MAHDI SHAHBAKHTI

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Academic Appointments

Michigan Tech. University: Associate Professor (2017-), Assistant Professor (2012-2017), USA
Director of Energy Mechatronics Lab (EML), Co-adviser of Alternative Energy Enterprise

- Research interests: Energy Mechatronics, Low Temperature Combustion Engines, Hybrid Electric Vehicles, Connected and Automated Vehicles, Renewable Energy, Climate Controls, Building-Power Grid Integration

University of California Berkeley: Post-doctoral Scholar, 2010 – 2012, USA
Supervisor: Prof. J. Karl Hedrick, Mech. Eng. Dept., Vehicle Dynamics and Control Laboratory
Projects with *Toyota Motor Company*:

- Developing easily verifiable methodology for design process of automotive powertrain controllers
- Techniques of model order reduction for control of automotive systems

University of Alberta: Instructor and Research Scholar, 2009, Canada

- Teaching a graduate course on combustion engines and alternative fuels; Research on HCCI engine controls

Education

Ph.D. in Mechanical Engineering, University of Alberta, Edmonton, Canada, 2004 - 2009
Thesis: Modeling and Experimental Study of an HCCI Engine for Combustion Timing Control
Advisor: Prof. Bob Koch

M.Sc. in Mechanical Engineering *(Summa Cum Laude)*, KNT University of Tech., Tehran, Iran, 2000 - 2003
Thesis: Dynamic Modeling of MPFI Engines for AFR Control during Cold Start and Warm up Conditions and Investigation of Factors Influencing Mixture Preparation and Pollutant Formation in these Conditions

B.Sc. in Mechanical Engineering *(Summa Cum Laude)*, KNT University of Tech., Tehran, Iran, 1996 - 2000
Thesis: Design of Feeding Mechanism of Metal Rod and Inert Gas for a MIG Welding Robot

Industry Experience

R&D Engineer, IPCO, Tehran, Iran, Mar. 2001 – Aug. 2004
Iran Khodro Powertrain Company (www.ip-co.com), the largest powertrain manufacturer in the Middle East

- Dynamic modeling of gasoline engines and longitudinal vehicle dynamics
- Calibration of engines and design of control strategies for CNG-gasoline engine control units
- On-vehicle testing of powertrain controllers
- Benchmarking of Peugeot 206 engine - a mutual project with FEV® carried out in Aachen, Germany

R&D Engineer (Part time), Advanced Robotics Automatic Systems (ARAS), Tehran, Iran, 2000 - 2001

- Controller sensitivity analysis of a MIG welder robot for welding of typical boiler conjunctions used in Azarab Boiler Manufacturing Industries

Intern (Part time), Yekta Tahvieh Arvand Air Conditioning Industries, Iran, 1998 - 2000

- Design a novel control test bench to simulate real operation of air-conditioning chillers

Selected Awards

Research/Academic

- Best Student Paper Award Finalists (top 6 papers), selected *three times* in 2012, 2013, 2016 ASME Dynamic System Control (DSC) Conferences, USA. Submissions to these conferences ranged from 233 to 406 papers.

- Best Paper Award, ASME Automotive and Transportation Systems Technical Committee – DSCC, 2015

- 2018 MARQUIS Who's Who in the World ("top 3% of the professionals in the world")

- Best Presentation in the Session, American Control Conference (ACC), 2012, 2015, 2016

- Best Presentation Award, SAE Int. Powertrain, Fuels & Lubricants Conference, Baltimore, MD, USA, 2016

- Research Excellence Fund, Michigan Tech University, 2013, 2014

- Best Paper Award, ASME Automotive and Transportation Systems Technical Committee – DSCC, 2012

- Canada NSERC (Natural Science and Engineering Research Council) Postdoctoral Fellowship, 2010 - 2012

- Andrew Stewart Memorial Graduate Prize, University of Alberta, 2009

- Prairie Mines & Royalty Ltd. Scholarship in Environments Engineering, University of Alberta, 2008

- THECIS - Ingenuity Scholarship, THECIS (The Center for Innovation Studies), Canada, 2008

- Queen Elizabeth II Graduate Scholarship - Doctoral Level, University of Alberta, 2008

- Lehigh Inland Cement Graduate Scholarship in Environmental Studies, University of Alberta, 2007

- Winning Team (first prize) of a Total of 66 Research Teams from 26 Canadian Universities, Canada Automotive21 High Qualified Personnel Competition, Windsor, Canada, June 11-13, 2007

- Chevron Graduate Scholarship in Natural Gas Engineering, University of Alberta, 2005

- Best Paper Award in 3rd International Conference on Internal Combustion Engines, Tehran, Iran, 2004

- Summa Cum Laude (ranked first among graduates) in both MSc Mech Eng – Powertrain (2003) and BSc Mech Eng – Thermofluids (2000), K. N. Toosi University of Technology, Tehran, Iran.
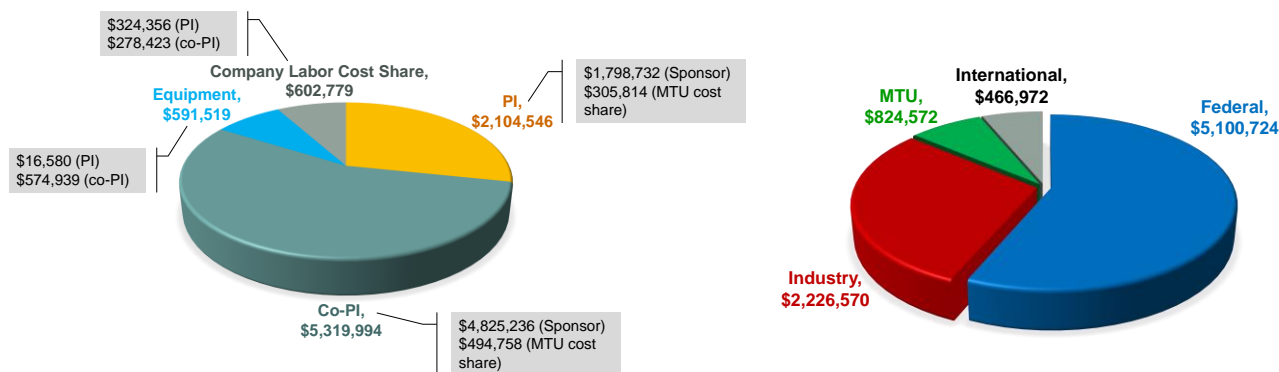

Teaching

- SAE Ralph R. Teetor Educational Award, 2016

- Provost's List, Top 10% instructors among over 1050 evaluated sections/instructors university-wide, Michigan Tech University, Selected *four times* in Fall 2015, Fall 2016, Fall 2017, Spring 2018

- Zita and John Rosen Teaching Excellence Award for Principal Instructor, University of Alberta, 2009
  Only one award across the university is granted annually to give special recognition to a graduate student principal instructor who is an especially skilled and dedicated teacher.

Leadership and Service

- Province of Alberta Graduate Citizenship Award for Student Leadership, Canada, 2009

- Award for Outstanding Contribution for "Most Youth Reached" in National Let's Talk Science Program, Canada, 2007-2008

- Alan Wharmby Memorial Graduate Award in Mechanical Engineering, University of Alberta, 2008

Grants/Funding

Pie chart 1 labels:
- $324,356 (PI) $278,423 (co-PI)
- Company Labor Cost Share, $602,779
- Equipment, $591,519
- $16,580 (PI) $574,939 (co-PI)
- PI, $2,104,546
- $1,798,732 (Sponsor) $305,814 (MTU cost share)
- Co-PI, $5,319,994
- $4,825,236 (Sponsor) $494,758 (MTU cost share)

Pie chart 2 labels:
- MTU, $824,572
- International, $466,972
- Federal, $5,100,724
- Industry, $2,226,570

Awarded

26- J. Naber, Y. Ra, S.-Y. Lee, M. Shahbakhti (co-PI), J. Worm, " Co-optimized PPCI-SI Engine System Demonstrator to Improve Fuel Economy while Meeting LEV III Emissions ", $1,161,130 including $899,372 from US Department of Energy and $261,758 MTU cost share, 2019 – 2021.

25- M. Shahbakhti (lead PI), J. Naber, J. Mohammadpour (Univ. of Georgia), A. Borhan (Cummins Inc.), " GOALI: Collaborative Research: Control-oriented Modeling and Predictive Control of High Efficiency Low-Emission Natural Gas Engines ", $561,422 including $499,976 from US National Science Foundation and $61,446 MTU, 2018 – 2021.

24- A. Barnard, M. Shahbakhti (co-PI), " Application of Carbon Nanotubes (CNT) for Heating Aftertreatment Systems in Vehicles ", $18,525, Faurecia Company, 2018.

23- M. Shahbakhti (PI), D. Robinette J. Blough, " Improved Driveline Torque Shaping: Controls and Calibration ", $240,964 including $200,000 from Ford Motor Company and $40,964 MTU cost share, 2018 – 2020.

22- J. Naber, M. Shahbakhti (co-PI), C. Morgan, " Development, Validation, and Integration Support for a Hardware-In-the-Loop (HIL) VD&PT Vehicle Model ", $59,600, Hitachi America Ltd., 2018.

21- D. Robinette J. Blough, M. Shahbakhti (co-PI), " Improved Clunk Parameterization and Rig Development ", $240,964 including $200,000 from Ford Motor Company and $40,964 MTU cost share, 2018 – 2020.

20- J. Naber, M. Shahbakhti (co-PI), " High Engine Speed Cranking and Individual Combustion Control for Reduced Cold Start Emissions ", $240,964 including $200,000 from Ford Motor Company and $40,964 MTU cost share, 2018 – 2020.

19- M. Shahbakhti (PI), D. Robinette, J. Blough, " Driveline Torque Modeling and Estimation for Anti Jerk Control ", Ford Motor Company, $24,770, 2017 – 2018.

18- M. Shahbakhti (PI), R. Robinett, " Micro Concentrated Solar Power (CSP) Contribution on the Management of an Electrical Grid Including Renewable Energy Sources ", Mohammadia School of Engineering via Morocco's Institut de Recherche en Energie Solaire et an Energies Nouvelles (IRESEN), $17,616, 2017 – 2018.

