

CURRICULUM VITAE  
SHAWN W. MIDLAM-MOHLER

**Current Appointments:**

Professor of Practice – Primary Appointment Ohio State University Department of Mechanical and Aerospace Engineering, Columbus, OH	8/2019 to present
Director Ohio State University Simulation Innovation and Modeling Center, Columbus, OH	7/2017 to present
Fellow Ohio State University Center for Automotive Research, Columbus, OH	8/2012 to present

**Education:**

Ph.D.	Mechanical Engineering The Ohio State University Dissertation Title: "Modeling, Control, and Diagnosis of a Diesel Lean NO <sub>x</sub> Trap Catalyst"	6/2005 Columbus, OH
M.S.	Mechanical Engineering The Ohio State University Thesis Title: "A Novel Fuel-Operated Heater for Automotive Thermal Management"	3/2001 Columbus, OH
B.S.	Mechanical Engineering Wright State University	<i>Summa cum Laude, 4.0 GPA</i> 6/1999 Dayton, OH

**Academic Experience:**

Associate Professor of Practice Ohio State University Department of Mechanical and Aerospace Engineering, Columbus, OH	9/2015 - 8/2019
Associate Director Ohio State University Simulation Innovation and Modeling Center, Columbus, OH	1/2014 - 6/2017
Assistant Professor of Practice Ohio State University Department of Mechanical and Aerospace Engineering, Columbus, OH	8/2012 - 8/2015
Research Scientist Ohio State University Center for Automotive Research, Columbus, OH	10/2008 - 7/2012
Senior Research Associate Ohio State University Center for Automotive Research, Columbus, OH	11/2005 - 9/2008
Research Associate II Ohio State University Center for Automotive Research, Columbus, OH	2/2004 - 10/2005

**Professional Licenses:**

Professional Engineer State of Ohio	License 75703 Inactive
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Project Management Professional  
Project Management Institute

License 1622962  
Inactive

**Awards:**

National Science Foundation Outstanding Faculty Advisor Award 5/2018

- Presented to the EcoCAR faculty advisor who best promotes the goals, objectives, and activities related to the EcoCAR student design competition

Honda-OSU Partnership Award 5/2016

- Presented to an individual who has made significant contributions towards promoting and strengthening the Honda-OSU Partnership

Outstanding Faculty Advisor – Ohio State University College of Engineering 2/2015

- Presented to most impactful faculty advisor of student engineering teams in the College

Applied Automotive Engineering Fellow - Department of Energy 6/2015

- Presented to acknowledge significant contributions to applied automotive engineering research and education

Outstanding Technology Team – TechColumbus 2/2012

- Presented to a team of OSU-CAR faculty and research staff because of their extensive partnerships driving technology forward in Ohio

National Science Foundation Outstanding Incoming Faculty Advisor Award 7/2011

- Presented to the junior EcoCAR faculty advisor who best promotes the goals, objectives, and activities related to the EcoCAR student design competition

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**TEACHING AND MENTORING**

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**Doctoral Student (Lead Co-Advisor<sup>1</sup>)**

1. 2014 - Present David Hillstrom. The Ohio State University. Expected Graduation Fall, 2019.
2. 2015 – Present Vivek Bithar. The Ohio State University. Expected Graduation Fall, 2019.
3. 2014 – Present Greg Jankord. The Ohio State University. Expected Graduation Spring, 2020.
4. 2015 – Present Aditya Karamanchi. The Ohio State University.
5. 2016 – Present Wilson Perez. The Ohio State University.
6. 2017 – Present Phillip Aquino. The Ohio State University. Expected Graduation Spring, 2020.

**Doctoral Students Mentored & Funded<sup>2</sup>**

1. 2010-2012 Qiuming Gong. The Ohio State University.
2. 2009-2011 Jason Meyer. The Ohio State University.
3. 2007-2010 Kenny Follen. The Ohio State University.

**Masters Student (Advisor / Lead Co-Advisor)**

1. M. Fang, Analysis of Variability and Injection Optimization of a Compression Ignition Engine, 2009.

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<sup>1</sup> Professor's of Practice at Ohio State University are not permitted sole advising of PhD students

<sup>2</sup> Prior to becoming a Professor of Practice, Dr. Midlam-Mohler was not permitted co-advisor status of PhD students

