Ardalan Vahidi, Ph.D.
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EDUCATION

Ph.D., Mechanical Engineering, University of Michigan, Ann Arbor, Michigan	09/2001-08/2005
M.Sc., Transportation Safety, George Washington University, Washington DC	01/1999-08/2001
M.Sc., Structural Engineering, Sharif University of Technology, Tehran	09/1996-07/1998
B.Sc., Civil Engineering, Sharif University of Technology, Tehran	09/1992-07/1996

POSITIONS

Clemson University, Professor of Mechanical Engineering	08/2017- present
IFP Energies Nouvelles, Rueil-Malmaison, France, Scientific Visitor	05/2017-08/2017
Clemson University, Associate Professor of Mechanical Engineering	08/2011- 07/2017
University of California, Berkeley, Visiting Scholar	06/2012-08/2013
BMW Group Technology Office USA, Research Fellow	06/2012-08/2013
Clemson University, Assistant Professor of Mechanical Engineering	08/2005-07/2011

HONORS AND AWARDS

Eastman Award of Research and Teaching Excellence, Clemson University	2012
First Prize, Graduate Student Symposiums, Dept. Mechanical Eng., University of Michigan	2003/2004
Third Prize, The First Iranian Universities Civil Eng. Olympiad, Awarded by Ministry of Higher Education	1996
Ranked 11th, Nationwide University Entrance Examination for Iranian Universities among 300,000 Participants	1992

EXPERIENCE HIGHLIGHTS

Publications and Patents: 4500 citations. 75 journal/refereed conference publications. 3 patents.

Student Advising: Graduated 7 Ph.D. and 10 Master students. Currently advising 4 Ph.D. students and one postdoc. Advised 18 undergraduate students.

Teaching: 3 undergraduate and 4 graduate courses in Dynamic Systems and Control, in 35 sections with end-of-semester student ratings above 4.0/5.0.

Research Interests: Dynamic Systems and Controls applied to: 1. Automated and Connected Vehicles   2. Alternative Energy Generation and Storage Systems 3. Real-Time Estimation of Human Performance.

Research Experience: Control and dynamical systems with application to vehicle active safety and crash avoidance systems at the George Washington University (1999-2001), fuel cell power systems and advanced energy storage systems at the University of Michigan (2001-2005), hybrid energy systems, connected and autonomous vehicles at Clemson (2005-present). Machine learning and data mining from vehicular traffic data during sabbatical year at UC, Berkeley and BMW Technology Office in California (2012-2013). Energy efficient connected and autonomous vehicles at IFPEN, France (2017).

Research Grants: 3.3 million dollars in 17 grants as PI.

PUBLICATIONS

Book

B1. A. Sciarretta and A. Vahidi, *Energy Efficient Driving of Road Vehicles: Towards Cooperative, Connected, and Automated Mobility*, in preparation, 2018.

Journals (under review)

J34. A. Fayazi, A. Vahidi, and A. Luckow, "A Vehicle-in-the-loop (VIL) Verification of an all-Autonomous Intersection Traffic Management," under review, *Transportation Research, Part C,* 2018.

Journals (published or accepted)

J33. J. Han, A. Vahidi, and A. Sciarretta, "Fundamentals of Energy Efficient Driving for Combustion Engine and Electric Vehicles: An Optimal Control Perspective," accepted, *Automatica*, 2018.

J32. A. Vahidi and A. Sciarretta, "Energy Saving Potentials of Connected and Automated Vehicles," in print, *Transportation Research Part C*, 2018.

J31. R. A. Dollar and A. Vahidi, "Efficient and Collision-Free Anticipative Cruise Control in Randomly Mixed Strings," in print, *IEEE Transactions on Intelligent Vehicles*, 2018.

J30. A. Fayazi and A. Vahidi, "Mixed Integer Linear Programming for Optimal Scheduling of Autonomous Vehicle Passage Through Intelligent Intersections," *IEEE Transactions on Intelligent Vehicles*, **3**, 287-299, 2018.

J29. J. Roy, N. Wan, A. Goswami, A. Vahidi,P. Jayakumar, and C. Zhang, "A Hierarchical Route Guidance Framework for Off-Road Connected Vehicles," *ASME Journal of Dynamic Systems, Measurement, and Control*, **140**, 071011,2018.

J28. N. Wan, C., and A. Vahidi, "Probabilistic Anticipation and Control in Autonomous Car Following," in print, *IEEE Transactions on Control Systems Technology*, 2018.

J27. Y. Parvini and A. Vahidi, "Heuristic versus Optimal Charging of Supercapacitors, Lithium-Ion and Lead-Acid Batteries: An Efficiency Point of View," *IEEE Transactions on Control Systems Technology*, **26**, 167-180, 2018.

J26. R. Hutchison, R., G. Klapthor, K. Edwards, A. Vahidi, G. Mocko, G., K. Bruneau, "Validity and Reproducibility of the Garmin Vector Power Meter when Compared to the SRM Device," *Journal of Sports Science*, **5**, 235-241, 2017 .

J25. B. HomChaudhuri, A. Vahidi, and P. Pisu, "Fast Model Predictive Control Based Fuel Efficient Control Strategy for a Group of Connected Vehicles in Urban Road Conditions," *IEEE Transactions on Control Systems Technology*, 760-767, 25, 2017.

J24. N. Wan and A. Vahidi, and A. Luckow, "Optimal Speed Advisory For Connected Vehicles in Arterial Roads and The Impact on Mixed Traffic," *Transportation Research: Part C*, **69**, 548-563, 2016.

