayakirana, K., Gerdes, C., Langer, D., Hernandez, M., Mueller-Bessler, B., Huhnke, B.  
IEEE.2012: 541–547



- **CONTROLLING VEHICLE INSTABILITY THROUGH STABLE HANDLING ENVELOPES** *ASME Dynamic Systems and Control Conference / Bath/ASME Symposium on Fluid Power and Motion Control*  
Beal, C. E., Bobier, C. G., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2012: 861–868
- **COMBUSTION PHASING VARIATION REDUCTION FOR LATE-PHASING HCCI THROUGH CYCLE-TO-CYCLE PILOT INJECTION TIMING CONTROL** *ASME Dynamic Systems and Control Conference / Bath/ASME Symposium on Fluid Power and Motion Control*  
Jungkunz, A. F., Ravi, N., Liao, H., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2012: 685–692
- **A CONTROLLER FRAMEWORK FOR AUTONOMOUS DRIFTING: DESIGN, STABILITY, AND EXPERIMENTAL VALIDATION** *ASME Dynamic Systems and Control Conference / Bath/ASME Symposium on Fluid Power and Motion Control*  
Hindiyeh, R. Y., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2012: 901–908
- **GENERATING A RACING LINE FOR AN AUTONOMOUS RACECAR USING PROFESSIONAL DRIVING TECHNIQUES** *ASME Dynamic Systems and Control Conference / Bath/ASME Symposium on Fluid Power and Motion Control*  
Theodosis, P. A., Gerdes, J. C.  
AMER SOC MECHANICAL ENGINEERS.2012: 853–860
- **Using the centre of percussion to design a steering controller for an autonomous race car** *22nd Symposium of the International-Association-of-Vehicle-System-Dynamics (IAVSD)*  
Kritayakirana, K., Gerdes, J. C.  
TAYLOR & FRANCIS LTD.2012: 33–51
- **Late Phasing Homogeneous Charge Compression Ignition Cycle-to-Cycle Combustion Timing Control With Fuel Quantity Input** *American Control Conference (ACC)*  
Jungkunz, A. F., Erlien, S., Gerdes, J. C.  
IEEE COMPUTER SOC.2012: 2078–2083
- **Modeling and Control of an Exhaust Recompression HCCI Engine Using Split Injection** *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*  
Ravi, N., Liao, H., Jungkunz, A. F., Chang, C., Song, H. H., Gerdes, J. C.  
2012; 134 (1)
- **Implementation and Analysis of a Repetitive Controller for an Electro-Hydraulic Engine Valve System** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*  
Liao, H., Roelle, M. J., Chen, J., Park, S., Gerdes, J. C.  
2011; 19 (5): 1102-1113
- **Pushing the limits: From lanekeeping to autonomous racing** *ANNUAL REVIEWS IN CONTROL*  
Talvala, K. L., Kritayakirana, K., Gerdes, J. C.  
2011; 35 (1): 137-148
- **Control of Exhaust Recompression HCCI using Hybrid Model Predictive Control** *American Control Conference (ACC)*  
Widd, A., Liao, H., Gerdes, J. C., Tunestal, P., Johansson, R.  
IEEE.2011: 420–425
- **Combustion Phasing Variation Reduction for Late-phasing HCCI Through Cycle-to-cycle Pilot Injection Timing Control**  
Jungkuz, A., Ravi, N., Liao, H., Gerdes, J., Christian  
2011
- **Driftkeeping: Path tracking at the friction limits using high sideslip cornering**  
Hindiyeh, R., Gerdes, J., Christian  
2011
- **Using the center of percussion to generate feedforward steering for an autonomous race car**  
Kritayakirana, K., Gerdes, J., Christian  
2011
- **Controlling Vehicle Instability Through Stable Handling Envelopes**

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- Beal, Craig, E., Bobier, Carrie, G., Gerdes, J., Christian  
2011
- **Implementation and analysis of a repetitive controller for an electro-hydraulic engine valve system** *IEEE Transactions on Control Systems Technology*  
Liao, H., Roelle, M., Chen, J., Park, S., Gerdes, J., Christian  
2011; 5 (19): 1102-1113
  - **A controller framework for autonomous drifting: Design, stability, and experimental validation**  
Hindiyeh, R., Gerdes, J., Christian  
2011
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