2. R. S. Maringanti, Inverse-Distance Interpolation Based Setpoint Generation Methods for Closed-Loop Combustion Control of a CIDI Engine, 2009.
3. C. M. Hoops, Uncertainty Analysis for Control Inputs of Diesel Engines, 2010.
4. R. B. Cooley, Engine Selection, Modeling, and Control Development for an Extended Range Electric Vehicle, 2010.
5. B. Bezaire, Modeling and Control of an Electrically-Heated Catalyst, 2011.
6. R. V. Everett, An Improved Model-Based Methodology for Calibration of an Alternative Fueled Engine, 2011.
7. J. M. Davis, Diesel Engine Experimental Design and Advanced Analysis Techniques, 2011.
8. Gupta, Characterization of Engine and Transmission Lubricants for Electric, Hybrid, and Plug-in Hybrid Vehicles, 2012.
9. M. Garcia, Feed-Forward Air-Fuel Ratio Control during Transient Operation of an Alternative Fueled Engine, 2013.
10. N. Hyde, Development of a Traction Control System for a Parallel-Series PHEV, 2014.
11. S. Gurusubramanian, A comprehensive process for Automotive Model-Based Control, 2013.
12. T. Ma, Model-Based Control Design and Experimental Validation of an Automated Manual Transmission, 2013.
13. N. V. Baradwaj, Uncertainty Analysis of Resistive Soot Sensors for On-Board Diagnostics of Automotive Particulate Filters, 2013.
14. S. A. Ramirez, Supervisory Control Validation of a Fuel Cell Hybrid Bus Using Software-in-the-Loop and Hardware-in-the-Loop Techniques, 2013.
15. M. J. Organiscak, Model Based Suspension Calibration for Hybrid Vehicle Ride and Handling Recovery, 2014.
16. D. R. Hillstrom, Light Duty Natural Gas Engine Characterization, 2014.
17. T. Mukherjee, One Dimensional Air System Modeling of Advanced Technology Compressed Natural Gas Engines, 2014.
18. S. Shivaprasad, Model Based Investigation of Lean Gasoline PM and NOx Control, 2014.
19. E. M. Gallo, Development of Series Mode Control of a Parallel-Series Plug-In Hybrid Electric Vehicle, 2014.
20. W. Spiegel, A Soft ECU Approach to Develop a Powertrain Control Strategy, 2015.
21. Hegde, Look-Ahead Energy Management Strategies for Hybrid Vehicles., 2018.
22. J. J. Ward, Modeling and Simulating a Performance Hybrid Electric Vehicle, 2015.
23. S. Yacinthe, System Safety Development of a Performance PHEV Through a Model-Based Systems Engineering Approach, 2016.
24. Khanna, Full-Vehicle Model Development of a Hybrid Electric Vehicle And Development of a Controls Testing Framework, 2016.
25. L. A. Cardinale, Automating the Subjective Analysis of Knock during Hot Engine Starts, 2016.
26. J. Mack, Calibration of Automotive Aftertreatment Models through Co-Simulation with MATLAB Optimization Routines, 2016.
27. M. J. Yatsko, Development of a Hybrid Vehicle Control System, 2016.
28. C. Huster, Design and Validation of an Active Stereo Vision System for the OSU EcoCAR 3, 2017.
29. Modak, Modeling and Control of an Automated Manual Transmission for EcoCAR 3 Vehicle, 2017.
30. D. S. Kibalama, Design and Implementation of a Belted Alternator Starter System for the OSU EcoCAR 3 Vehicle, 2017.
31. B. Bishop, Model-Based Suspension Optimization of the Ohio State EcoCAR 3 Vehicle, 2018.
32. S. J. Trask, Systems and Safety Engineering in Hybrid-Electric and Semi-Autonomous Vehicles, 2019.
33. M. A. Mandokhot, Development of Predictive Gasoline Direct Fuel Injector Model for Improved In-cylinder Combustion Characterization, 2018.
34. E. G. Clepper, Agile Project Management/Systems Engineering of an AV Interior Prototype, 2018.
35. A. Thomas, Modeling and Performance Analysis of a 10-Speed Automatic Transmission for X-in-the-Loop Simulation, 2018.
36. J. Hurd, Design of Reconfigurable Interior for Autonomous Vehicle Prototype, 2018.
37. K. B. Kavathia, Uncertainty Analysis of an Engine Test Cell, 2018.
38. S. K. Sahu, Model-Supported Heat- Flux Sensor Development, 2018.
39. U. R. Gambhira, Powertrain Optimization of an Autonomous Electric Vehicle, 2018.
40. E. Stoddart, Computer Vision Techniques for Automotive Perception Systems, 2019.

41. 2018 – present P. Dalke. The Ohio State University.
42. 2018 – present K. Kuwabara. The Ohio State University.
43. 2018 – present L. Longmire. The Ohio State University.
44. 2018 – present M. Satra. The Ohio State University.
45. 2018 – present M. Patil. The Ohio State University.
46. 2018 – present Y. Jin. The Ohio State University.
47. 2019 – present H. Rangarajan. The Ohio State University.
48. 2019 – present J. Karl-DeFrain. The Ohio State University.
49. 2019 – present S. Goel. The Ohio State University.
50. 2019 – present A. Narasimhan. The Ohio State University.

#### **MS Students Mentored and Funded:<sup>3</sup>**

1. Eric Snyder, 2005. The Ohio State University.
2. Adam Vosz, 2006. The Ohio State University.
3. Courtney Coburn, 2006. The Ohio State University.
4. Kenny Follen, 2007. The Ohio State University.
5. Josh Cowgill, 2007. The Ohio State University.

#### **Visiting Scholars Supervised:**

The following individuals conducted research at Ohio State for periods of 3 – 12 while completing MS/PhD programs at other institutions.

1. Simone Bernasconi, 2007, The Ohio State University.
2. Patrick Rebechi, 2008, The Ohio State University.
3. Andrea Pezzini, 2008, The Ohio State University.
4. Adalbert Wolany, 2009, The Ohio State University.
5. Bernhard Grimm, 2010, The Ohio State University.
6. Asier Martinez, 2011, The Ohio State University.
7. Dennis Kibilama, 2014, The Ohio State University.
8. Africa Junior, 2014, The Ohio State University.
9. Tom Kigezi, 2014, The Ohio State University.
10. Guido Guercioni, 2016, The Ohio State University.
11. Vincente Capito, 2019, The Ohio State University.

#### **Undergraduate Research (Advisor/Supervisor)**

1. 2006 – 2007 Rhisee Bhatt. The Ohio State University.
2. 2007 Joshua Supplee. The Ohio State University.
3. 2008 John Lutz. The Ohio State University.
4. 2008 Konrad Svzed. The Ohio State University.
5. 2008 – 2009 Chris Hoops. The Ohio State University.
6. 2008 – 2009 Al Godfrey. The Ohio State University.
7. 2009 Ross Want. The Ohio State University.
8. 2009 Sean Ewing. The Ohio State University.
9. 2009 David Griffin. The Ohio State University.
10. 2009 – 2010 Jennifer Loy. The Ohio State University.
11. 2009 – 2010 John Macauley. The Ohio State University.
12. 2009 – 2010 Alixandra Keil. The Ohio State University.
13. 2009 – 2010 Andrew Arnold. The Ohio State University.
14. 2009 – 2010 Ryan Everett. The Ohio State University.
15. 2009 – 2010 John Davis. The Ohio State University.
16. 2009 – 2010 Katherine Bovee. The Ohio State University.