17- J. Naber, D. Robinette, M. Shahbakhti (co-PI), K. Zhang, B. Chen, G. Cesiel (GM), " NEXTCAR: Connected and Automated Control for Vehicle Dynamics and Powertrain Operation on a Light-Duty Multi-Mode Hybrid Electric Vehicle ", US Energy Department's Advanced Research Projects Agency-Energy (ARPA-E), $3,505,824 including $2,801,390 from DOE, $553,362 GM cost share, $151,072 MTU cost share, 2017 – 2020.

16- J. Naber, J. Blough, B. Chen, M. Shahbakhti (co-PI), " Sensor Evaluation and Fusion for Closed Loop Combustion Control for SI Engines ", Ford Motor Company, $165,000, 2016 – 2017.

15- M. Shahbakhti (PI), J. Naber, S. Munshi (Westport Innovations Inc. - Canada), " High BMEP and High Efficiency Micro-Pilot Ignition Natural Gas Engine ", $1,224,356 including $600,000 from US Department of Energy, $125,000 from Westport cash to MTU, $175,000 MTU cost share, and $324,356 Westport in-

kind cost share, 2016 – 2019. [Naber has been selected as the intermedium PI until Shahbakhti is approved by DOE since the final award included requirement for foreign national approval.]

14- M. Shahbakhti (lead PI), K. Hedrick (UC Berkeley), K. Butts (Toyota), " GOALI: Collaborative Research: Easily Verifiable Controller Design ", $328,390 including $28,404 MTU cost share, NSF, 2014 – 2017.

13- J. Naber, M. Shahbakhti (co-PI), P. Dice, " Investigation of Ignition Performance of Hitachi Coils for PFI Natural Gas Fueled Engine on a Single Cylinder, Boosted, Spark Ignition Engine ", $42,500, Hitachi North America, Feb. 2016 – Aug. 2016.

14- M. Shahbakhti (PI), " FPGA Software for Real-Time Powertrain Control Research and Education ", Xilinx® Design Software Tool, $1,099.00, Xilinx Inc., Mar. 2016.

11- J. Naber, S.Y. Lee, M. Shahbakhti (co-PI), " Continuation of Engine Ignition Studies ", $115,000, Ford Motor Company, 2015-2016.

10- J. Naber, M. Shahbakhti (co-PI), " Injector Evaluation and Characterization on Mahle Optical Single Cylinder DI SI Engine ", $63,477, Nostrum Motors, 2015.

9- M. Shahbakhti (PI), R. Berkey, " Advancing Vehicle Education and Research through HIL Simulator and Student Competition Vehicle Support ", $25,000, Denso North America, 2014-2015.

8- J. Naber, S.Y. Lee, M. Shahbakhti (co-PI), " Continuation of Ignition Studies ", $115,000, Ford Motor Company, 2014-2015.

7- M. Shahbakhti (PI), " NI-based Automotive Hardware-in-the-Loop Setup Research", National Instruments, equipment $4,381, 2015.

6- M. Shahbakhti (PI), " Optimal, Energy-Efficient Solutions for Integration of Buildings and Smart Grids ", $15,000, Michigan Tech Research Excellence Fund, 2014-2015.

5- M. Shahbakhti (PI), " Research on Li-ion Battery in Hybrid Electric Powertrain Test Cell ", LG Chem Power Inc., equipment $11,100, 2013.

4- J. Naber, S.Y. Lee, M. Shahbakhti (co-PI), " Ignition Studies ", $95,752, Ford Motor Company, 2013-2014.

3- J. Naber, M. Shahbakhti (co-PI), " Optical Engine for Detailed Combustion Research ", equipment with value over $300,000, Mahle Powertrain North America, 2013.

2- M. Shahbakhti (PI), " REF-MG: Mentoring in Advanced Powertrain Control ", $9,000, Michigan Tech Research Excellence Fund, 2013-2014.

1- J. Worm, J. Naber, M. Shahbakhti (co-PI), 4-day course on " Torque-based Control of SI Engines ", $32,003, DENSO North America Inc., Feb. 2013.

Publications (students under Shahbakhti's supervision/mentorship are indicated by "*")

Selected Peer Reviewed Journal Papers

56- A. Raut*, B. Irdmousa*, M. Shahbakhti, " Dynamic Modeling and Model Predictive Control of an RCCI Engine ", *Control Engineering Practice*, Vol. 81, Pages 129-144, 2018.

55- E. Ansari*, M. Shahbakhti, J. Naber, " Optimization of Performance and Operational Cost for a Dual Mode Diesel-Natural Gas RCCI and Diesel Combustion Engine ", *Applied Energy*, Vol. 231, Pages 549-561, 2018.

54- M. Bidarvatan*, M. Shahbakhti, " Analysis and Control of Torque Split in Hybrid Electric Vehicles by Incorporating Powertrain Dynamics ", *ASME Journal of Dynamic Systems, Measurement, Control*, Vol. 140, Issue 11, No. 111009-111009-11, 2018.

53- M. Amini*, M. Shahbakhti, S. Pan, " Adaptive Discrete Second Order Sliding Mode Control with Application to Nonlinear Automotive Systems ", *ASME Journal of Dynamic Systems, Measurement, Control*, Vol. 140, Issue 12, No. 121010-121010-12, 2018.

52- B. M. Mahadevan*, J. Johnson, M. Shahbakhti, " Development of a Kalman Filter Estimator for Simulation and Control of Particulate Matter Distribution of a Diesel Catalyzed Particulate Filter ", *International Journal of Engine Research*, 19 pages, DOI: 10.1177/1468087418785855, 2018.

51- M. Razmara*, G. Bharati, M. Shahbakhti, S. Paudyal, R. Robinett, " Bilevel Optimization Framework for

Smart Building-to-Grid Systems ", *IEEE Transactions on Smart Grid*, Vo. 9, No. 2, Pages 582-593, 2018.

50- A. Solouk*, M. Shakiba, J. Arora*, M. Shahbakhti, " Fuel Consumption Assessment of an Electrified Powertrain with a Multi-Mode High-Efficiency Engine in Various Levels of Hybridization ", *Energy Conversion and Management*, Vol. 155, Pages 100-115, 2018.

49- A. Rezaei*, J. B. Burl, A. Solouk*, B. Zhou, M. Rezaei, M. Shahbakhti, " Catch Energy Saving Opportunity (CESO), an Instantaneous Optimal Energy Management Strategy for Series Hybrid Electric Vehicles ", *Applied Energy*, Vol. 208, pages 655-665, 2017.

48- A. Solouk*, J. Tripp*, M. Shakiba, M. Shahbakhti, " Fuel Consumption Assessment of a Multi-Mode Low Temperature Combustion Engine as Range Extender for an Electric Vehicle ", *Energy Conversion and Management*, Vol. 148, pages 1478–1496, 2017.

47- M. Razmara*, G. R. Bharati, D. Hanover*, M. Shahbakhti, S. Paudyal, R.D. Robinett III, " Building-to-grid Predictive Power Flow Control for Demand Response and Demand Flexibility Programs ", *Applied Energy*, Vol. 203, pages 128-141, 2017.

46- K. Poorghasemi, R. Khoshbakhti Saray, E. Ansari*, B. Khoshbakht*, M. Shahbakhti, J. D. Naber, " Effect of Diesel Injection Strategies on Natural Gas/Diesel Combustion Characteristics in a Light Duty Diesel Engine ", *Applied Energy*, Vol. 199, pages 430-446, 2017.

45- B. Bahri, M. Shahbakhti, A.A. Aziz, " Real-time Modeling of Ringing in HCCI Engines using Artificial Neural Networks ", *Energy*, Vol. 125, pages 509-518, 2017.

44- M. Fathi, O. Jahanian, M. Shahbakhti, " Modeling and Controller Design Architecture for Cycle-by-Cycle Combustion Control of Homogeneous Charge Compression Ignition (HCCI) Engines - A Comprehensive Review ", *Energy Conversion and Management*, Vol. 139, pages 1-19, 2017.

43- M. R. Amini*, M. Shahbakhti, S. Pan, J. K. Hedrick, " Bridging the Gap Between Designed and Implemented Controllers via Adaptive Robust Discrete Sliding Control ", *Control Engineering Practice*, Vol. 59, pages 1-15, 2017.

42- A. Solouk*, M. Shakiba, M. Shahbakhti, " Analysis and Control of a Torque Blended Hybrid Electric Powertrain with a Multi-Mode LTC-SI Engine ", *SAE Int. J. of Alternative Powertrains*, 15 pages, 6(1):2017, DOI:10.4271/2017-01-1153, 2017.

41- M. R. Amini*, M. Razmara*, M. Shahbakhti, " Robust Model-Based Discrete Sliding Mode Control of an Automotive Electronic Throttle Body ", *SAE Int. J. of Commercial Vehicles*, 15 pages, 10(1):2017, DOI:10.4271/2017-01-0598, 2017.

40- Y. Wang*, J. Zhang*, X. Wang*, P. Dice, M. Shahbakhti, J. Naber, M. Czekala, Q. Qu, G. Huberts,   " Investigation of Impacts of Spark Plug Orientation on Early Flame Development and Combustion in a DI Optical Engine ", *SAE Int. J. Engines*, 17 pages, 10(3):2017, DOI:10.4271/2017-01-0680, 2017.

39- A. Solouk*, M. Shahbakhti, " Modeling and Energy Management of an HCCI based Powertrain for Series Hybrid and Extended Range Electric Vehicles ", *Int. J. of Powertrains*, Vol. 6, Issue 3, pages 226-258, 2017.

38- B. M. Singalandapuram*, J. H. Johnson and M. Shahbakhti, " Predicting Pressure Drop, Temperature and Particulate Matter Distribution of a Catalyzed Diesel Particulate Filter using a Multi-zone Model including Cake Permeability ", *Emission Control Science & Technology*, Vol. 3, Issue 2, pages 171-201, 2017.

37- A. Solouk*, M. Shahbakhti, " Energy Optimization and Fuel Economy Investigation of Series Hybrid Electric Vehicle Integrated with Diesel/RCCI Engines ", *Energies*, 9(12), pages 1-23, 1020; 2016.