J23. N. Wan, A. Vahidi, and A. Luckow, "Reconstructing Maximum Likelihood Trajectory of Probe Vehicles Between Sparse Updates," *Transportation Research: Part C*, **65**, 16-30, 2016.

J22. A. Fayazi, A. Vahidi, "Crowdsourcing Phase and Timing of Pre-Timed Traffic Signals in Presence of Queues: Algorithms and Backend System Architecture," *IEEE Trans. on Intelligent Transportation Systems*, **17**, 870-881, 2016.

J21. S. Schepmann and A. Vahidi, "Ultracapacitor Power Assist with Preview-based Energy Management For Reducing Fuel Consumption of Heavy Vehicles," *International Journal of Powertrain*, **5**, 375-394, 2016.

J20. Y. Parvini, J. Siegel, A. Stefanopoulou, and A. Vahidi, "Identification and Validation of an Electro-Thermal Model of Cylindrical Double Layer Supercapacitors for Low and High Power and Temperature Operations," *IEEE Transactions on Industrial Electronics*, **63**, 1574-1585, 2016.

J19. A. Fayazi, A. Vahidi, G. Mahler, and A. Winckler, "Traffic Signal Phase and Timing Estimation from Low-Frequency Vehicular Probe Data," *IEEE Transactions on Intelligent Transportation Systems*, **16**, 19-28, 2015.

J18. G. Mahler and A. Vahidi, "An Optimal Velocity-Planning Scheme for Vehicle Energy Efficiency Through Probabilistic Prediction of Traffic-Signal Timing," *IEEE Transactions on Intelligent Transportation Systems*, **15**, 2516-2523, 2014.

J17. H. Borhan and A. Vahidi, "Model predictive control of a hybrid electric powertrain with combined battery and ultracapacitor energy storage system," *International Journal of Powertrain*, **1**, 351-376, 2012.

J16. H. Borhan, A. Vahidi, Tony Phillips, Ming Kuang, Ilya Kolmanovsky, and Stefano Di Cairano, "MPC-based Energy Management of a Power-Split Hybrid Electric Vehicle," *IEEE Transactions on Control Systems Technology*, **20**, 593-603, 2012.

J15. C. Zhang and A. Vahidi, "Route Preview in Energy Management of Plug-in Hybrid Vehicles," *IEEE Transactions on Control Systems Technology*, **20**, 546-553, 2012.

J14. B. Asadi and A. Vahidi, "Predictive Cruise Control for Improving Fuel Economy and Reducing Trip Time," *IEEE Transactions on Control Systems Technology*, **19**, 707-714, 2011.

J13. D. Rotenberg, A. Vahidi, and I. Kolmanovsky, "Ultracapacitor Assisted Powertrains: Modeling, Control, Sizing, and The Impact on Fuel Economy," *IEEE Transactions on Control Systems Technology*, **19**, 576-589, 2011.

J12. C. Zhang, A. Vahidi, P. Pisu, X. Li, and K. Tennant, "Role of Terrain Preview in Energy Management of Hybrid Electric Vehicles," *IEEE Trans. on Vehicular Technology*, **59**, 1139-1147, 2010.

J11. W. Greenwell and A. Vahidi, "Predictive Control of Voltage and Current in a Fuel Cell-Ultracapacitor Hybrid," *IEEE Transactions on Industrial Electronics*, **57**, 1954-1963, 2010.

J10. M. McIntyre, T. Ghotikar, A. Vahidi, X. Song, and Darren Dawson, "A Two-Stage Lyapunov-Based Estimator for Estimation of Vehicle Mass and Road Grade," *IEEE Transactions on Vehicular Technology*, **58**, 3177-3185, 2009.

J9. W. Schmittinger and A. Vahidi, "A Review of the Main Parameters Influencing Long-Term Performance and Durability of PEM Fuel Cells," *Journal of Power Sources*, **180**, 1-14, 2008.

J8. A. Vahidi, I. Kolmanovsky, and A. Stefanopoulou, "Constraint Handling in a Fuel Cell System: A Fast Reference Governor Approach," *IEEE Transactions on Control Systems Technology*, **15**, 86-98, 2007.

J7. A. Vahidi, A. Stefanopoulou, and H. Peng, "Current Management in a Hybrid Fuel Cell Power System: A Model Predictive Control approach," *IEEE Trans. on Control Systems Technology*, **14**, 1047-1057, 2006.

J6. A. Vahidi, A. Stefanopoulou, and H. Peng, "Adaptive Model Predictive Control for Coordination of Compression and Friction Brakes in Heavy Duty Vehicles," *International Journal of Adaptive Control and Signal Processing*, **20**, 581-598, 2006.

J5. A. Vahidi, A. Stefanopoulou, and H. Peng, "Recursive Least Squares with Forgetting for Online Estimation of Vehicle Mass and Road Grade: Theory and Experiments," *Vehicle System Dynamics*, **43**, 31-57, 2005.

J4. A. Vahidi and A. Eskandarian, "Research Advances in Intelligent Collision Avoidance and Adaptive Cruise Control," *IEEE Transactions on Intelligent Transportation Systems*, **4**, 3, pp. 143-153, 2003.

J3. A. Vahidi and A. Eskandarian, "Influence of Preview Uncertainties in the Preview Control of Vehicle Suspensions," *Journal of Multi-Body Dynamics*, **216**, pp. 295-301, 2002.