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<sup>3</sup> These students were mentored by Dr. Midlam-Mohler as a staff member prior to having advising status

17. 2010 – 2013 Sarah Jadwin. The Ohio State University.
18. 2010 – 2011 Abbey Underwood. The Ohio State University.
19. 2011 Jerrin Lutesh. The Ohio State University.
20. 2012 – 2013 Tom Brown. The Ohio State University.
21. 2012 – 2013 Jason Ward. The Ohio State University.
22. 2012 – 2013 Tyler Joswick. The Ohio State University.
23. 2012 – 2013 Sarah Vasey. The Ohio State University.
24. 2012 – 2013 Andrew Speigel. The Ohio State University.
25. 2013 – 2014 Bryan Silverman. The Ohio State University.
26. 2013 – 2014 MJ Yatsko. The Ohio State University.
27. 2013 – 2014 Gaurav Krishnaraj. The Ohio State University.
28. 2012 – 2014 Arjun Khanna. The Ohio State University.
29. 2016 – 2017 Shuhan Yang. The Ohio State University.
30. 2017 – 2018 Briana Antorino. The Ohio State University.
31. 2018 – 2019 Jacqueline Karl-DeFrain. The Ohio State University.
32. 2018 – 2019 Alisson Mellor. The Ohio State University.
33. 2018 – 2019 Kristina Kuwabara. The Ohio State University.
34. 2018 – 2019 Phillip Dalke. The Ohio State University.

### Research Staff Supervision:

Dr. Midlam-Mohler has supervised the following technical staff. Only their current/terminal position is listed.

1. 2014 - 2019 Punit Tulpule. Research Scientist. The Ohio State University.
2. 2015 – 2017 Ayyoub Rezaeian. Post-Doctoral Researcher. The Ohio State University.
3. 2015 – Present Emily Nutwell, Research Specialist. The Ohio State University.
4. 2015 – 2019 Sheng Dong, Research Scientist. The Ohio State University.
5. 2015 – 2019 Zhenyu Wang, Research Scientist. The Ohio State University.
6. 2015 – Present Raju Dantuluri. Senior Research Associate - Engineer. The Ohio State University.
7. 2017 – Present Satchit Ramnath, Research Associate 2 - Engineer. The Ohio State University.
8. 2017 – Present Peiyu Yang, Research Associate 2 - Engineer. The Ohio State University.
9. 2017 – 2019 Ali Nassiri, Research Scientist. The Ohio State University.
10. 2018 – Present Luke Fredette, Post-Doctoral Researcher. The Ohio State University.
11. 2019 – Present Rodrigo Auza Gutierrez, Research Associate 2 – Engineer. The Ohio State University.
12. 2019 – Present Rasoul Esmailpour, Post-Doctoral Researcher. The Ohio State University.

### Research Faculty Mentored:

Four of Dr. Midlam-Mohler’s supervised research staff were successful in transitioning to research faculty positions in 2019.

1. Dr. Zhenyu Wang, Mechanical and Aerospace Engineering, Ohio State University
2. Dr. Punit Tulpule, Mechanical and Aerospace Engineering, Ohio State University
3. Dr. Sheng Dong, Mechanical and Aerospace Engineering, Ohio State University
4. Dr. Ali Nassiri, Integrated Systems Engineering, Ohio State University

### Undergraduate and Graduate Courses:

Dr. Midlam-Mohler’s teaching focuses on automotive technical electives and capstone senior design. His cumulative mean electronic student evaluation score for “Overall Rating” is 4.7 out of a 5 point scale.

Period Offered	Course Number and Title
Spring 2007	ME 730 Internal Combustion Engine Modeling
Winter 2009	ME 631 Automotive Powertrain Laboratory

Spring 2009	ME 730 Internal Combustion Engine Modeling
Winter 2010	ME 631 Automotive Powertrain Laboratory
Winter 2011	ENGR 659.01 Multidisciplinary Capstone 1
Winter 2011	ME 565.02 Mechanical Engineering Design 1
Winter 2011	ME 631 Automotive Powertrain Laboratory
Spring 2011	ENGR 659.02 Multidisciplinary Capstone 2
Spring 2011	ME 565.03 Mechanical Engineering Design 2
Winter 2012	ENGR 659.01 Multidisciplinary Capstone 1
Winter 2012	ME 565.02 Mechanical Engineering Design 1
Winter 2012	ME 631 Automotive Powertrain Laboratory
Spring 2012	ENGR 659.02 Multidisciplinary Capstone 2
Spring 2012	ME 565.03 Mechanical Engineering Design 2
Fall 2012	ME 4902.01 Mechanical Engineering Capstone 1
Spring 2013	ME 4902.02 Mechanical Engineering Capstone 2
Spring 2013	ME 5531 Automotive Powertrain Laboratory
Fall 2013	ME 4902.01 Mechanical Engineering Capstone 1
Fall 2013	ME 4194 Applied Project Management and System Engineering 1 (Pilot)
Spring 2014	ME 4902.02 Mechanical Engineering Capstone 2
Spring 2014	ME 5531 Automotive Powertrain Laboratory
Spring 2014	ME 4194 Applied Project Management and System Engineering 2 (Pilot)
Fall 2014	ME 4902.02 Engineering Capstone
Fall 2014	ME 5194 Applied Project Management and System Engineering 1
Spring 2015	ME 5531 Automotive Powertrain Laboratory
Spring 2015	ME 5194 Hardware-in-the-Loop for Control System Development (Pilot)
Spring 2015	ME 4902.02 Mechanical Engineering Capstone 2
Fall 2016	ME 5600 Applied Project Management and System Engineering
Fall 2016	ME 4902.02 Mechanical Engineering Capstone 1
Spring 2017	ME 4902.02 Mechanical Engineering Capstone 2
Fall 2017	ME 4902.02 Mechanical Engineering Capstone 1
Spring 2017	ME 5531 Automotive Powertrain Laboratory
Spring 2017	ME 4902.02 Mechanical Engineering Capstone 2
Autumn 2017	MECHENG 4902.01 ME Capstone Design II: Student Design Competitions
Spring 2018	MECHENG 5531 Automotive Powertrain Laboratory
Spring 2018	MECHENG 4902.02 ME Capstone Design III: Student Design Competitions
Spring 2018	ME 5531 Automotive Powertrain Laboratory
Autumn 2018	ME 4900 ME Capstone Design I
Autumn 2018	ME 4902.01 ME Capstone Design II: Student Design Competitions
Spring 2019	ME 4902.02 ME Capstone Design III: Student Design Competitions
Autumn 2019	ME 4900 ME Capstone Design I
Autumn 2019	ME 4902.01 ME Capstone Design II: Student Design Competitions