36- M. Razmara*, M. Bidarvatan*, M. Shahbakhti, R. Robinett III, " Optimal Exergy-based Control of Internal Combustion Engines ", *Applied Energy*, Vol. 183, pages 1389-1403, 2016.

35- B. Bahri, M. Shahbakhti, K. Kannan*, A.A. Aziz, " Identification of Ringing Operation for Low Temperature Combustion Engines ", *Applied Energy*, Vol. 171, pages 142-152, Jun. 2016.

34- M.R. Nazemi* and M. Shahbakhti, " Modeling and Analysis of Fuel Injection Parameters for Combustion and Performance of an RCCI Engine ", *Applied Energy*, Vol. 165, pages 135-150, Mar. 2016.

33- K. Khodadadi Sadabadi*, M. Shahbakhti, A. N. Bharath and R. D. Reitz, " Modeling of Combustion Phasing of a Reactivity-Controlled Compression Ignition Engine for Control Applications ", *Int. J. of Engine Research*, Vol. 17, Issue 4, Pages 421-435, 2016.

32- M. Razmara*, M. Maasoumy, M. Shahbakhti, and R. D. Robinett III, " Optimal Exergy Control of Building HVAC System ", *Applied Energy*, Vol. 156, pages 555-565, Oct. 2015.

31- B. M. Singalandapuram*, J. H. Johnson and M. Shahbakhti, " Experimental and Simulation Analysis of Temperature and Particulate Matter Distribution for a Catalyzed Diesel Particulate Filter ", *Emission Control Science & Technology*, Vol. 1, Issue 4, Pages 255-283, Oct. 2015.

30- M. Boudaghi*, M. Shahbakhti, S.A. Jazayeri, " Misfire Detection of SI Engines Using a New Technique Based on Mean Power Output ", *ASME J. of Engineering for Gas Turbines and Power*, 9 pages, Vol. 137, Issue 9, Sept. 2015.

29- B. M. Singalandapuram*, J. H. Johnson and M. Shahbakhti, " Development of a Catalyzed Diesel Particulate Filter Multi-zone Model for Simulation of Axial and Radial Substrate Temperature and Particulate Matter Distribution ", *Emission Control Science & Technology*, Vol. 1, Issue 2, Pages 183-202, May 2015.

28- R. Salehi*, A. Alasty, M. Shahbakhti, G. Vossoughi, " Detection and Isolation of Faults in the Exhaust Path of Turbocharged Automotive Engines ", *Int. J. of Automotive Technology*, Vol. 16, Issue 1, Pages 127-138, Feb. 2015.

27- J. Rezaei*, M. Shahbakhti, B. Bahri, A.A. Aziz, " Performance Prediction of Oxygenate Fueled HCCI Engines using Artificial Neural Networks ", *Applied Energy*, Vol. 138, Pages 460-473, Jan. 2015.

26- M. Shahbakhti, M. R. Amini*, J. Li*, S. Asami, J. K. Hedrick, " Early Model-Based Design and Verification of Automotive Control System Software Implementations ", *ASME Journal of Dynamic Systems, Measurement and Control*, 14 pages, Vol. 137, Issue 2, Feb. 2015.

25- M. Bidarvatan*, V. Thakkar*, M. Shahbakhti, B. Bahri, A.A. Aziz, " Grey-box Modeling of HCCI Engines ", *Applied Thermal Engineering*, Vol. 70, Issue 1, Pages 397-409, Sept. 2014.

24- M. Maasoumy, M. Razmara*, M. Shahbakhti, A. Sangiovanni-Vincentelli, " Handling Model Uncertainty in Model Predictive Control for Energy Efficient Buildings ", *Energy and Buildings*, Vol. 77, Pages 377-392, Jul. 2014.

23- M. Amini*, M. Shahbakhti, A. Ghaffari, " A Novel Singular Perturbation Technique for Model-Based Control of Cold Start Hydrocarbon Emission ", *SAE Int. J. Engines*, 13 pages, Vol. 7, Issue 3, Aug. 2014.

22- M. Bidarvatan*, M. Shahbakhti, " Integrated HCCI Engine Control based on a Performance Index ", *ASME J. of Engineering for Gas Turbines and Power*, 12 pages, Vol. 136, Issue 10, Oct. 2014.

21- M. Bidarvatan*, M. Shahbakhti, " Grey-Box Modeling for Performance Control of an HCCI Engine with Blended Fuels ", *ASME J. of Engineering for Gas Turbines and Power*, 10 pages, Vol. 136, Issue 10, Oct. 2014.

20- R. Salehi*, M. Shahbakhti, J. K. Hedrick, " Real-time Hybrid Switching Control of Automotive Cold Start Hydrocarbon Emission ", *ASME J. of Dynamic Systems, Measurement and Control*, 11 pages, Vol. 136, Issue 4, Jul. 2014.

19- M. Bidarvatan*, M. Shahbakhti, S. A. Jazayeri, C. R. Koch, " Cycle-to-Cycle Modeling and Sliding Mode Control of Blended-Fuel HCCI Engine ", *J. of Control Engineering Practice*, Vol. 24, Pages 79-91, Mar. 2014.

18- M. Koochack, A. Gharehghani, M. Shahbakhti, " Experimental and Simulation Study of In-cylinder Strategies for Regeneration of Lean NOx Traps in an HSDI Diesel Engine ", *IMechE Part D: J. of Automobile Engineering*, Vol. 227, Issue 12, Pages 1661-1673, Dec. 2013.

17- B. Bahri*, A. A. Aziz, M. Shahbakhti, M. F. Muhamad Said, " Analysis and Modeling of Exhaust Gas Temperature in an Ethanol Fuelled HCCI Engine ", *J. of Mechanical Science and Technology*, Vol. 27, Issue 11, Pages 3531-3539, Nov. 2013.

16- M. Dehghani*, M. Shahbakhti, C. R. Koch, S. A. Jazayeri, " Thermodynamic Control-oriented Modeling of Cycle-to-Cycle Exhaust Gas Temperature in an HCCI Engine ", *Applied Energy*, Vol. 110, Pages 236-243, Oct. 2013.

15- B. Bahri*, A. A. Aziz, M. Shahbakhti, M. F. Muhamad Said, " Understanding and Detection of Misfire in an HCCI Engine Fuelled with Ethanol ", *Applied Energy*, Vol. 108, pages 24-33, Aug. 2013.

14- M. Nazoktabar, S. A. Jazayeri, O. Jahanian, M. Shahbakhti, " Using a Single Zone Thermodynamic Model in an HCCI Engine to Predict Effective Controlling Parameters ", *J. of Engine Research*, Vol. 25, pages 13-23, 2013.

13- B. Bahri*, A. A. Aziz, M. Shahbakhti, M. F. Muhamad Said, " Misfire Detection Based on Statistical Analysis for an Ethanol Fueled HCCI Engine ", *J. of International Review of Mechanical Engineering*, Vol. 6, Issue 6, pages 1276-1282, 2012.

12- M. Bidarvatan*, M. Shahbakhti, S. A. Jazayeri, " Model-Based Control of Combustion Phasing in an HCCI Engine ", *SAE Int. J. Engines*, Vol. 5, Issue 3, pages 1163-1176, 2012.

11- M. Bidarvatan*, M. Shahbakhti, S. A. Jazayeri, " Optimal Integral State Feedback Control of HCCI Combustion Timing ", *Int. J. of Automotive Engineering*, Vol. 1, Issue 3, pages 206-217, 2011.

10- M. Shahbakhti, A. Ghazimirsaied, C. R. Koch, " Experimental Study of Exhaust Temperature Variation in an HCCI Engine "*, IMechE Part D: J. of Automobile Engineering*, Vol. 224, pages 1177-1197, 2010.

9- A. Ghazimirsaied, M. Shahbakhti, C. R. Koch, " HCCI Combustion Phasing Prediction Using a Symbol-Statistic Approach ", *ASME J. of Engineering for Gas Turbine and Power*, Vol. 132, Issue 8, 5 pages, Aug. 2010.

8- M. Shahbakhti, C. R. Koch, " Physics Based Control Oriented Model for HCCI Combustion Timing ", *ASME J. of Dynamic Systems, Measurement and Control*, Vol. 132, Issue 2, 12 pages, Mar. 2010.

7- M. Shahbakhti, S. A. Jazayeri, M. Ghafuri, A. R. Aslani, A. Sahraeian, S. Azadi, " A Method to Determine Fuel Transport Dynamic Model Parameters in Port-Fuel Injected Gasoline Engines during Cold Start and Warm-Up Conditions ", *ASME J. of Engineering for Gas Turbine and Power*, Vol. 132, Issue 7, 5 pages, Jul. 2010.

6- M. Shahbakhti, C. R. Koch, " Dynamic Modeling of HCCI Combustion Timing in Transient Fueling Operation ", *SAE Int. J. Engines*, Vol. 2, pages 1098-1113, Oct. 2009.

5- M. Shahbakhti, C. R. Koch, " Characterizing the Cyclic Variability of Ignition Timing in an HCCI Engine Fueled with n-Heptane/iso-Octane Blend Fuels ", *Int. J. of Engine Research*, Vol. 9, Issue 5, pages 361-397, Oct. 2008.

4- M. Shams Zahraei, S. A. Jazayeri, M. Shahbakhti, M. Sharifirad, " Look-Forward Longitudinal Dynamic Modeling for a Series-Parallel Hybrid Electric Vehicle ", *Int. J. of Electric and Hybrid Vehicles*, Vol. 1, Issue 4, pages 342-363, 2008.

3- P. Kirchen, M. Shahbakhti, C. R. Koch, " A Skeletal Kinetic Mechanism for PRF Combustion in HCCI Engines ", *J. of Combustion Science and Technology*, Vol. 179, Issue 6, pages 1059-1083, Jun. 2007.

2- K. Swan, M. Shahbakhti, C. R. Koch, " Predicting Start of Combustion Using a Modified Knock-Integral Method for an HCCI Engine ", *SAE 2006 Transactions J. of Engines*, pages 611-620, Mar. 2007.