J2. A. Vahidi and A. Eskandarian, "Predictive Time-Delay Control of Vehicle Suspensions," *Journal of Vibration and Control*, **7**, pp. 1195-1211, 2001.

J1. A. Joghataie and A. Vahidi, "Designing A General Neuro-Controller for Water Towers," *ASCE Journal of Engineering Mechanics*, **126**, pp. 582-587, 2000.

Refereed Conference Publications

C44. D. Gundana, R. A. Dollar, and A. Vahidi, "To Merge Early or Late: Analysis of Traffic Flow and Energy Impact in a Reduced Lane Scenario," *Proceedings of IEEE ITSC*, Maui, HI, 2018.

C43. S. Karimi, A. Vahidi, and P. Jayakumar, "A Comprehensive Framework for Simulating Dynamics of An Off-Road Vehicle in Unstructured Environments," in *Proceedings of ASME DSCC*, Atlanta, GA, 2018.

C42. R. A. Dollar and A. Vahidi, "Predictive Coordinated Vehicle Acceleration and Lane Selection Using Mixed Integer Programming," in *Proceedings of ASME DSCC*, Atlanta, GA, 2018.

C41. J. Han, J. Rios-Torres, A. Vahidi, A. Sciarretta, "Impact of Model Simplification on Optimal Control of Combustion Engine and Electric Vehicles Considering Control Input Constraints," in *Proceedings of IEEE VPCC*, Chicago, IL, 2018.

C40. A. Goswami, H. Saeidi, A. Vahidi, and P. Jayakumar, "Implementation of Hierarchical Framework with Accurate Localization and Low Level Control in a Low-Cost Scaled Autonomous Car," in *Proceedings of American Control Conference*, Milwaukee, WI, 2018.

C39. R. Koli, H. Arunachalam, Qi. Zhu, S. Onori, A. Vahidi, and R. Prucka, "Nonlinear Model Predictive Control of Dual Loop - Exhaust Gas Recirculation in a Turbocharged Spark Ignited Engine," in *Proceedings of American Control Conference*, Milwaukee, WI, 2018.

C38. F. Ashtiani, A. Fayazi, and A. Vahidi, "Multi-Intersection Traffic Management for Autonomous Vehicles via Distributed Mixed Integer Linear Programming," in *Proceedings of American Control Conference*, Milwaukee, WI, 2018.

C37. A. Dollar and A. Vahidi, "Quantifying the Impact of Limited Information and Control Robustness on Connected Automated Platoons," *Proceedings of IEEE 20th International Conference on Intelligent Transportation Systems*, Yokohama, Japan, 2017.

C36. G. Mahler, A. Winckler, A. Fayazi, A. Vahidi, and M. Filusch, "Cellular Communication of Traffic Signal State to Connected Vehicles for Arterial Eco-Driving," *Proceedings of IEEE 20th International Conference on Intelligent Transportation Systems*, Yokohama, Japan, 2017.

C35. A. Fayazi and A. Vahidi, "A Smart City Traffic Management Scheme and Vehicle-in-the-loop (VIL) Verification Platform for Autonomous Driving," *Proceedings of IEEE Conference on Control Technology and Applications*, Kohala Coast, HI, 2017 .

C34. A. Fayazi, A. Vahidi, and A. Luckow, "Optimal Scheduling of Autonomous Vehicle Arrivals at Intelligent Intersections via MILP" *Proceedings of American Control Conference*, Seattle, WA, 2017.

C33. Y. Parvini and A. Vahidi, "Maximizing Charging Efficiency of Lithium-Ion and Lead-Acid Batteries Using Optimal Control Theory, " in *Proceedings of American Control Conference*, Chicago, IL, 2015.

C32. B. HomChaudhuri, A. Vahidi, and P. Pisu "A Fuel Economic Model Predictive Control Strategy for a Group of Connected Vehicles in Urban Roads," in *Proceedings of American Control Conference*, Chicago, IL, 2015.

C31. N. Wan and A. Vahidi, "Maximum Likelihood Estimation of Vehicle Trajectories at Intersections Using Sparse Transit Bus Data," in *Proceedings of Transportation Research Board*, Washington DC, 2015.

C30. N. Wan and A. Vahidi, "Probabilistic Estimation of Travel Times in Arterial Streets Using Sparse Transit Bus Data," in *Proceedings of IEEE Intelligent Transportation Systems Conference*, Qingdao, China, 2014

C29. Y. Parvini, J. Siegel, A. Stefanopoulou, and A. Vahidi, "Preliminary Results on Identification of an Electro-Thermal Model for Low Temperature and High Power Operation of Cylindrical Double Layer Ultracapacitors, " in *Proceedings of American Control Conference*, Portland, OR, 2014.

C28. N. Wan, A. Fayazi, H. Saeedi, and A. Vahidi, "Optimal Power Management of an Electric Bicycle based on Terrain Preview and Considering Human Fatigue Dynamics," *Proceedings of American Control Conference*, Portland, OR, 2014.

C27. N. Wan, G. Gomes, A. Vahidi, R. Horowitz, "Prediction on Travel-Time Distribution for Freeways Using Online Expectation Maximization Algorithm," *Proceedings of Transportation Research Board*, Washington, DC, 2014.

C26. A. Fayazi, N. Wan, S. Lucich, A. Vahidi, and G. Mocko, "Optimal Pacing in a Cycling Time-Trial Considering Cyclist's Fatigue Dynamics," in *Proceedings of American Control Conference*, Washington, DC, 2013.