### Curriculum Development – Internal:

#### ME 5531 Advanced Automotive Systems Analysis

2019

Ohio State University, Columbus, OH

- Redeveloped previous 5531 course to include autonomous vehicle sensing and electrified powertrains
- Reused < 50% of previous material
- Secured donations of equipment for the lab from Fiat Chrysler and Honda

#### ME 4900 ME Capstone Design I

2018

Ohio State University, Columbus, OH

- Developed a dedicated 4900 course for students engaged in the Student Design Competition Capstone

- Used < 5% of colleague's 4900 course material

ME 5600 Applied Project Management and System Engineering 2016  
Ohio State University, Columbus, OH

- Developed new course based on MAE EAB feedback on value of course for our undergraduates
- Course immerses students in a system engineering and project management role-playing scenario

ME 5194 Hardware-in-the-Loop for Control System Development (Pilot) 2015  
Ohio State University, Columbus, OH

- Developed new course on HIL to complement existing controls / system modeling courses
- Effort was funded via a competitive grant from The Mathworks

ME 565.02/.02 Mechanical Engineering Design 1 & 2 2011  
Ohio State University, Columbus, OH

- Adapted existing MAE and ENGR to work with student design competition teams
- Developed sponsors to fund the activity fully and have never used department funds

ME 631 Internal Combustion Engine Modeling 2009  
Ohio State University, Columbus, OH

- Redeveloped course with <25% reuse of previous lecture material and total redevelopment of assignments
- Developed content that walked students through building an entire engine model in stages, developed project that used industry-standard simulation package

ME 730 Internal Combustion Engine Modeling 2007  
Ohio State University, Columbus, OH

- Redeveloped course with <10% reuse of previous material/labs
- Developed adaptable labs/content that utilized latest research engines/vehicles at CAR to provide industry-relevant experience for students

### **Curriculum Development – External:**

Dr. Midlam-Mohler is an active participant in the industry-focused distance education program through the Center for Automotive Research. He has also developed a number of courses in his area of expertise for the Department of Energy sponsored advanced technology vehicle competition program.

Internal Combustion Engine Control 2015  
Ohio State University, Columbus, OH

- Developed a 6 hour seminar from on IC engine control
- Supported by the Department of Energy

Internal Combustion Engines from a System Perspective 2014  
Ohio State University, Columbus, OH

- Developed a 6 hour seminar from on IC engines from a systems perspective
- Supported by the Department of Energy

IC Engine Modeling 2014  
Ohio State University, Columbus, OH

- Developed a 6 hour seminar from on modeling of internal combustion engines
- Supported by the Department of Energy

Matlab for Data Analysis and Calibration Seminar 2013  
Ohio State University, Columbus, OH

- Developed a 10 hour seminar on the use of Matlab for data analysis and calibration
- Developed for the CAR Distance Education program

SIL/HIL Techniques for Automotive Control Development 2013  
Ohio State University, Columbus, OH

- Developed a 10 hour seminar on the use of software-in-the-loop and hardware-in-the-loop techniques for control code validation and verification
- Developed for the CAR Distance Education program

Alternative Fuels Seminar 2013  
Ohio State University, Columbus, OH

- Developed a 10 hour seminar on automotive alternative fuels
- Developed for the CAR Distance Education program

Model-Based Control of Hybrid Electric Vehicles 2012  
Ohio State University, Columbus, OH

- Developed a 6 hour seminar from on model-based control of hybrid vehicles
- Supported by the Department of Energy

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### INTERNAL SERVICE

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Simulation Innovation and Modeling Center, Director 2017 to present  
Ohio State University, Columbus, OH

- Responsible for all Center leadership activities
- Supervise 3 business and 12 technical staff
- Grew center to \$6.5M in research annual expenditures
- Supports research of more than 70 faculty, 30 graduate students, and 60 undergraduates

Simulation Innovation and Modeling Center, Associate Director 2014 to 2017  
Ohio State University, Columbus, OH

- Responsible for day-to-day operation of the center
- Co-responsible for strategic leadership of the center
- Responsible for all hiring and staff performance
- Responsible for status reports to College and Honda

#### **Business Staff Supervision:**

1. 2015 – 2017 Alexis Duffy, Program Manager, The Ohio State University.
2. 2016 – Present Layla Mohamad-Ali, HR/Fiscal Generalist, The Ohio State University.
3. 2017 – Present Heather Sever, Associate Director, The Ohio State University.
4. 2017 – Present Amber Pasternak, Program Manager, The Ohio State University.
5. 2019 – Present Camille Weiker-Isaman, Program Assistant, The Ohio State University.