1- S. Sharifi Rad, S. A. Jazayeri, M. Shahbakhti, " Automatic Driver Design and Longitudinal Dynamic Simulation for Passenger Cars ", *SAE 2006 Transactions J. of Passenger Cars - Mechanical Systems*, pages 923-930, Mar. 2007.

Submitted Journal Papers

1- V. R. Chundru, B. S. Mahadevan*, J. H. Johnson, G. G. Parker, M. Shahbakthi, " Development of a 2D Model of a SCR Catalyst on a DPF ", submitted to *Emission Control Science and Technology*, 35 pages, Aug. 2018.

2- E. Ansari*, T. Menucci, M. Shahbakhti, J. Naber, " Experimental Investigation into Effects of High Reactive Fuel on Combustion and Emission Characteristics of the Diesel - Natural Gas RCCI Engine ", 20 pages, *Applied Energy*, Nov. 2018.

Refereed Conference Papers in Proceedings

89- C. R. Reddy*, M. Toub*, M. Razmara, M. Shahbakhti, R. D. Robinett III, G. Aniba, " Modeling and Optimal Control of MicroCSP and a Building HAVC System to Minimize Electricity Cost ", 10 pages, *ASME 2018 Dynamic Systems and Control Conference*, Sep. 30 – Oct. 3, 2018, Atlanta, GA, USA.

88- H. Wang, K. Sacheva, J. Tripp*, B. Chen, D. Robinette, M. Shahbakhti, " Optimal Map-Based Mode Selection and Powertrain Control for a Multi-Mode Plug-in Hybrid Electric Vehicle ", *14th IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA)*, 6 pages, July 2-4, 2018, Oulu, Finland.

87- M. Toub*, C. R. Reddy*, M. Razmara, M. Shahbakhti, R. D. Robinett III, G. Aniba, " Model Predictive Control for MicoCSP Integration into a Building HVAC System ", *14th IEEE International Conference on Control and Automation*, 6 pages, Jun. 12-15, 2018, Anchorage, AK, USA.

86- M. Amini*, M. Shahbakhti, J. Sun, " Predictive Second Order Sliding Control of Constrained Linear Systems with Application to Automotive Control Systems ", *2018 American Control Conference*, 6 pages, June 27-29, 2018, Milwaukee, WI, USA.

85- A. Raut*, M. Bidarvatan, H. Borhan, M. Shahbakhti, " Model Predictive Control of an RCCI Engine ", 7 pages, *2018 American Control Conference*, 6 pages, June 27-29, 2018, Milwaukee, WI, USA.

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2- B. Khoshbakht Irdmousa*, S. Z. Rizvi, J. Mohammadpour Velni, J. Naber, M. Shahbakhti, " Data-driven Modeling and Predictive Control of Combustion Phasing for RCCI Engines ", 8 pages, American Control Conference, Jul. 10-12, 2019, Philadelphia, PA, USA.

3- M. Toub*, M. Shahbakhti, R. Robinett, G. Aniba, " MPC-trained ANFIS for Control of MicroCSP Integrated into a Building HVAC System ", 8 pages, American Control Conference, Jul. 10-12, 2019, Philadelphia, PA, USA.

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1- M. Mashkournia, A. Ghazimirsaied, J. Boddez, M. Shahbakhti, D. Achtymichuk, D. Handford, " Flexible Operation of HCCI Combustion Using Intelligent Control ", Canada Auto21 HQP Conference, May 26-28, 2009, Hamilton, Ontario, Canada.

2- S. Varnhagen, A. Audet, M. Shahbakhti, D. Handford, A. Ghazimirsaied, " Flexible Operation of HCCI Combustion Using Intelligent Control ", Canada Auto21 HQP Conference, Jun. 1-4, 2008, London, Ontario, Canada.

3- A. Audet, R. Lupul, M. Shahbakhti, V. Hosseini, A. Ghazimirsaied, P. Kongsereeparp, X. Yao, " Electronic Control for VVT and HCCI Combustion ", Canada Auto21 HQP Conference, Jun. 11-13, 2007, Windsor, Canada.

4- R. Chladny, R. Lupul, M. Shahbakhti, V. Hosseini, P. Kongsereeparp, Y. Gao, " Electronic Control for VVT and HCCI Combustion ", Canada Auto21 HQP Conference, May 15-17, 2006, Barrie, Canada.

5- R. Chladny, V. Hosseini, S. Chung, K. Frank, P. Kongsereeparp, M. Shahbakhti, " Electronic Control for VVT and HCCI Combustion ", Canada Auto21 HQP Conference, May 10-12, 2005, Oshawa, Canada.

Invited Talks

23- M. Shahbakhti, " Intelligent Control of Building and Automotive Energy Systems in a Connected World ", College of Engineering Seminar Series, University of Georgia, Oct. 5, 2018, Athens, GA, USA.

22- M. Shahbakhti, " Energy Mechatronics: Enabling Smart Buildings and Building-to-Grid Operation in a Connected World ", Mechanical Engineering Department, University of Alberta, July 6, 2018, Edmonton, AB, Canada.

21- M. Shahbakhti, " Modeling and Control of Building and Automotive Energy Systems in the New Era of Connected World ", Mechanical and Aerospace (MAE) Engineering Graduate Seminar Series, MAE Department, University of California - Davis, May 17, 2018, Davis, CA, USA.

20- M. Shahbakhti, " Intelligent Control of Buildings Integrated with Renewable Solae Energy Sources ", Guest lecture at Alternative Energy Enterprise, Michigan Technological University, Mar. 27, 2018, Houghton, MI, USA.

19- M. Shahbakhti, " Control of Advanced Hybrid Electric Vehicles ", Center for Automotive Research (CAR), Ohio State University, Sep. 5, 2017, Columbus, OH, USA.

18- M. Shahbakhti, " Ultra Low CO_2 Transportation Technologies via Energy Mechatronics ", Department of Automotive, Mechanical, and Manufacturing Engineering, University of Ontario Institute of Technology, Aug. 11, 2017, Oshawa, ON, Canada.

17- M. Shahbakhti, " Physics-based Control of Energy Systems Ranging from Smart Buildings and Power Grid to Smart Hybrid Electric Vehicles ", Waterloo Institute for Sustainable Energy, WISE Lecture Series, University of Waterloo, Aug. 02, 2017, Waterloo, ON, Canada.

16- M. Shahbakhti, " Multi-Physics Modeling and Model-based Control of Energy Systems ", University of Calgary, Mechanical Engineering Department, Jun. 23, 2017, Calgary, AB, Canada.

15- M. Shahbakhti, " Advanced Engine and Powertrain Research Towards Fuel-efficient Vehicles ", VolvoCars Company, Jun. 2, 2017, Gothenburg, Sweden.

14- M. Shahbakhti, A. Solouk, " Fuel Economy Benefits of Electrified Powertrains with Advanced Combustion Engines: Mild to Strong HEV Applications ", *2017 SIA Int. Powertrain Conference*, Jun. 7, 2017, Versailles, France.

13- B. Mahadevan, J. Johnson, M. Shahbakhti, " Simulation of Temperature and Particulate Matter Distribution and Pressure Drop of a Catalyzed Diesel Particulate Filter ", Cross Cut Lean Exhaust Emissions Reduction Simulations (CLEERS) Focus Group including a number of industry, government, and academic representatives, Teleconference Presentation, Mar. 22, 2017, USA.

12- M. Shahbakhti, D. Hanover, " Modeling and Control of Smart Buildings with Renewable Integrations ", Guest lecture at Alternative Energy Enterprise, Michigan Technological University, Mar. 14, 2017, Houghton, MI, USA.

11- M. Shahbakhti, " Control and Electrification of Multi-mode Low Temperature Combustion Engines ", University of Wisconsin-Madison, Mechanical Engineering Department, Feb. 27, 2017, Madison, WI, USA.

10- A. Solouk, M. Shahbakhti, " Potential of Low Temperature Combustion (LTC) Engine Technology for Range Extender Vehicles ", *2016 SAE Range Extenders for Electric Vehicles Symposium*, Nov. 2, 2016, Knoxville, TN, USA.

9- M. Shahbakhti, " Modeling and Control of Energy Systems ", Halla Visteon Climate Control Corp. (HVCC), Apr. 21, 2015, Van Buren Township, MI, USA.

8- M. Shahbakhti, " Model-based Control of a Low Temperature Combustion (LTC) Engine ", University of Wisconsin-Madison, Engine Research Center, May 23, 2013, Madison, WI, USA.

7- M. Shahbakhti, " Model-based Control of a Low Temperature Combustion (LTC) Engine ", GM R&D, October 16, 2013, Warren, MI, USA.

6- M. Shahbakhti, " Control Challenges and Opportunities for Advanced Automotive Combustion Engine Research ", 2013 IEEE Workshop on Open Problems and Challenges in Automotive Control, June 20, 2013, Washington DC, USA.

5- M. Shahbakhti, " LTC Engines: Opportunities, Challenges, and Solutions ", Michigan Tech University, Graduate Curriculum Seminar Series, Apr. 11, 2013, Houghton, MI, USA.

4- M. Shahbakhti, " Model-based Powertrain Controller Design and Verification ", University of Alberta, Apr. 20, 2012, Edmonton, Canada.

3- M. Shahbakhti, " Early Model-based Design and Verification of Powertrain Control System ", University of California - Merced, Feb. 8, 2012, Merced, CA, USA.

2- M. Shahbakhti, " Powertrain Research Seminar ", Cranfield University, Dec. 1, 2011, Cranfield, UK.

1- M. Shahbakhti, " Powertrain Modeling for Model-based Controller Design ", McMaster University, Jul. 14, 2011, Hamilton, Canada.