C25. Y. Parvini and A. Vahidi, "Optimal Charging of Ultracapacitors During Regenerative Braking," in *Proceedings of IEEE International Electric Vehicle Conference*, Greenville, SC, 2012.

C24. G. Mahler and A. Vahidi, "Reducing Idling at Red Lights Based on Probabilistic Prediction of Traffic Signal Timings," *Proceedings of American Control Conference*, Montreal, Canada, 2012.

C23. C. Zhang and A. Vahidi, "Model Predictive Cruise Control with Probabilistic Constraints for Eco Driving," *Proceedings of the 2011 ASME DSCC Conference*, Arlington, VA, 2011.

C22. H. Borhan, W. Liang, A. Vahidi, A. Phillips, M. Kuang, S. Di Cairano, and R. McGee "Nonlinear Model Predictive Control of a Power-split Hybrid Electric Vehicle with Battery and Engine Dynamics," *Proceedings of the ASME DSCC Conference*, Arlington, VA, 2011.

C21. S. Schepmann and A. Vahidi, "Heavy Vehicle Fuel Economy Improvement Using Ultracapacitor Power Assist and Preview-based MPC Energy Management," *Proceedings of American Control Conference*, San Francisco, CA, 2011.

C20. H. Borhan, C. Zhang, A. Vahidi, T. Phillips, M. Kuang, and S. Di Cairano, "Nonlinear Model Predictive Control for Power-split Hybrid Electric Vehicles," *Proceedings of IEEE Conference on Decision and Control*, Atlanta, GA, 2011.

C19. B. Asadi, C. Zhang and A. Vahidi, "The Role of Traffic Flow Preview For Planning Fuel Optimal Vehicle Velocity," in *Proceedings of ASME Dynamic Systems and Control Conference*, Boston, MA, 2010.

C18. C. Zhang and A. Vahidi, "Real-Time Optimal Control of Plug-in Hybrid Vehicles with Trip Preview," *Proceedings of American Control Conference*, Baltimore, MD, 2010.

C17. H. Borhan and A. Vahidi, "Model Predictive Control of a Power-split Hybrid Electric Vehicle with Combined Battery and Ultracapacitor Energy Storage," *Proceedings of American Control Conference*, Baltimore, MD, 2010.

C16. C. Zhang, A. Vahidi, X. Li, and D. Essenmacher, "Role of Trip Information Preview in Fuel Economy of Plug-in Hybrid Vehicles," *Proceedings of ASME Dynamic Systems and Control Conference*, Hollywood, CA, 2009.

C15. C. Zhang, A. Vahidi, P. Pisu, X. Li, and K. Tennant, "Utilizing Road Grade Preview for Increased Fuel Economy of Hybrid Vehicles," *Proceedings of IFAC Symposium on Control in Transportation Systems*, Redondo Beach, CA, 2009.

C14. B. Asadi and A. Vahidi, "Predictive Use of Traffic Signal State for Fuel Saving," *Proceedings of 12th IFAC Symposium on Control in Transportation Systems*, Redondo Beach, CA, 2009.

C13. H. Borhan, A. Vahidi, T. Phillips, M. Kuang, and I. Kolmanovsky, "Predictive Energy Management of a Power-Split Hybrid Electric Vehicle," *Proceedings of American Control Conference*, St. Louis, MO, 2009.

C12. W. Greenwell and A. Vahidi, "Experiments in Predictive Coordination of a Fuel Cell/Ultracapacitor Hybrid," *Proceedings of ASME Dynamic Systems and Control Conference*, Ann Arbor, MI, 2008.

C11. D. Rotenberg, A. Vahidi, and Ilya Kolmanovsky, "Ultracapacitor Assisted Powertrains: Modeling, Control, Sizing, and The Impact on Fuel Economy," *Proceedings of American Control Conference*, Seattle, WA, 2008.

C10. A. Vahidi, and W. Greenwell, "A Decentralized Model Predictive Control Approach to Power Management of a Fuel-Cell Ultracapacitor Hybrid," *Proceedings of American Control Conference*, New York, NY, 2007.

C9. M. McIntyre, A. Vahidi, and D. Dawson, "An Online Estimator for Heavy Vehicle's Mass and Road Grade," *Proceedings of ASME Dynamic Systems and Control Division*, Chicago, IL, 2006.

C8. A. Vahidi, I. Kolmanovsky, and A. Stefanopoulou, "Constraint Management in Fuel Cells: A Fast Reference Governor Approach," *Proceedings of American Control Conference*, Portland, OR, 2005.

C7. A. Vahidi, A. Stefanopoulou, and H. Peng, "Adaptive Model Predictive Control for Vehicle Braking Assist System Design," *Proceedings of ASME Dynamic Systems and Control Division*, Anaheim, CA, 2004.

C6. A. Vahidi, A. Stefanopoulou, and H. Peng, "Model Predictive Control for Starvation Prevention in a Fuel Cell System," *Proceedings of American Control Conference*, Boston, MA, 2004.

C5. A. Vahidi, A. Stefanopoulou, and H. Peng, "Experiments for Online Estimation of Heavy Vehicle's Mass and Time-Varying Road Grade," *Proceedings of ASME Dynamic Systems and Control Division*, Washington, DC, 2003.