#### **Internal Board/Committee Involvement:**

Simulation Innovation and Modeling Center Steering Board 2014 to present  
Ohio State University, Columbus, OH

- Work with other faculty to advance the mission of the SIMCenter

Center for Automotive Research Faculty Advisory Board 2014 to present  
Ohio State University, Columbus, OH



- Work with other faculty to advance the mission of the Center for Automotive Research

MAE Graduate Admissions Committee

2012 to 2019

Ohio State University, Columbus, OH

- Reviews graduate student applications and recommends acceptance to the Department and consideration for Department and University fellowships

**Student Organization Advising:**

EcoCAR Mobility Challenge Hybrid / Autonomous Vehicle Team

8/2018 – present

Ohio State University, Columbus, OH

- Serve as lead co-adviser of a 40 member (~80% undergraduate) student design project team competing in U.S. Department of Energy sponsored vehicle competition
- The team won the competition in the first year along with multiple honors amongst the various award categories

EcoCAR 3 Hybrid Electric Vehicle Team

8/2014 – 5/2018

Ohio State University, Columbus, OH

- Serve as lead co-adviser of a 40 member (~80% undergraduate) student design project team competing in U.S. Department of Energy sponsored vehicle competition
- The team has won the competition in each of the four competition years along with multiple honors amongst the various award categories

EcoCAR 2 Hybrid Electric Vehicle Team

7/2011 – 6/2014

Ohio State University, Columbus, OH

- Served as lead co-adviser of a 40 member (~80% undergraduate) student design project team competing in U.S. Department of Energy sponsored vehicle competition
- The team finished 2<sup>nd</sup> place in the first year of competition, 3<sup>rd</sup> place in the second year, and 1<sup>st</sup> place the final year of the competition

EcoCAR Challenge Hybrid Electric Vehicle Team

6/2008 – 6/2011

Ohio State University, Columbus, OH

- Served as lead co-adviser of a 40 member (~80% undergraduate) student design project team competing in U.S. Department of Energy sponsored vehicle competition
- Team won 1<sup>st</sup>, 5<sup>th</sup>, and 2<sup>nd</sup> in the three years of competition and won numerous event awards

Challenge-X Hybrid Electric Vehicle Team

8/2006 – 6/2008

Ohio State University, Columbus, OH

- Co-advised primarily undergraduate team competing in a U.S. Department of Energy sponsored advanced technology vehicle competition
- Over the course of the four year competition from 2004 – 2008, OSU placed 3<sup>rd</sup>, 4<sup>th</sup>, 4<sup>th</sup>, and 3<sup>rd</sup> respectively

**Diversity Activities**

Dr. Midlam-Mohler EcoCAR team has won 10 awards for support of diversity in engineering. He has mentored three SROP students (URMs) and funded two of them as graduate students as they conducted their graduate studies at OSU.

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## EXTERNAL SERVICE

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### Service to Government Agencies:

- EPA Vehicle System Model Reviewer 2016  
Peer Reviewer
- Conducted a ~30 hour peer review of a system model for future vehicle technology used in making policy decisions for future fuel-economy regulations
- NHTSA Automotive Technology/Policy Report Reviewer 2015  
Peer Reviewer
- Conducted a ~20 peer review of a studies of future vehicle technology used in making policy decisions for future fuel-economy regulations.
- NHTSA Automotive Technology/Policy Report Reviewer 2014  
Peer Reviewer
- Conducted a ~30 peer review of a studies of future vehicle technology used in making policy decisions for future fuel-economy regulations.
- EcoCAR 2 Faculty Advisory Board 2013-14  
Board Member
- Work with Department of Energy staff, Argonne National Labs Staff, General Motors staff, and four other EcoCAR faculty advisors to improve the student design experience for the EcoCAR program
- Clean Fuels Ohio, Columbus, OH 2009-13  
Member of the Board of Directors
- Elected to Board of Directors of Clean Fuels Ohio, a non-profit committed to cleaner transportation fuels which is part of the U.S. Department of Energy Clean Cities program
  - Served as Secretary and member of the Executive Committee for the organization
- EPA Automotive Technology Policy Report Reviewer 2012  
Peer Reviewer
- Conducted a ~30 hour peer review of a study of future light-duty vehicle technology used in making policy decisions for future fuel-economy regulations.
- EcoCAR 2 Faculty Advisory Board 2011-12  
Board Member
- Work with Department of Energy staff, Argonne National Labs Staff, General Motors staff, and four other EcoCAR faculty advisors to improve the student design experience for the EcoCAR program
- EPA Light-Duty Vehicle Model Reviewer 2011  
Peer Reviewer
- Conducted a ~30 hour peer review of a study of future light-duty vehicles for the U.S. EPA used for guiding future fuel economy and greenhouse gas emissions regulations
- EPA GEM Model Reviewer 2010  
Peer Reviewer
- Conducted a ~20 hour peer review of a heavy-duty truck model developed by the U.S. EPA used for predicting fuel economy and greenhouse gas emissions

State of Indiana  
Proposal Reviewer

2009

- Reviewed multi-million dollar proposal for Indiana grant program in area of internal combustion engines

**Conference and Session Organization:**

NAFEMS 2019 Session Chair

2019

- Organized session focused on modeling and simulation education

E'COSM 2015 Co-Chair

2015

- Worked with Chair (Giorgio Rizzoni) to host major conference at Ohio State University

**Journal / Conference Publication Reviewer:**

Dr. Midlam-Mohler is a reviewer for the following publications / conferences:

1. International Journal of Vehicle Design
2. International Journal of Powertrains
3. Society of Automotive Engineers World Congress
4. American Society of Mechanical Engineers - Dynamic Systems and Control Conference
5. Institute of Electrical and Electronics Engineers – American Controls Conference
6. Institute of Electrical and Electronics Engineers - Conference on Decision and Control
7. Institute of Electrical and Electronics Engineers - Transactions on Automatic Control
8. Institute of Electrical and Electronics Engineers - Transactions on Power Systems

**Professional Society Membership:**

- ASME
- IEEE
- SAE

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**SCHOLARSHIP**

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Dr. Midlam-Mohler maintains an active research program and has been awarded more than \$10 million in research funding. He has more 1100+ citations and an h-index of 18 via Google Scholar and 650+ citations and an h-index of 14 via SCOPUS. He has more than 100 peer-reviewed conference publications, journal publications, and issued US patents assigned to industry. He has been PI or co-PI on five projects which have generated intellectual property royalties.