Professional Service

Technical Committees

- Elected chair of ASME-Dynamic Systems & Control Division (DSCD) Energy Systems Technical Committee, 2018 – present

- Elected vice-chair of ASME-DSCD Automotive and Transportation Systems Technical Committee, 2018 – present

- Member of ASME-DSCD Mechatronic Technical Committee, 2011 – present

- Member of IEEE CSS Technical Committee on Automotive Controls, 2015 – present

- Member of SAE Technical Committee on New Engines, Components, Actuators and Sensors, 2016 – present

- Elected vice-chair (2016-2018), secretory (2014-2016), publicity chair (2012-2014), and Fuels & Combustion thrust area leader (2012-2013) in ASME-DSCD Energy Systems Technical Committee

- Elected secretory (2016-2018), lead session organizer (2014-2016) of ASME-DSCD Automotive and Transportation Systems Technical Committee

Editorships

- Associate Editor, *ASME Journal of Dynamic Systems, Measurement, and Control*, 2017 – present

- Associate Editor, *Int. Journal of Powertrains* (Inderscience Publishers), 2014 – present

- Guest Editor for Special Issue on "Vehicle Powertrain Research", *Int. Journal of Powertrains*, 2016-2017

- Guest Editor for *ASME Dynamic Systems and Control Division E-Newsletter* – Summer Issue, 2017

- Editorial Board - Associate Editor, Proceedings of 2014 American Control Conference
- Editorial Board - Associate Editor, Proceedings of 2014 ASME Dynamic Systems Control Conference

Consulting

- Law firms, Patent/IP applications, 2018 – present

Reviewing/Refereeing Activities

Funding Agencies

- Panel for US Department of Energy (DOE), Reviewer for grant proposals, 2015, 2017, 2018.
- Panel for US National Science Foundation (NSF), Reviewer for grant proposals, 2015, 2016.
- Panel for US Department of Energy (DOE) Vehicle Technologies - Fuels Technologies (FT) Program, Annual Merit Review and Peer Evaluation, Washington DC, 2013, 2014, 2018.
- Panel for MTU REF Mentoring Grant Proposals, 2014.
- Grant proposal review, Poland National Science Centre (SHENG), 2018.
- Grant proposal review, Dutch Technology Foundation STW - NWO (Netherlands), 2016.
- Grant proposal review, IdEx Bordeaux (France), 2015.
- Grant proposal review, Luxembourg National Research Fund (Germany), 2014.
- Grant proposal review, Croatian Science Foundation, 2012.
- Grant proposal review, Shota Rustaveli National Science Foundation (USA), 2012.

National Institutions

- Review of the Research Program of the US DRIVE Partnership: Fifth Report (2017), 204 pages, Available online, US National Academies of Sciences, Engineering, Medicine, 2017.

Books/eLearning

- Springer International Publishing AG, 2017.
- IEEE eLearning Course, 2018.

Journals

- Automatica (Elsevier)
- Annual Reviews in Control (Elsevier)
- Journal of Dynamic Systems, Measurement, and Control (ASME)
- Applied Energy (Elsevier)
- Journal of the Energy Institute (Elsevier)
- Mechatronics (Elsevier)
- Int. Journal of Robust and Nonlinear Control (Wiley)
- Control Engineering Practice (Elsevier)
- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Control Systems Technology
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Intelligent Vehicles

- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Transportation Electrification
- Transportation Research Part D: Transport and Environment (Elsevier)
- Journal of Mechanical Engineering Science - Proceedings of IMechE, Part C (SAGE)
- Int. Journal of Engine Research (SAGE)
- Int. Journal of Powertrains (Inderscience)
- Journal of Automobile Engineering - Proceedings of IMechE, Part D (SAGE)
- Fuel (Elsevier)
- Journal of Petroleum Gas and Engineering (Academic Journals)
- Journal of Petroleum Technology and Alternative Fuels (Academic Journals)
- Combustion Science and Technology (Taylor & Francis)
- Journal of Heat Transfer Research (BegellHouse)
- Int. Journal of Vehicle Noise and Vibration (InderScience)

Conferences

- ASME: Dynamic Systems and Control Conference (DSCC); Internal Combustion Engine Conference
- SAE: World Congress; Powertrains, Fuels & Lubricants Conference
- IEEE/IFAC: American Control Conference; IFAC World Congress; IEEE Conference on Decision and Control; European Control Conference; Multi Conference on Systems and Control; IEEE Conference on Control Technology and Applications; Int. Symposium on Advances in Automotive Control

Chair/Co-chair Technical Sessions (27)

- Co-chair of the session on " Homogenous Charge Compression Ignition – Part I ", 2018 SAE World Congress, Apr. 2018, Detroit, MI, USA.
- Co-chair of the session on " Control of Smart Buildings and Microgrids ", 2017 ASME Dynamic Systems Control Conference, Oct. 2017, Tysons Corner, VA, USA.
- Co-chair of the session on " Sliding Mode Control ", 2017 ASME Dynamic Systems Control Conference, Oct. 2017, Tysons Corner, VA, USA.
- Co-chair of the session on " Control and Energy Management of Building Systems ", 2017 American Control Conference, May 2017, Seattle, WA, USA.
- Co-chair of the session on " IC Engine Modeling and Control ", 2017 American Control Conference, May 2017, Seattle, WA, USA.
- Co-chair of the session on " Modeling, Optimization, and Control of Engine Exhaust Systems ", 2017 American Control Conference, May 2017, Seattle, WA, USA.
- Co-chair of the session on " Homogenous Charge Compression Ignition – Part I ", 2017 SAE World Congress, Apr. 2017, Detroit, MI, USA.
- Chair of the session on " Modeling and Control of Automotive Systems ", 2016 ASME Dynamic System Controls Conference, Oct. 2016, Minneapolis, MN, USA.
- Chair of the session on " Modeling and Control of Combustion Engines ", 2016 ASME Dynamic System Controls Conference, Oct. 2016, Minneapolis, MN, USA.
- Co-chair of the session on " Homogenous Charge Compression Ignition – Part I ", 2016 SAE World Congress, Apr. 2016, Detroit, MI, USA.
- Chair of the session on " Homogenous Charge Compression Ignition – Part II ", 2016 SAE World Congress, Apr. 2016, Detroit, MI, USA.

- Chair of the session on " Modeling and Control of Electric and Hybrid Vehicles ", 2015 ASME Dynamic System Controls Conference, Oct. 2015, Columbus, OH, USA.

- Chair of the session on " Estimation and Control of Advanced Internal Combustion Engines ", 2015 American Control Conference, Jul. 2015, Chicago, IL, USA.

- Co-chair of the session on " Control of Autonomous Vehicles and Connected Vehicles ", 2015 American Control Conference, Jul. 2015, Chicago, IL, USA.

- Co-Chair of the session on " Control-Oriented Modeling of Advanced Internal Combustion Engines ", 2015 American Control Conference, Jul. 2015, Chicago, IL, USA.

- Co-chair of the session on " Modeling and Control of IC Engines ", 2014 ASME Dynamic System Control Conference, Oct. 2014, San Antonio, TX, USA.

- Co-chair of the session on " Dynamic Systems Modeling for the Design and Optimization of Vehicle Systems ", 2014 ASME Dynamic System Control Conference, Oct. 2014, San Antonio, TX, USA.

- Co-chair of the session on " Energy Storage: Transportation Applications ", 2014 ASME Dynamic System Control Conference, Oct. 2014, San Antonio, TX, USA.

- Chair of the session on " Modeling and Control of Advanced IC Engine Combustion ", 2014 American Control Conference, Jun. 2014, Portland, OR, USA.

- Co-chair of the session on " Model-based Estimation for Control and Diagnosis of Automotive systems ", 2014 American Control Conference, Jun. 2014, Portland, OR, USA.

- Co-chair of the session on " Modeling and Control of Advanced Transportation Systems ", 2014 American Control Conference, Jun. 2014, Portland, OR, USA.

- Chair of the session on "Control of Advanced Combustion Engines", 2013 ASME Dynamic System Control Conference, Oct. 2013, Palo Alto, CA, USA.

- Chair of the session on "Control Design Methods for Advanced Powertrain Systems and components", 2013 ASME Dynamic System Control Conference, Oct. 2013, Palo Alto, CA, USA.

- Co-chair of the session on "Automotive Control Systems", 2013 ASME Dynamic System Control Conference, Oct. 2013, Palo Alto, CA, USA.

- Chair of the session on "Modeling and Control of Advanced Combustion Systems", 2013 American Control Conference, Jun. 2013, Washington, DC, USA.

- Chair of the session on "Modeling, Estimation, and Control of Advanced Engine Sensing and Actuation", 2013 American Control Conference, Jun. 2013, Washington, DC, USA.

- Chair of the session on "Modeling and Model-Based Control of Advanced IC Engines", 2012 ASME Dynamic Systems and Control Conference, Oct. 2012, Fort Lauderdale, FL, USA.

Organizing Technical Sessions at Conferences (> 60 sessions)

- Co-organizing a technical invited session in the area of control and energy management of building systems at 2019 American Control Conference.

- Co-organizing a technical invited session in the area of modeling, control and management of power grids at 2019 American Control Conference.

- Co-organizing a special industry session in the area of connected and autonomous vehicles at 2019 American Control Conference.

- Led and co-organized an invited session in the area of modeling and management of power and energy systems for 2018 ASME Dynamic Systems and Control Conference.

- Co-organized two technical sessions in the area of combustion engines for 2018 SAE World Congress.
- Co-organized one technical invited session in the area of control of smart buildings and microgrids for 2017 ASME Dynamic Systems and Control Conference.
- Co-organized one industry special session in the area of control research perspective in Automotive Industry for 2017 ASME Dynamic Systems and Control Conference.
- Led and co-organized eight technical invited sessions in the area of automotive systems for 2017 American Control Conference.
- Co-organized one technical invited session in the area of building energy systems for 2017 American Control Conference.
- Co-organized two technical sessions in the area of combustion engines for 2017 SAE World Congress.
- Led and co-organized three technical invited sessions in the area of Automotive and Transportation Systems for 2016 ASME Dynamic Systems and Control Conference.
- Led and co-organized five technical invited sessions in the area of automotive systems for 2016 American Control Conference.
- Co-organized two technical invited sessions in the area of building energy systems for 2016 American Control Conference.
- Co-organized two technical sessions in the powertrain area for 2016 SAE World Congress.
- Led and co-organized three technical invited sessions in division of Automotive and Transportation Systems (ATS) for 2015 ASME Dynamic Systems and Control Conference.
- Co-organized five technical invited sessions in the area of Automotive and Transportation Systems (ATS) for 2015 American Control Conference.
- Co-organized two technical sessions in the area of HCCI engines for 2015 SAE World Congress.
- Co-organized four technical invited sessions in the area of Automotive and Transportation Systems (ATS) and Energy Systems (ES) for 2014 ASME Dynamic Systems and Control Conference.
- Co-organized seven technical invited sessions in the areas of Automotive and Transportation Systems (ATS) and Energy Systems (ES) for 2014 American Control Conference.
- Co-organized six technical invited sessions in the area of Automotive and Transportation Systems (ATS) and Energy Systems (ES) for 2013 ASME Dynamic Systems and Control Conference.
- Co-organized five technical invited sessions in the areas of Automotive and Transportation Systems (ATS) and Energy Systems (ES) for 2013 American Control Conference.
- Co-organized three invited technical sessions in the area of Automotive and Transportation Systems (ATS) in 2012 ASME Dynamic Systems and Control Conference.
- Organized and coordinated a series of teaching seminars entitled " What Contributes to Successful Teaching in Engineering " in the Faculty of Engineering, University of Alberta, 2007-2008.