C4. A. Vahidi, M. Druzhininia, A. Stefanopoulou, and H. Peng, "Simultaneous Mass and Time-Varying Grade Estimation for Heavy Duty Vehicles," *Proceedings of American Control Conference*, Denver, CO, 2003.

C3. A. Vahidi and A. Eskandarian, "A Study on the Effect of Preview Uncertainties in Preview Control of Vehicle Suspensions," *ASME Design Engineering Division DE*, New York, NY, 2001.

C2. A. Vahidi, and A. Eskandarian, "Predictive Control of Vehicle Suspensions with Time-Delay for a Quarter Car Model," *Proceedings of Multi-Body Dynamics: Monitoring and Simulation Techniques*, pp. 97-105, 2000.

C1. A. Joghataie and A. Vahidi, "Neural Networks in the Control of Water Towers," *Proceedings of the Artificial Neural Networks in Engineering*; pp. 733-738, 1999.

Abstracts

A1. G. Klapthor,, R. Hutchison, K. Edwards, K. Knowles, K. Humes, G. Mocko, A. Vahidi, "Validity And Reliability Of A Pedal-based Power Meter During Maximal Ergometer Testing," *ACSM Medicine and Science in Sports and Exercise*, **48** (5), pp. 107, 2016.

A2. R. Hutchison, G. Klapthor, K. Knowles, K. Edwards, K. Humes, G. Mocko, A. Vahidi, "Comparison Of Ventilatory Thresholds Via V-slope Method to Lactate Thresholds With NIRS," *ACSM Medicine and Science in Sports and Exercise*, **48** (5), pp. 107, 2016.

A3. K. Edwards, R. Hutchison, G. Klapthor, K. Knowles, G. Mocko, A. Vahidi, K. Humes, M. Murr, "Comparison of Threshold Determinations between Blood Lactate Samples and Near Infrared Spectroscopy," *ACSM Medicine and Science in Sports and Exercise*, **48** (5), pp. 434, 2016.

Other Publications

M4. A. Vahidi, "Constrained Optimal Control Applied to Fuel Cells and Vehicle Systems," Ph.D. Dissertation, University of Michigan, 2005.

M3. A. Vahidi, A. Stefanopoulou, X. Wang, and T.-C. Tsao, "Experimental Verification of Discretely Variable Compression Braking Control for Heavy Duty Vehicles," PATH Technical Report, UC Berkeley, 2004.

M2. A. Vahidi, A. Stefanopoulou, P. Farias, and T.-C. Tsao, "Experimental Verification of Discretely Variable Compression Braking Control for Heavy Duty Vehicles," PATH Technical Report, UC Berkeley, 2003.

M1. A. Vahidi, "Active Vibration Control of Water Towers under Earthquake Loading," Master's Thesis, Sharif University of Technology, Tehran, Iran, 1998. (in Persian)

PATENTS

1. A. Vahidi and G. Mahler, "System and Method for Utilizing Traffic Signal Information for Improving Fuel Economy and Reducing Trip Time," *US Patent 8,478,500*, 2013.

2. G. Mahler, A. Winckler, A. Vahidi, A. Luckow, "Systems and Methods for Predicting Traffic Signal Information*," US Patent 8,972,145*, 2015.

3. A. Vahidi, A. Fayazi, G. Mahler, A. Winckler, "Systems and Methods for Estimating Traffic Signal Information," *US Patent 9,183,743*, 2015.

INVITED PRESENTATIONS

P32. "Eco-Driving with Connected and Automated Vehicles", ASME DSCC, Workshop on Connected and Automated Vehicles, Atlanta, GA, September 30, 2018.

P31. "Anticipative Guidance of Connected and Autonomous Cars for Energy Efficiency ", Ford Motor Company, Research and Advanced Engineering, May 17, 2018.

P30. "Optimal Coordination of Connected and Autonomous Cars in Smart Cities", New York University, Abu Dhabi, November 19, 2017.

P29. "Optimal Coordination of Connected and Autonomous Cars in Smart Cities", University of California, Berkeley, November 3, 2017.

P28. "Eco Driving with Connected and Automated Vehicles", IFP Energies Nouvelles - Technology, Computer Science, and Applied Mathematics Division, Rueil-Malmaison, France, June 1, 2017.

P27. "Efficient Vehicular Mobility Via Connectivity and Control", Control Seminar Series, University of Michigan, Ann Arbor, March 31, 2017.

P26. "Coordinating Connected Cars and Signals in Smart Cities", Winter School on Intelligent Transportation, Singapore, January 17, 2017.

P25. "Coordinating Connected Cars and Signals in Smart Cities", Smart Cities Workshop, IEEE Conference on Decision and Control, Las Vegas, NV, December 11, 2016.

P24. "Opportunities for Increasing Fleet Energy Efficiency with Connected and Autonomous Cars," Research and Innovation Center, Ford Motor Company, May 24, 2016.

P23. "Driver Decision Support For Improving Energy Efficiency of Connected Cars and The Impact on Arterial Traffic," Institute for Pure and Applied Mathematics, University of California, Los Angeles, November 17, 2015.

P22. "Increasing The Energy Efficiency of Connected Cars," Department of Mechanical and Aerospace Engineering, George Washington University, Washington DC, October 2, 2015.

P21. "Increasing The Energy Efficiency of Connected Cars," Department of Electrical And Computer Engineering, University of Maryland, College Park, October 10, 2014.

P20. "Constrained Optimal Control of Automotive Systems," Department of Mechanical and Aerospace Engineering, University of California, Davis, California, November 5, 2013.