**Research Grants/Funding:**

Dr. Midlam-Mohler was PI or co-PI on the following research projects:

Start Date	Duration (Years)	Sponsor	Project Title
8/2005	1.9	Tenneco Automotive	Diesel Particulate Filter Regeneration with External Burner
9/2005	3.3	Tenneco Automotive	Reductant Generation for NOx Remediation
3/2007	0.8	Tenneco Automotive	Heavy-Duty Burner Prototypes and Control Development
3/2007	3.8	General Motors Corp	Development and Implementation of a Methodology, Processes, and Tools to Produce a Hierarchy of Powertrain Models that Enable a Math-Based Virtual Design Environment for Powertrain Control
9/2007	1.6	Nat Energy Tech Lab	Design and Fabrication of Diesel Fuel Atomizers

1/2008	2.0	Tenneco Automotive	Non-Catalytic Reformer Sensitivity Study and Prototype Development
4/2008	4.0	Cummins, Inc	Diesel Engine Combustion Control
9/2008	3.0	Department of Energy / General Motors	EcoCAR 1 Advanced Technology Vehicle Competition
1/2009	3.0	CAR PHEV Consortium	Fleet Studies and Transformer Modeling of PHEVs
4/2009	2.3	FirmGreen, Inc.	Landfill Gas Derived CNG Fuel Cycle Analysis
4/2009	3.4	Cummins, Inc	Cummins CIDI Engine Variability Measurements
4/2009	2.5	Stoneridge	Soot Sensor Testing and Soot Sensor Test Fixture
9/2009	1.3	Henkel Corp	Combustion Chamber Coating Evaluation
5/2010	3.8	Chrysler Group LLC	Advanced Technology Powertrains for Light-Duty Vehicles
10/2010	2.0	CAR Industrial Consortium	Lubricant Effects on Advanced Technology Vehicles
8/2011	3.0	Stoneridge	Fundamental Electrical Properties of Diesel Soot Films on a Diesel Soot Sensor
9/2011	3.0	Department of Energy / General Motors	EcoCAR 2 Advanced Technology Vehicle Competition
8/2012	2.0	Ctr for Trans. & Environment	ECO Saver IV Hybrid Electric Fuel Cell Bus Demonstration
10/2012	2.0	CAR Industrial Consortium	Gasoline Engine Particulate Matter Control
1/2013	0.3	Honda R&D Americas	Automated Vehicle Control Using Low-Cost Sensors
7/2013	0.5	American Electric Power	Plug-In Electric Vehicle Data Analyses, Insights and Reports
12/2013	2.0	Chrysler Group LLC	Model-Based Optimization and Control Methodology for the Design of Chrysler's Next Generation Powertrain Control Systems
9/2014	2.0	Honda R&D Americas	Engine Startability Simulation, Modeling, and Control
9/2014	2.0	Honda R&D Americas	Model-Based Engine Calibration Techniques
9/2014	1.5	CAR Industrial Consortium	HIL Capabilities Development
9/2014	1.5	CAR Industrial Consortium	Flexible Engine ECU Development
9/2014	2.0	Chrysler Group LLC	Model-Based Particulate Filter Diagnosis and Control
9/2014	4	Department of Energy / General Motors	EcoCAR 3 Advanced Technology Vehicle Competition
6/2015	0.3	Harley-Davidson Motorcycles	Development of a Post-Catalyst Air-to-Fuel Ratio Controller
10/2015	2	General Motors	Engine Calibration Using Eigenvariables
9/2016	2	Honda R&D Americas	APEX Phase 1 – 2030 Concept Vehicle R&D
9/2016	3	Honda R&D Americas	1D and 3D Model-Based Engine Design Techniques
9/2016	1.3	Honda R&D Americas	0D Tool Development to Improve Combustion Modeling Performance

10/2016	0.3	Schaeffler Group USA Inc.	Trailer Sway Vehicle Dynamics and Control
11/2016	0.3	Harley-Davidson Motorcycles	Fuel and Air Dynamics Modeling and Compensation for PFI IC Engines
6/2017	3	Honda R&D Americas	Traffic System Modeling for ADAS/Autonomous Vehicles
9/2017	1.5	GE Appliance	Model-Based Heat Flux Sensor Development
10/2017	1.5	Honda R&D Americas	Transmission Modeling for xIL Simulation
12/2017	.75	Honda R&D Americas	Powertrain Optimization for the APEX Autonomous Vehicle
12/2017	.75	Honda R&D Americas	Structural Optimization for the APEX Autonomous Vehicle
6/2018	3	Ford / Honda	Virtual V/V of Autonomous Vehicle Software for Safety
6/2018	2	Trans. Res. Center (TRC)	Development of Virtual Test Cases for AV Safety
6/2019	.5	Honda R&D Americas	Human-Centric Metrics of ADAS Vehicle Drive Quality
9/2018	4	Department of Energy / General Motors	EcoCAR Mobility Challenge
8/2019	.5	Honda R&D Americas	3D Modeling of GDI Combustion
9/2019	.5	NHTSA-VRTC	Evaluation of Open Source Standards for Autonomous Vehicle Test Case Creation

### Journal Publications – In Preparation:

Individuals who were advised/mentored/supervised by Dr. Midlam-Mohler are denoted via **gray highlighting**.

Working Title: Injector Modifications for Partial Needle Lift Experiments with GDI Injectors

Journal Target: FUEL or Int. J. for Engine Research

Status: 80% of first draft completed

Authors: David Hillstrom, Seung-Hyun Jim, Garrett Stockburger, Shawn Midlam-Mohler

Working Title: Novel Experiments for Quantifying Spray Droplet Size vs Needle Lift in GDI Injector

Journal Target: FUEL or Int. J. for Engine Research

Status: Data acquired and validated; part of dissertation being defended in Fall of 2019

Authors: David Hillstrom, Seung-Hyun Jim, Garrett Stockburger, Shawn Midlam-Mohler

Working Title: Online Robust Tube-Based MPC for Obstacle Avoidance and Path Tracking of Autonomous Ground Vehicles

Journal Target: IEEE Transactions on Control Systems Technology or IEEE Transactions on Intelligent Transportation Systems

Status: 80% of first draft complete; part of dissertation being defended in Fall of 2019