Conference Organizing Team

- Organizing Committee Chair, 2019 International Conference on Advanced Vehicle Powertrains, Hefei, China, Aug. 25-27, 2019.
- Member of Program Committee, 2017 ASME Dynamic Systems and Control Conference, Tysons Corner, VA, USA, Oct. 11-13, 2017.
- Organizing Committee Chair, 2017 International Conference on Advanced Vehicle Powertrains, HangZhou, China, Sep. 25-27, 2017.
- Co-chaired and coordinated 2nd Annual Mechanical Engineering Graduate Symposium, over 180 participants from 8 different departments, University of Alberta, March 6, 2008.

- Member of organizing team for Combustion Institute/Canadian Section (CI/CS) spring technical conference, Banff, Alberta, Canada, May 14-16, 2007.

Workshops

1- M. Shahbakhti, H. Fathy, workshop (including 16 invited speakers) on "Connected and Automated Vehicles (CAVs)", 2018 ASME Dynamic System and Control, Atlanta, GA, USA, Sep. 30, 2018.

2- A. Scacchioli, M. Shahbakhti, workshop (including 6 invited speakers) on "From Data to Models and Decisions in Engineering Systems", 2018 ASME Dynamic System and Control, Atlanta, GA, USA, Sep. 30, 2018.

3- M. Shahbakhti, K. Hedrick, K. Butts, half-day workshop on "Methods of Easily Verifiable Control Design", American Control Conference, Boston, MA, USA, Jul. 5, 2016.

4- J. Worm, J. Naber, M. Shahbakhti, 4-day workshop on " Torque-based Control of SI Engines ", DENSO Inc., Southfield, MI, USA, Feb. 5-8, 2013.

5- M. Shahbakhti, N. Yusefi, " Automotive Engines and Power Transmission Systems ", Let's Talk Science Workshop, Edmonton, Canada, Mar. 14, 2008.

6- M. Shahbakhti, N. Yusefi, " Vortex in Rotational Flows ", Let's Talk Science Workshop, Edmonton, Canada, Mar. 14, 2008.

7- M. Shahbakhti, " HCCI Engines and Advanced Methods to Improve Emissions of Motor Vehicles ", 81th Annual GETCA Convention (Greater Edmonton Teachers Convention), Shaw conference center, Edmonton, Canada, Mar. 1-2, 2007.

8- M. Shahbakhti, " Vehicles' Emissions ", Heritage Youth Researcher Summer (HYRS) Teachers Workshop, University of Alberta, Jul. 25-26, 2006.

9- M. Shahbakhti, " Engineering Solutions for Automotive Emissions ", HYRS Teachers Workshop, University of Alberta, Aug. 8-10, 2005.

10- M. Shahbakhti, " Methods to Reduce Emissions of Vehicles during Cold Start and Warm up Conditions ", 3rd International Conference on Internal Combustion Engines (ICICE), Tehran, Iran, Feb. 19, 2004.

Teaching/Mentoring Experience

Principal Instructor

Department of Mechanical Eng.-Eng. Mechanics, Michigan Tech. University

- MEEM 5295: *Advanced Propulsion for Hybrid Electric Vehicles*, 45 students, Spring 2018 (student evaluation: **4.74/5**)

- MEEM 2201: *Energy-Thermal-Fluids I*, 85 students, Fall 2017 (student evaluation: **4.61/5**)

- MEEM 2201: *Energy-Thermal-Fluids I*, 85 students, Fall 2016 (student evaluation: **4.66/5**)

- MEEM 5295: *Advanced Propulsion for Hybrid Electric Vehicles*, 37 students, Spring 2016

- MEEM 2201: *Energy-Thermal-Fluids I*, 96 students, Fall 2015 (student evaluation: **4.57/5**)

- MEEM 2201: *Energy-Thermal-Fluids I*, 76 students, Spring 2015 (student evaluation: **4.35/5**)

- MEEM 2200: *Thermodynamics*, Spring 2014, two sections, 85 students (student evaluation – ave. of two sections: **4.3/5**)

- MEEM 2200: *Thermodynamics*, Spring 2013, 26 students (student evaluation: **4.36/5**)

- MEEM 5990/6990 Special Topics (graduate courses):
    - *Optimal and Model Predictive Controls*, 7 students, Fall 2013
    - *Design, Instrumentation, Control of HEV-LTC Powertrain Setup*, 20 students, 2013-2016

- *Experiment and Simulation of LTC Engine in HEV Powertrain*, 4 students, Spring 2013
- *HCCI Engine Control*, 1 student, Fall 2012

Department of Mechanical Engineering, KNT University of Technology
- ME16-31: *Deign of Combustion Engines*, Winter 2010, 28 students (student evaluation: **3.61/4**)
- ME19-31: *Environmental Pollution Control*, Winter 2010, 32 students (student evaluation: **3.94/4**)

Department of Mechanical Engineering, University of Alberta
- MECE 541: *Combustion Engines and Alternative Fuels*, Fall 2008, 28 students (student evaluation: **4.7/5**)
- MECE 541: *Combustion Engines and Alternative Fuels*, Fall 2009, 50 students (student evaluation: **4.4/5**)

Teaching Assistant

Department of Mechanical Engineering, University of Alberta
- MECE 420: *Feedback Control Design of Dynamic Systems*, Winter 2005, Winter 2006
- MECE 330: *Fluid Mechanics*, Fall 2004, Fall 2005, Fall 2006, Winter 2007, Winter 2008
- MECE 541: *Combustion Engines*, Winter 2009

Teaching Professional Development

- University Teaching Program, University of Alberta, 2004 **-** 2009
  - Completed 50 hours of formal classroom training which covers a wide range of theoretical teaching topics through seminars and workshops.

Supervising/Mentoring

- **Postdoc/Research Engineer (2)**
  - Dr. H. Somaz, Postdoctoral Researcher, Experimentation and Analysis of LTC Regimes in a Light-duty Engine, Michigan Tech University, 2015 **-** 2016.
  - Dr. M. Razmara, Research Engineer co-supervised by Prof. R. Robinett, Building-to-Grid Demand Response Optimization, Michigan Tech University, 2016 **-** 2017.

- **PhD Students (24)**
  Thesis advising (15)
  - Y. Lonari, PhD thesis co-adviser (50%), Powertrain control of connected and automated vehicles (CAVs), 2018 - present.
  - P. Reddy, PhD thesis main adviser (co-adviser: Dr. Darrell Robinette), Anti jerk control of a vehicle driveline, Michigan Tech University, 2018 - present.
  - S. Batool, PhD thesis adviser, Model-based control of advanced multi-mode low temperature combustion engines, Michigan Tech University, 2018 **-** present.
  - S. Hemmati, PhD thesis adviser, Control of connected and automated hybrid electric vehicles, Michigan Tech University, 2018 **-** present.
  - C. R. Reddy, PhD thesis main adviser (co-adviser: Dr. Rush Robinett III), Modeling and control of Building-to-grid system integrated with solar CSP systems, Michigan Tech University, 2017 **-** present.

- A. A. Khameneian, PhD thesis co-adviser (50%), Cycle-by-cycle intake air charge estimation and combustion control of a turbocharged direct injection SI engine, Michigan Tech University, 2016 - present.
- B. Khoshbakht Irdmousa, PhD thesis co-adviser (50%), Modeling and control of natural gas-diesel RCCI engines, Michigan Tech University, 2016 - present.
- V. B. Vinhaes, PhD thesis co-adviser (50%), Combustion Development of a High Efficiency Diesel Micro Pilot Natural Gas Engine, Michigan Tech University, 2016 - present.
- X. Yang, PhD thesis co-adviser (50%), Experimental and Analytical Combustion Characterization of a Micro-Pilot Diesel Natural Gas Combustion Process, Michigan Tech University, 2016 - present.

Graduated (6):
- M. R. Amini, PhD thesis adviser, Easily verifiable controller design with application to automotive powertrains, Michigan Tech University, 2013 - 2017.
- A. Solouk Mofrad, PhD thesis adviser, Model-based control of hybrid electric powertrains integrated with LTC engines, Michigan Tech University, 2013 - 2017.
- B. Mahadevan, PhD thesis co-adviser (50%), Development of a Multi-Zone Catalyzed Particulate Filter Model and Kalman Filter Estimator for Simulation and Control of Particulate Matter Distribution of a CPF for Engine ECU Applications, 2014 - 2017.
- M. Razmara, PhD thesis main adviser (co-adviser: Dr. Rush Robinett III), Predictive control of power grid-connected energy systems based on energy and exergy metrics, Michigan Tech University, 2012 - 2016.
- M. Bidarvatan, PhD thesis adviser, Physics-based modeling and control of powertrain systems integrated with low temperature combustion engines, Michigan Tech University, 2012 - 2015.
- B. Bahri, PhD thesis co-adviser (30%), Investigation of HCCI engines fueled with ethanol blends, University Technology Malaysia, 2010 - 2013.