P19. "Eco-driving via Connected Vehicle Technologies," IEEE International Sustainable Mobility and Connected Vehicle Leadership Forum, Santa Clara, California, October 23, 2013

P18. "Optimization-based Energy Management of Hybrid Powertrains," Eaton Corporation Global Research and Technology, Southfield, Michigan, June 4, 2013.

P17. "Traffic and Terrain Preview for Energy Saving of Connected Vehicles," BMW Group Technology Office USA, Mountain View, California, July 12, 2012.

P16. "Predictive Use of Upcoming Traffic Signal Information for Improving Fuel Economy," Innomobility 2011.

P15. "Role of Traffic and Terrain Preview in Energy Saving of Connected Vehicles," ITS Georgia Annual Meeting, Greensboro, Georgia, September 19, 2011.

P14. "Saving Energy by Data Sharing and Computing on the Cloud," Annual IEEE Vehicular Technology Meeting, Vehicles in the Cloud Panel, San Francisco, September 8, 2011.

P13. "A Cyberphysical Framework for Increasing Energy Efficiency and Mobility of Networked Vehicles," Department of Mechanical Engineering, University of Texas, Austin, November 5, 2010.

P12. "A Cyberphysical Framework for Increasing Energy Efficiency and Mobility of Networked Vehicles," Department of Mechanical And Aerospace Engineering, University of California, Irvine, October 29, 2010.

P11. "Predictive Energy Management in Networked Vehicles: Utilizing Traffic and Terrain Preview for Fuel Saving," Department of Mechanical Engineering, Georgia Institute of Technology, Atlanta, September 24, 2010

P10. "Predictive Energy Management in Networked Vehicles: Utilizing Traffic and Terrain Preview for Fuel Saving," Control Seminar Series, University of Michigan, Ann Arbor, December 4, 2009.

P9. "Energy Savings in Networked Vehicles by Exploiting Traffic, Traffic Signal, and Terrain Information", BMW Information Technology Research Center, Greenville, South Carolina, June 15, 2009.

P8. "Role of System Engineering and Telematics in Energy Management of Next generation Hybrid   Vehicles" Clemson University International Center for Automotive Research, January 14, 2009.

P7. "Role of System Engineering and Telematics in Energy Management of Next Generation hybrid Vehicles" Department of Mechanical Engineering, University of North Carolina, Charlotte, October 30, 2008.

P6. "Overview on Modeling and Control of Hybrid Electric Powertrains" Tutorial Presentation, American Control Conference, Seattle, WA, June 11, 2008.

P5. "Control Engineering of Fuel Cell Systems" Invited Panel, Fuel Cell South Meeting, Atlanta, GA, December 2006.

P4. "Model Predictive Control for Controlling the Air Supply System in a Hybrid Fuel Cell System" Scientific Research Lab, Ford Motor Company, Dearborn, Michigan, July 14, 2004.

P3. "Fuel Cell Control for Automotive Applications: Computational and Real-Time Perspectives" National Instrument/ ACTC Automotive Workshop, Dearborn, Michigan, February 7, 2005.

P2. "Power and Constraint Management in Fuel Cells" The Wilson Center for Research and Technology", Xerox Corporation, Webster, New York, March 24, 2005.

P1. "Coordination of Propulsion Systems in Vehicles" General Motors Research Lab, Warren, Michigan, April 1, 2005.

SPONSORED RESEARCH

S17. "Advancing Platooning with Advanced Driver Assisted Systems," US Department of Energy, Clemson PI (100%) $364,393 (Led by Cummins Inc, Total Federal Funding: $2,500,000) Duration: 3 years. [Award announced 9/5/2018]

S16. "Boosting Energy Efficiency of Heterogeneous Connected Automated Vehicle (CAV) Fleets via Anticipative and Cooperative Vehicle Guidance," US Department of Energy, PI (40%) $1,343,193 (9/1/2017-8/31/2019). [More Info]

S15. "Data-Enabled Statistical Prediction of Surrounding Traffic for Automated Driving, " BMW, PI (100%), $50,000, (1/1/2018-12/31/2018)

S14. "Improving Energy Efficiency and Mobility of Connected Fleets via Route Preview and Cooperative Control" US Army TACOM, PI (100%), $270,747 (7/1/2015-6/30/2018)

S13. "Increased Mobility and Energy Efficiency Enabled by Vehicle to Vehicle and Vehicle to Infrastructure Connectivity" BMW, PI (100%), $133,473, (1/1/2015-12/31/2016)

S12. "Understanding Human Muscle Fatigue Dynamics During Prolonged Exertions" Clemson University Internal Grant, PI (50%, With G. Mocko), $15,000, (3/1/2014-2/28/2015)

S11. "Estimation and Prediction of the State of Traffic Signals" BMW, PI (100%), $215,873, (1/1/2011-12/31/2014)

S10. "Ultracapacitor Energy Storage for Improving Fuel Economy and Extending Battery Life in Heavy Vehicles" US Army TACOM, PI (100%), $257,885 (6/1/2011-6/30/2015)

S9. "Predictive Energy Management in Smart Vehicles: Exploiting Traffic and Terrain Preview for Fuel Saving" National Science Foundation (CMMI-0928533), PI (100%), $260,000, (8/1/2009-7/31/2013)

S8. "Utilizing 3D Aerial Terrain Maps for Improving Energy Management of Hybrid Vehicles" US Army TACOM, PI (55%), $84,000 (8/15/2008-8/15/2010)