Authors: Vivek Bithar, Punit Tulpule, and Shawn Midlam-Mohler

Working Title: Chance Constrained Robust Tube MPC for Collision Avoidance and Path following of Automated Vehicles

Journal Target: Control Engineering Practice

Status: Technical work 90% completed; part of dissertation being defended in Fall of 2019

Authors: Vivek Bithar, Punit Tulpule, and Shawn Midlam-Mohler

Working Title: Model-Based Systems Engineering for Hybrid Vehicle Design and Optimization

Journal Target: International Journal of Vehicle Design

Status: Technical work complete; first draft 50%

Authors: Greg Jankord, Punit Tulpule, and Shawn Midlam-Mohler

Working Title: Dynamic Control of Catalyst Oxygen Storage State in Hybrid Vehicle Supervisory Control

Journal Target: International Journal of Electric and Hybrid Vehicles

Status: Technical work underway; part of dissertation being defended in Spring 2020

Authors: Greg Jankord, Punit Tulpule, and Shawn Midlam-Mohler

### Journal Publications – Published:

Individuals who were advised/mentored/supervised by Dr. Midlam-Mohler are denoted via **gray highlighting**.

1. Gong, Qiuming, Shawn Midlam-Mohler, Emmanuele Serra, Vincenzo Marano, and Giorgio Rizzoni. "PEV Charging Control Considering Transformer Life and Experimental Validation of a 25 kVA Distribution Transformer." *Smart Grid, IEEE Transactions on* 6, no. 2: 648-656. 2015.
2. Hyde, A., Midlam-Mohler, S., and Rizzoni, G., "Development of a Dynamic Driveline Model for a Parallel-Series PHEV," *SAE Int. J. Alt. Power.* 3(2):244-256, 2014, doi: 10.4271/2014-01-1920. 2014.
3. Rajagopalan, S. S., Midlam-Mohler, S., Yurkovich, S., Dudek, K. P., Guezennec, Y. G., & Meyer, J. "A control design and calibration reduction methodology for AFR control in gasoline engines", *Control Engineering Practice*, 27, 42-53. 2014.
4. Bovee, K.; Hyde, A.; Midlam-Mohler, S.; Rizzoni, G.; Yard, M.; Trippel, T. et al. "Design of a Parallel-Series PHEV for the EcoCAR 2 Competition." *SAE International Journal of Fuels and Lubricants*, 5 (3), 1317-1344. doi:10.4271/2012-01-1762. 2012.
5. Gong, Q.; Midlam-Mohler, S.; Marano, V.; Rizzoni, G. "PEV Charging Impact to the Distribution Transformer Life." *IEEE Transactions on Smartgrid*, 3. 2012.
6. Q. Gong, S. Midlam-Mohler, V. Marano, G. Rizzoni, "Statistical Analysis for PHEV Virtual Fleet Study", *International Journal of Vehicle Design*, Vol. 58, Nos. 2/3/4, 2012.
7. Gong, Qiuming, Shawn Midlam-Mohler, Vincenzo Marano, and Giorgio Rizzoni. "Virtual PHEV fleet study based on Monte Carlo simulation." *International Journal of Vehicle Design* 58, no. 2-4 (2012): 266-290. doi:10.1504/IJVD. 047388. 2012.
8. B. Cooley, D. Vezza, S. Midlam-Mohler, G. Rizzoni, "Model Based Engine Control Development and Hardware-in-the-Loop Testing for the EcoCAR Advanced Vehicle Competition", *SAE International Journal on Engines*, Vol. 4, No. 1, pp. 1699 -1707, 2011.
9. Meyer, Jason,A; Yurkovich, Stephen; Midlam-Mohler, Shawn. "A Model Based Estimator for Cylinder Specific Air-to-Fuel Ratio Corrections." *JOURNAL OF DYNAMIC SYSTEMS MEASUREMENT AND CONTROL-TRANSACTIONS OF THE ASME*. Vol. 133, no. 3. : 031001. 2011.
10. Q. Gong, S. Midlam-Mohler, V. Marano, G. Rizzoni, "An Iterative Markov Chain Approach for Generating Vehicle Drive Cycles", *SAE International Journal on Engines*, Vol. 4, No. 1, pp. 1035-1045, 2011.
11. M. Canova, S. Midlam-Mohler, P. Pisu, A. Soliman, "Model-Based Fault Detection and Isolation for a Diesel Lean NOx Trap Aftertreatment System," *Control Engineering Practice*, November 2009.
12. M. Canova, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, "Mean Value Modeling and Analysis of HCCI Diesel Engines with External Mixture Formation," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 131, No. 11, 2009.
13. M. Canova, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, "Theoretical and Experimental Investigation on Diesel HCCI Combustion with External Mixture Preparation," *International Journal of Vehicle Dynamics*, Volume 44, Nos 1-2, 2007.
14. N. Szabo, C. Lee, J. Trimboli1, O. Figueroa, R. Ramamoorthy, S. Midlam-Mohler, A. Soliman, H. Verweij, P. Dutta and S. Akbar, "Ceramic-Based Chemical Sensors, Probes and Field-Tests in Automobile Engines," *Journal of Materials Science*, November, 2003.

## Peer-Reviewed Conference Papers:

All of the following conference publications included presentations by Dr. Midlam-Mohler or one of the co-authors. Individuals who were advised/mentored/supervised by Dr. Midlam-Mohler are denoted via **gray highlighting**. Dr. Midlam-Mohler's students have made more than 25 presentations as conferences.