Visiting students (6)
- M. Toub, co-hosted by Prof. R. Robinett, Visiting PhD candidate from Mohammed V University in Morocco, Modeling and control of concentrated solar power (CSP) for building energy management and building-to-grid operation, Sep. 2016 – present.
- P. Ahmadizadeh, Visiting PhD candidate from Iran University of Science and Technology, Two-mode power split hybrid electric powertrain, Michigan Tech University, Feb. 2016 – Oct. 2016.
- K. Poorghasemi, Visiting PhD candidate from Sahand University of Tech in Iran, RCCI engine combustion modeling, Michigan Tech University, Feb. - Aug. 2015.
- M. Baloo, co-hosted by Prof. S.Y. Lee, Visiting PhD candidate from Amir Kabir University of Tech in Iran, Experimental combustion diagnosis, Michigan Tech University, Sep. 2014 – Jan. 2015.
- S. Polat, Visiting PhD candidate from Gazi University in Turkey, Modeling and experimental study of an HCCI engine, Michigan Tech University, Jan. 2014 – Mar. 2015.
- M. Pčolka, co-hosted by Prof. R. Robinett, Visiting PhD candidate from Czech Tech University in Prague, Building energy controls, Michigan Tech University, Jan. 2013 – May 2013.

Mentoring (3)
- S. Pan, PhD candidate, Adaptive sliding controller design with robustness to implementation imprecision, University of California, Berkeley, 2012.
- R. Salehi, Visiting PhD candidate from Sharif University in Iran, Hybrid switching controller for cold start emission reduction, University of California, Berkeley, 2012.
- Y. Chen, Visiting PhD candidate from Jilin University in China, Control of engine emissions during cold start, University of California, Berkeley, 2010 - 2011.

- **MSc Students (59)**

  Thesis advising (24)
    - R. Sitaraman, MS thesis main adviser (co-adviser: Dr. Jeff Naber), Data driven RCCI engine modeling and control, Michigan Tech University, 2018 - present.
    - A. Basina, MS thesis adviser, RCCI combustion control, Michigan Tech University, 2018 - present.
    - N. Doshi, MS thesis main adviser (co-adviser: Dr. Darrell Robinette), Climate control of connected and automated hybrid electric vehicles, Michigan Tech University, 2018 - present.
    - S. Bhasme, MS thesis main adviser (co-adviser: Dr. Darrell Robinette), Modeling and control of powertrain and vehicle dynamics for optimum energy saving in connected and automated hybrid electric vehicles, Michigan Tech University, 2018 - present.
    - K. Darokar, MS thesis main adviser (co-adviser: Dr. Darrell Robinette), Vehicle driveline anti jerk modeling and control, Michigan Tech University, 2018 - present.

  Graduated (19):
    - P. Reddy, MS thesis main adviser (co-adviser: Dr. Darrell Robinette), Control oriented modeling of an automotive drivetrain for anti-jerk control, Michigan Tech University, 2017 - 2018.
    - R. Yadav, MS thesis main adviser (co-adviser: Dr. Darrell Robinette), Modeling and analysis of energy consumption in Chevrolet Volt Gen II Hybrid Electric Vehicle, Michigan Tech University, 2017 – 2018.
    - A. Abhay Raut, MS thesis adviser, Model-based control of an RCCI engine, Michigan Tech University, 2016 - 2017.
    - N. Kondipati, MSc thesis adviser, Experimental Study, Modeling and Controller Design for an RCCI Engine, Michigan Tech University, 2015 - 2016.
    - J. Arora, MSc thesis adviser, Design of Real-Time Combustion Feedback System and Experimental Study of an RCCI Engine for Control, Michigan Tech University, 2015 - 2016.
    - K. Kannan, MSc thesis adviser, An Experimental Investigation of Low Temperature Combustion Regimes in a Light Duty Engine, Michigan Tech University, 2014 - 2016.
    - J. Dobbs, MSc thesis adviser, Model Predictive Control of Building Energy Management Systems in a Smart Grid Environment, Michigan Tech University, 2013 - 2015.
    - K. Khodadadi, MSc thesis adviser, Modeling and Control of Combustion Phasing of an RCCI Engine, Michigan Tech University, 2013 - 2015.
    - M. R. Nazemi, MSc thesis adviser, Modeling and Analysis of Reactivity Controlled Compression Ignition (RCCI) Engine Combustion, Michigan Tech University, 2013 - 2015.
    - M. Paranjape, MSc thesis adviser, Optimal Control of Building Energy with Smart Grid Interaction, Michigan Tech University, 2013 - 2014.
    - H. Saigaonka, MSc thesis adviser, An Investigation of Variable Valve Timing Effects on HCCI Engine Performance, Michigan Tech University, 2013 - 2014.
    - D. Kothari, MSc thesis adviser, Experimental Setup and Controller Design for an HCCI Engine, Michigan Tech University, 2013 - 2014.
    - V. Thakkar, MSc thesis adviser, Modeling and Experimental Setup of an HCCI Engine, Michigan Tech University, 2013 - 2014.
    - A. Soloukmofrad, MS thesis co-adviser (50%), Modeling and control of a hybrid electric powertrain using an HCCI engine, University of Tehran, 2011 - 2013.
    - M. Amini, MSc thesis co-adviser (50%), Model-based Control of Cold Start Hydrocarbon Emissions in SI Engines, KNT University, 2010 - 2012.
    - M. Boodaghi, MSc thesis co-adviser (50%), Strategies of Misfire Detection in Gasoline-CNG Bi-fuel Engines, KNT University, 2010 - 2011.

- M. Marami, MSc thesis co-adviser (50%), Simulation of Oil Circuit in an SI Engine at Cold Start Transient Conditions, KNT University, 2010 - 2011.

- M. Dehghani, MSc thesis co-adviser (50%), Thermodynamic Modeling of HCCI Exhaust Temperature, KNT University, 2010 - 2011.

- M. Bidarvatan, MSc thesis co-adviser (50%), Control of Combustion Phasing in an HCCI Engine, KNT University, 2010 - 2011.

Technical report advising (5)

Graduated (5):

- V. B. Vinhaes, MS technical report co-adviser (50%), Combustion development of a high efficiency diesel micro pilot natural gas engine, Michigan Tech University, 2016 - 2018.

- K. Surresh, MS technical report main adviser (co-adviser: Dr. Darrell Robinette), Modeling and analysis of Chevy Volt Gen II hybrid vehicle in electric mode, Michigan Tech University, 2017 - 2018.

- P. Lakhani, MS technical report main adviser (co-adviser: Dr. Darrell Robinette), Modeling and analysis for driveline jerk control, Michigan Tech University, 2017 - 2018.

- A. Soloukmofrad, MS technical report adviser, Energy management of hybrid electric powertrains integrated with low temperature combustion engines, Michigan Tech University, 2013 - 2015.

- M. Razmara, MS technical report main adviser (co-adviser: Dr. Rush Robinett III), Model Predictive Control of Building HVAC Systems, Michigan Tech University, 2012 - 2014.

Mentoring (30)

- R. Kamaraj, Short term scholar, Investigations into state-of-the-art hybrid electric vehicles powertrain configurations and their HVAC systems, Michigan Tech University, 2018 - present.

- A. Somasundaram, Short term scholar, Modeling of mode switching control strategies of Chevy Volt II plug-in hybrid electric vehicle, Michigan Tech University, 2018 - present.

- J. Tripp, Short term scholar, Modeling of powertrain and vehicle dynamics for Chevy Volt II, Michigan Tech University, 2017.

- M. Darji, Short term scholar, Electrification of high-efficiency engines, Michigan Tech University, 2017.

- K. C. Dhankani, Short term scholar, LPV modeling of an RCCI engine, Michigan Tech University, 2016.

- D. B. Lodaya, Short term scholar, Modeling and optimization of two-mode power split hybrid electric powertrain, Michigan Tech University, 2016.

- G. Ramanathan, D. Dhanraj, Short term scholars, Control of robot's electric motor for throwing ball and demonstration for MTU's Summer Youth Program, Michigan Tech University, 2016.

- J. Dwivedi, V. Ghadge, E. Malik, D. Dhanraj, Short term scholars, Calibration and torque control of 100-kW E-motor for hybrid electric powertrain test bed, Michigan Tech University, 2015 – 2016.

- R. R. Zakkam, H. Nutulapati, M. Cheruvathur, Short term scholars, Experimental setup for a LTC engine and hybrid electric powertrain, Michigan Tech University, 2014.

- F. Ahmed, G. Xiong, A. Ketkale, A. Kondra, A. Girase, and H. Su, Short term scholars, Experimental setup for low temperature combustion engine research, Michigan Tech University, 2013 - 2014.

- Z. Han, S. Viswanathan, Z. Huang, and N. Ghike, Short term scholars, Control of electric motor and Lithium-ion battery for HEV powertrain, Michigan Tech University, 2013 - 2014.

- B. Moridian, Short term scholar, Adaptive parameter/state estimation for building energy control, Michigan Tech University, 2012 - 2013.

- A. Hansen, Visiting M.Sc. student from Technische Universität Hamburg-Harburg, Discrete sliding mode control of automotive controllers, University of California, Berkeley, 2012.

- K. Edelberg, MSc student, Robust model-based controller design using implementation imprecision bounds, University of California, Berkeley, 2012.
- A. Cranmer, MSc student, Modeling HC tailpipe emissions from an SI engine, University of California, Berkeley, 2010 - 2011.
- S. Sharifirad, Visiting MSc student from KNT University, Automatic driver controller design for standard driving test cycles simulation, Iran Khodro Engine Research Center, 2003 - 2004.

- **BSc Students (27)**
  Thesis advising (8)
    - A. Solouk Mofrad, BSc thesis co-adviser (50%), On-board diagnosis of catalytic converters in SI engines, KNT University, 2010.
    - A. Kazemi Taskoh, BSc thesis co-adviser (50%), Control strategies to reduce cold start and warm-up emissions from passenger cars, KNT University, 2010.
    - M. Aliramezani, BSc thesis co-adviser (50%), Control strategies of Anti-lock Braking Systems (ABS) in passenger cars, KNT University, 2010.
    - J. Rezaee, BSc thesis co-adviser (50%), Experimental study of an HCCI engine running with butanol blended fuels, KNT University, 2010.
    - A. Shahrokhshahi and H. Zamani, BSc thesis co-adviser (50%), Strategies to control/monitor evaporative emissions in passenger cars, KNT University, 2010.
    - H. Jafarian, BSc thesis co-adviser (50%), Simulation of bearings of a SI engine using AVL-EXCITE software, KNT University, 2010.
    - M. Amereh, BSc thesis co-adviser (50%), Numerical modeling of the flow under engine's hood of Samand vehicle using Fluent software, KNT University, 2010.