S7. "Ultracapacitors for Power Boost in Vehicles", US Army TACOM, PI (48%), $80,000 (8/15/2008-8/15/2010)

S6. "Ford URP: Optimization-based Control for Advanced Hybrid Powertrain System" Ford Motor Company, PI (100%), $120,000, (3/1/2007 - 3/1/2010)

S5. "Online Parameter Estimation for Advanced Control of Heavy Vehicles" Eaton Corporation Research Lab, PI (100%), $80,787 (4/1/2007-7/30/2008)

S4. "Quantifying the Potentials of 3D Road Maps for Improving the Energy Management of Hybrid Electric Vehicles" Intermap Technologies, PI (100%), $59,850 (9/1/2007-8/31/2009)

S3. "Multi-core Computing for Implementation of Advanced Engine Control Algorithms" General Motors Research Lab, co-PI (50%), $43,788, (5/1/2007-11/1/2007)

S2. "Next-Generation Actuation Technologies in Vehicle Control" BMW, PI (100 %), $25,587, (9/1/2006-12/31/2006)

S1. "Ultracapacitors for Power Boost in ICE Vehicles: System Integration, Supervisory Control Design, and Hardware-in-the-loop Experiments" Ford Motor Company, PI (50%), $25,000, (9/1/2006-5/31/2007)

STUDENT ADVISING

<u>Current Graduate and Postdoctoral Advisees</u>

      1. Dr. Alireza Fayazi (Postdoc) Research: "Connected and Automated Vehicle Guidance" (Since January 2017)

      2. Shahab Karimi (Ph.D.) Research: "Autonomous Off-Road Vehicles," (Since July 2016)

      3. Austin Dollar (Ph.D.) Research: "Energy Efficient Autonomous Vehicles" (Since September 2016)

      4. Faraz Ashtiani (Ph.D.) Research: "Modeling Dynamics of Muscle Fatigue and Recovery," (Since January 2016)

      5. Tyler Ard (Ph.D.) Research: "Impact of Connected and Automated Vehicles on Traffic," (January 2018)

<u>Past Graduate Students</u>

      1. Alireza Fayazi (Ph.D.) Dissertation: "Connected Vehicles At Signalized Intersections: Arterial Eco-Driving And Traffic Signal Optimization" (August 2011-December 2016). *Finalist and Third Prize:* 2017 Best Dissertation Award from IEEE Intelligent Transportation Systems Society.

      2. Yasha Parvini, (Ph.D.) Dissertation: "Modeling, Hybridization, and Optimal Charging of Electrical Energy Storage Systems" (May 2011-August 2016), Now: Assistant Professor at University of Detroit, Mercy.

      3. Nianfeng Wan (Ph.D.) Dissertation: "Estimation and Control of Traffic Relying on Vehicular Connectivity" (August 11- May 16) Now at: IAV Automotive, California.

      4. Judhajit Roy (Ph.D. co-advised with Harry Law) Dissertation: "Design of Cab Suspensions and Semi-active Seat Damping Control Strategies for Tractor Semi-Trailers" Now at: Ford Motor Company

      5. Grant Mahler, (Ph.D.) Dissertation: "Enhancing Energy Efficiency in Connected Vehicles Via Access to Traffic Signal Information" (September 09-November 13) Now at: BMW Technology Office, California.

      6. Hosseinali Borhan, (Ph.D.) Dissertation: "Optimization-Based Power Management Of Hybrid Power Systems With Applications In Advanced Hybrid Electric Vehicles And Wind Farms," (January 07-July 2011), Now at: Cummins.

      7. Chen Zhang, (Ph.D.) Dissertation: "Predictive Energy Management In Connected Vehicles: Utilizing Route Information Preview For Energy Saving," (September 07-December 2010), Now at: Ford Motor Company.

      8. Angshuman Goswami (M. Sc.) Thesis: "Hierarchical Off-Road Path Planning and Technologies for Its Validation Using a Scaled Autonomous Car," (Sep. 2015-December 2017)

      9. Lei Fan, (M.Sc.) Research Project: "Strategizing The Energy Management Of An Experimental Electric Bicycle" (Sep. 2010-May 2011)

      10. Seneca Schepmann, (M.Sc.) Thesis: "Ultracapacitor Heavy Hybrid Vehicle: Model Predictive Control Using Future Information to Improve Fuel Consumption" (Aug. 2009-Aug. 2010) Now at: Proterra Electric Bus Company.

      11. Behrang Asadi, (M.Sc.) Thesis: "Predictive Energy Management In Smart Vehicles: Exploiting Traffic And Traffic Signal Preview For Fuel Saving" (August 2007-August 2009) Now at: Head of Advanced Analytics at Danaher Corporation.

12. Wesley Greenwell, (M.Sc.) Thesis: "Real-Time Power Management of A Fuel Cell/Ultracapacitor Hybrid" (July 06 - May 08) Hired by: Michelin USA.

13. Dean Rotenberg, (M.Sc.) Thesis: "Ultracapacitor Assisted Powertrains: Modeling, Control, Sizing, and The Impact on Fuel Economy" (September 06 - July 08) Hired by: Department of Defense- Aberdeen Proving Ground.

14. Saurabh Keni, (M.Sc. co-advised with Mohammed Daqaq) Thesis: "Stability Analysis and Decentralized Control of Coupled Oscillators with Feedback Delays" (September 06 - July 08) Hired by: Caterpillar.

15. Tejas Ghotikar, (M.Sc.) Thesis: "Estimation Of Vehicle Mass And Road Grade" (September 06 - July 08) Hired by: Caterpillar.

16. Aditya Bhandari, (M.Sc.) Research Project: "Dynamic Programming For Energy Optimization Of Ultracapacitor Hybrids" (September 06 - July 08) Hired by: Caterpillar.

17. Wolfgang Schmittinger, (M.Sc.) Research Project: "A Survey Of Conditions Influencing A PEM Fuel Cell Life" (September 05 - May 07) Hired by: Husky, Luxemburg.

Undergraduate Student Advising

1. David Gundana, "Optimal Lane Selection for Autonomous Vehicles," (Fall 2017-Spring2018)

2. Stefan Topper, "Control of a platoon of connected cars for improved mobility" (Spring 2016)

3. Hannah Willingham, "Comparative study of muscle fatigue models" (Spring 2016)

4. David Geyer, "Creating a scaled autonomous vehicle: software implementation"(Spring 2016)

5. Matthew Chicky, "Creating a scaled autonomous vehicle: hardware assembly" (Spring 2016)

6. Robert Hanlin, "Validation of a human muscle fatigue model based on electromyography" (Spring 2014)

7. Stephen Lucich, "Modeling muscle fatigue dynamics in cycling" (Spring 12-Summer 12)

8. Zack O'Brien (Honor College), "Adopting an iPhone as wireless control module of an electric bicycle", (2009-2010)

9. Justin Elgin, "Adopting an iPhone as wireless control module of an electric bicycle", (Fall 09)

10. Glenn Milner (Honor College), "Energy harvesting wireless mouse" (Spring 09-Fall 10)

11. Eric Fenimore, "Energy harvesting wireless mouse" (Spring 09)

12. Lance Clark, "Detection of human vital signs via wireless sensors with application in an electric bicycle haptics" (Spring 09)

13. Erica Nasto, "Integration of rider's heart rate in an electric bicycle's control system" (Fall 08 and Spring 09)

14. Seneca Schepmann, (Honor College), "Development of an energy recuperation mechanism for an electric bicycle" (Fall 07 and Spring 08)

15. Carl Eichel, "Development and performance verification of an ultracapacitor hybrid bicycle" (Spring 07 and Fall 08)

16. Maria Koon, "Onboard control algorithms for a hybrid ultracapacitor bicycle" (Spring 07)

17. Tim Stoval, "Development and performance verification of an ultracapacitor hybrid bicycle" (Spring 07)

18. Amir Matlock, "Survey of actuation mechanisms for control of lightweight structures" (Fall 06)

SERVICE

Committees and Memberships
- Associate Editor, IEEE Transactions of Control Systems Technology, 2019-2022
- Associate Editor, Journal of Dynamic Systems, Measurement, and Control, 2015-2018
- Vice Chair, Invited Sessions, 2020 American Control Conference
- Vice Chair, Student Programs, 2016 American Control Conference
- Member, ASME Executive Committee (treasurer) (2012-2015)
- Program Committee and Associate Editor: 2011-2015 American Control Conference
- Associate Editor: 2009-2011 ASME Dynamic Systems and Control Conference
- Member, American Society of Mechanical Engineers, ASME, (2001-)
- Member, Institute of Electrical and Electronics Engineers, IEEE, (2007-)
- IEEE Technical Committee on Smart Cities (TCSC) (2015-)
- IEEE Technical Committee on Automotive Controls (TCAC), (2005-)
- ASME Technical Committee on Automotive and Transportation Systems (ATS), (2005-)

Proposal Reviews
- Ontario Research Fund, Government of Ontario, Canada - May 2016
- National Science Foundation Panel Reviewer – CMMI – Jun. 2015
- National Science Foundation Panel Reviewer - CMMI – Jun. 2010
- National Science Foundation Panel Reviewer - CMMI – Nov. 2008
- Natural Sciences and Engineering Research Council of Canada Reviewer – Oct. 2009
- U.S. Army Research Office – Feb. 2010.

TEACHING

Course Number	Course Title	G/UG	Credits	Semester	Number of Students	Review (out of 5)
ME305	Modeling and Analysis of Dynamics Systems	UG	3	F05	27	4.6
				S06	36	4.7
				F07	45	4.3
				F08	35	4.0
				F16	41	4.6
				F17	46	4.2

				F06	26	4.5
ME416	Control of Mechanical Systems	UG	3	F07	15	3.8
ME403	Control and Integration of Dynamic Systems	UG	3	S09	28	4.3
				F10	41	4.2
				S10	27	4.6
				F13	50	4.3
				S14	38	4.3
				F14	87	4.0
				F15	72	4.1
ME616	Control of Mechanical Systems	G	3	F06	29	4.9
				F07	22	4.8
ME820	Modern Control (Linear Systems)	G	3	S07	32	4.4
				S08	22	4.7
				S09	30	4.6
				S10	35	4.6
				S11	13	4.6
				S12	33	4.7
				S16	23	4.4
				S17	49	4.6
				S18	26	4.6
ME823	Control of Mechanical Systems	G	3	F09	20	4.6
				F10	21	4.7
				F11	34	4.8
ME893	Optimal Control	G	3	F09	19	4.5
				S12	13	5.0
				F14	21	4.9
				F16	14	4.9
ME893	Advanced Estimation	G	3	F13	26	4.7
				S15	13	4.7