  Mentoring (19)
    - D. Hanover, Short term scholar, PV Panel modeling, HVAC modeling for an MTU building and a Chevy Volt Vehicle, Michigan Tech. University, 2015 – 2018.
    - A. Krisztian, Short term scholar, Analysis of the experimental data from Chevy Volt Gen 2 vehicle, Michigan Tech. University, Summer 2017.
    - R. P. Robles, Short term scholar, Sizing Analysis of Energy Storage Systems and Solar PV Panels for Commercial Buildings, Michigan Tech. University, 2016.
    - S. Hedblom, Student project as part of The Honors Institute, Skiing's mechanical efficiency, Michigan Tech. University, 2015.
    - T. Kovach, Short term scholar, Experimental study of building energy efficiency, Michigan Tech. University, 2014.
    - A. Soneji, R. Bhasin, A. Neti, N. Neti, A. Hayashi, S. Bigdeli, S. Raghunathan, Mech. Eng. undergraduate students, Modeling, control and testing of a 2.4-liter Toyota engine and exhaust aftertreatment system, University of California, Berkeley, 2012.
    - J. Li, and A. Cheng, Senior Mech. Eng. undergraduate students, Verification and hardware-in-the-loop testing of automotive controllers, University of California, Berkeley, 2012.
    - M. Muller, P. Sang Cho, and R. Sze, Senior Mech. Eng. undergraduate students, Model analysis and control trajectory modification for reducing hydrocarbon emissions in SI engines, University of California, Berkeley, 2011.
    - S. Varnhagen, NSERC summer student, HCCI experimental study, University of Alberta, 2008.
    - K. Swan, NSERC summer student, HCCI combustion modeling, University of Alberta, 2006.

Michigan Tech/Community Service

Theses/Proposals (committee member)

<u>PhD committees (13):</u>

- Mufaddel Dahodwala, PhD proposal and thesis defense "Experimental and Computational Investigation of Dual Fuel Diesel-Natural Gas RCCI Combustion in a Heavy-Duty Diesel Engine", Michigan Tech University, 2016-2018.

- Zhihao Zhao, PhD proposal, "Study of High Injection Pressure Impinging Diesel Spray and Combustion Processes" Michigan Tech University, 2018.

- Mojtaba Bahramgiri, PhD oral exam, Michigan Tech University, 2018.

- Guna R. Bharati, PhD proposal, and thesis defense, "Hierarchical Optimization for Vehicle-to-Grid and Building-to-Grid Integration" Michigan Tech University, 2015-2017.

- Yanyu Wang, PhD proposal, and thesis defense, "The Interaction of Ignition and In-Cylinder Flow on Flame Kernel Development and Combustion Variability in an Optically Accessible Direct Injection Engine", Michigan Tech University, 2014-2017.

- Ehsan Ansari, PhD proposal, and thesis defense, "Combustion, Emissions, and Performance Optimization in a DI/PFI-RCCI Diesel/Natural Gas Turbocharged Engine", Michigan Tech University, 2014-2017.

- Bin Zhou, PhD proposal entitled "Hybrid Electric Vehicle Battery Aging Estimation and Optimization based on Energy Consumption Minimization Strategy", Michigan Tech University, 2017.

- Amir Rezaei, PhD proposal, and thesis defense, "Optimal Energy Management Strategies for Hybrid Electric Vehicles", Michigan Tech University, 2015-2017.

- Xin Wang, PhD proposal entitled "Study of Model-based Adaptive Combustion Analysis and Control for Spark Ignition Engines in Dilution Conditions", Michigan Tech University, 2015.

- Jiongxun Zhang, PhD proposal entitled "Experimental Characterization of Spark Ignited Direct Injection Gasoline Engine Injection Processes", Michigan Tech University, 2015.

- Mufaddel Dohodwala, committee member for PhD qualifying exam, Michigan Tech University, 2014.

- Zhuyong Yang, committee member for PhD qualifying exam, Michigan Tech University, 2014.

- Eva Žáčeková, PhD thesis entitled "Identification for Model Predictive Control under Closed-loop Conditions", Czech Technical University, 2013.

<u>MS committees (18):</u>

- Anurag Kamal, MSc thesis entitled "Physical Modeling of Lithium-Ion Aging for Automotive Applications", Michigan Tech University, 2018.

- Gaurav Bagwe, MSc technical report entitled " Video Frame Reduction in Autonomous Vehicles ", Michigan Tech University, 2018.

- Huanqing Wang, MSc thesis entitled " Development of Dynamic Programming and Receding Horizon Control Strategies for GM Volt II Multi-mode Hybrid Electric Vehicle ", Michigan Tech University, 2018.

- Kovid_Sachdeva, MSc technical report entitled " Development of Optimal Operating Point maps and Mode Shift Strategy for Chevrolet Volt Gen II Plug-in Hybrid Electric Vehicle ", Michigan Tech University, 2018.

- Kaushik Prabhu, MSc thesis entitled " Sensor Fusion for Spark Ignited Engines ", Michigan Tech University, 2018.

- Yash Borghate, MSc thesis entitled " Cold Start Analysis and Modeling of a Direct-Injection Gasoline Engine ", Michigan Tech University, 2018.

- Abhishek Jadav, MSc thesis entitled "Experimental and Modeling Study of Particulate Matter Oxidation under Loading Conditions for a SCR Catalyst on a Diesel Particulate Filter ", Michigan Tech University, 2017.

- Sandesh S. Rao, MSc thesis entitled "An Experimental Investigation on the Effect of Dual Coil Ignition

Discharges on Dilute Combustion in a Spark Ignition Engine ", Michigan Tech University, 2017.

- Omkar Dilip Rane, MSc thesis entitled "Multi Resonant Feedback Control of Wave Energy Converters using Recursive Least Squares", Michigan Tech University, 2017.

- Biswajit Barik, MSc thesis entitled "Designing a Real-time Velocity Predictor for Powertrain Optimization of Connected and Automated Vehicles", Michigan Tech University, 2017.

- Reem Merchant, MSc thesis entitled "New Model to Predict Heat Transfer Coefficient for Flow Boiling in Microfin Tubes", Michigan Tech University, 2016.

- Arya Yazdani, MSc thesis entitled "Air Charge Estimation for an SI Engine using In-cylinder Pressure Sensor", Michigan Tech University, 2016.

- Rui Hu, MSc thesis entitled "State of Charge Balancing Droop Control", Michigan Tech University, 2015.

- Prathamesh Chendvankar, MSc technical report entitled "1D Simulation of Direct Water Injection in a Spark Ignited Engine", Michigan Tech University, 2015.

- Jiongxun Zhang, MSc technical report entitled "Optical Access Engine Setup and Validation", Michigan Tech University, 2015.

- Ritam Misra, MSc thesis entitled "Impact of Plug-in Electric Vehicles and Wind Generators on Harmonic Distortion of Electric Distribution Systems", Michigan Tech University, 2014.

- Zhe Huang, MSc technical report entitled "SVPWM Switching Pattern for Z-Source Inverter, Simulation and Application in HEV/EV Motor Drive", Michigan Tech University, 2014.

- Dustin Loveland, MSc thesis entitled "Development of a Predictive Combustion Model of a Spark Ignited Engine with Gasoline Direct Injection, Variable Valve Timing, Duration and Lift Technologies", Michigan Tech University, 2012.

MTU Service

- Co-adviser of Alternative Energy Enterprise (AEE), 2018 - present

- MTU Review Committee to Assess Participation into National APLU (Association of Public and Land-grant Universities) Program to Increase the Diversity of STEM Faculty, Fall 2017.

- Member of MEEM Department Seminar Committee, 2012 – 2016.

- Judge for MEEM Senior Capstone Design Critical Design Review, Spring 2017.

- Facilitator at the MEEM and Graduate School Orientation, 2016.

- Member of MEEM Department Faculty Development Committee, 2014.

- Judge for Undergraduate Research Expo, 2015.

- Review panel for Research Excellence Fund - Mentoring Grant Proposals, 2014.

- Judge in Graduate Research Colloquium (GRC), 2013, 2015.

- Faculty host for two of the MTU's Leading Scholar Award Finalists, 2012, 2013.

Community Service

- Led and co-organized a half-day workshop on "Controls and Robotics" in Michigan Tech's Summer Youth Program -- ME: Design the Future, high school students in grades 9-12, Jul. 27, 2016.

- Mentoring FIRST® Robotics Competition Team on motor controller design, Houghton High School, 2016

- Judge in Western UP Science Fair, Houghton, MI, March 23, 2015.

- Judge in Canada-Wide Youth Science Fair, Ottawa, May 10-18, 2008.

- Member of University of Alberta Student Life Advisory Committee for graduate students, 2008-2009.

- Student representative of the University of Alberta graduate students in the Council of Faculty of Graduate Studies and Research (FGSR), 2007-2009.

- Member of University of Alberta Grant Selection Committee for graduate students, 2007-2008.

- Elected Vice-President Events of Mechanical Engineering Graduate Students Association (MEGSA), University of Alberta, 2007-2008.

- One of the main coordinators for 2008 GSA (Graduate Students Association) Universal Orientation for over 400 new graduate students recruited to the University of Alberta in September 2008.

- Judge in Edmonton Regional Science Fair, Northern Alberta Institute of Technology (NAIT), Edmonton, April 9, 2007.

Professional Development

- Certificate of "Ingenuity - Innovation for Researchers" from THECIS (The Centre for Innovation Studies), a three-month course to advance understanding the use of innovation as a subject of both study and practice, 2008, AB, Canada.

Professional Affiliations

- American Society of Mechanical Engineers (ASME)
- Society of Automotive Engineers (SAE)
- International Federation of Automatic Control (IFAC)
- Renewable Fuel Association (RFA)
- The Combustion Institute
- Biomass Energy Research Association (BERA)
- The New York Academy of Sciences (NYAS)