1. Stoddart, E., Chebolu, S., and Midlam-Mohler, S., "System Engineering of an Advanced Driver Assistance System," SAE Technical Paper 2019-01-0876, 2019. [Student Presented at Conference]
2. Trask, S., Stewart, M., Kerwin, T., and Midlam-Mohler, S., "Effectiveness of Warning Signals in Semi-Autonomous Vehicles," SAE Technical Paper 2019-01-1013, 2019. [Student Presented at Conference]
3. Thomas, C., Tulpule, P., and Midlam-Mohler, S., "Model Order Reduction for x-In the Loop (xIL) Simulation of Automotive Transmissions," SAE Technical Paper 2019-01-1042, 2019. [Student Presented at Conference]
4. Z Zhu, M Canova, S Midlam-Mohler, "A Physics-Based Three-Way Catalytic Converter Model for Real-Time Prediction of Temperature Distribution", International Conference on Automotive Control, 2018.
5. Kibalama, Dennis, et al. Testing and Validation of a Belted Alternator System for a Post-Transmission Parallel PHEV for the EcoCAR 3 Competition. No. 2017-01-1263. SAE Technical Paper, 2017. [Student Presented at Conference]
6. Tulpule, Punit, et al. "Model Based Design (MBD) and Hardware In the Loop (HIL) validation: Curriculum development." American Control Conference (ACC), 2017. IEEE, 2017.
7. Guercioni, G. R., Vigliani, A., Galvagno, E., & Midlam-Mohler, S., "Gearshift control for hybrid powertrains with AMTs." Electrical and Electronic Technologies for Automotive, 2017 International Conference of. IEEE, 2017. [Student Presented at Conference]
8. Yacinthe, S., Khanna, A., Ward, J., Yatsko, M., Midlam-Mohler, S. Development of the Design of a Plug-in Hybrid-Electric Vehicle for the EcoCAR 3. No. 2016-01-1257. SAE Technical Paper, 2016. [Student Presented at Conference]
9. Khanna, A., Yacinthe, S., Ward, J., Yatsko, M., Midlam-Mohler, S. *Model and Controls Development of a Post-Transmission PHEV for the EcoCAR 3 Competition*. No. 2016-01-1252. SAE Technical Paper, 2016. [Student Presented at Conference]
10. Midlam-Mohler, S., Linger, J., & Slavinski, J., & Fiorentini, L. *Project Management Inside and Outside of the Curriculum at the Ohio State University*. ASEE Annual Conference and Exposition, Seattle, Washington, 10.18260/p.24600, 2015. [Student Presented at Conference]
11. Bovee, Katherine, Amanda Hyde, Margaret Yatsko, Matthew Yard, Matthew Organiscak, Bharatkumar Hegde, Jason Ward, Andrew Garcia, Shawn Midlam-Mohler, and Giorgio Rizzoni. *Plant Modeling and Software Verification for a Plug-in Hybrid Electric Vehicle in the EcoCAR 2 Competition*. No. 2015-01-1229. SAE Technical Paper, 2015. [Student Presented at Conference]
12. Hegde, Bharatkumar, Shawn Midlam-Mohler, and Punit J. Tulpule. "Thermal Model of Fuse Dynamics for Simulation Under Intermittent DC Faults." In *ASME 2015 Dynamic Systems and Control Conference*, pp. V002T34A008-V002T34A008. American Society of Mechanical Engineers, 2015. [Student Presented at Conference]
13. Bovee, K.; Rizzoni, G.; Midlam-Mohler, S.; Yard, M.; Yatsko, M.J. *Well-to-wheel analysis and measurement of energy use and greenhouse gas and criteria emissions in a Plug-in Hybrid Vehicle: The EcoCAR 2 case study*, 2015. [Student Presented at Conference]
14. Bovee, K., Hyde, A., Yatsko, M., Yard, M., Organiscak, M., Gallo, E. ... & Midlam-Mohler, S. W., "Refinement of a Parallel-Series PHEV for Year 3 of the EcoCAR 2 Competition", SAE Technical Paper 2014-01-2908, 2014. [Student Presented at Conference]
15. Alley, Robert Jesse, Patrick Walsh, Nicole Lambiase, Brian Benoy, Kristen De La Rosa, Douglas Nelson, Shawn Midlam-Mohler, Jerry Ku, and Brian Fabien. "ESS Design Process Overview and Key Outcomes of Year Two of EcoCAR 2: Plugging in to the Future." SAE Technical Paper, 2014.
16. Hyde, Amanda, Shawn Midlam-Mohler, and Giorgio Rizzoni. "Development of a Dynamic Driveline Model for a Parallel-Series PHEV." SAE Technical Paper, 2014. [Student Presented at Conference]
17. Bovee, K., Hyde, A., Yard, M., Gallo, E., Garcia, A., Organiscak, M., Midlam-Mohler, S. W. & Rizzoni, G., "Fabrication of a Parallel-Series PHEV for the EcoCAR 2 Competition", SAE Technical Paper 2013-01-2491, 2013. [Student Presented at Conference]

18. Gong, Q., S. Midlam-Mohler, E. Serra, V. Marano, and G. Rizzoni. "PEV charging control for a parking lot based on queuing theory." In *American Control Conference (ACC), 2013*, pp. 1124-1129. IEEE, 2013. [Student Presented at Conference]
19. Meyer, Jason, Stephen Yurkovich, and Shawn Midlam-Mohler. "Air-to-Fuel Ratio Switching Frequency Control for Gasoline Engines." In *Control Systems Technology, IEEE Transactions on*, 21:636-48, 2013. [Student Presented at Conference]
20. Bezaire, Beth, and Shawn Midlam-Mohler. "A Physically-Based, Lumped-Parameter Model of an Electrically-Heated Three-Way Catalytic Converter." SAE Technical Paper, 2012. [Student Presented at Conference]
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22. Bovee, Katherine, Amanda Hyde, Travis Trippel, Vignesh Vimalasan, Sabarish Gurusubramanian, Kishore Kumaraswamy Sai, Shawn Midlam-Mohler, and Giorgio Rizzoni. "Rapid Vehicle Architecture Selection With Use of Autonomic." In *ASME 2012 5th Annual Dynamic Systems and Control Conference Joint with the JSME 2012 11th Motion and Vibration Conference*, 119-28. American Society of Mechanical Engineers, 2012. [Student Presented at Conference]
23. Gong, Qiuming, Shawn Midlam-Mohler, Vincenzo Marano, and Giorgio Rizzoni. "Study of PEV Charging on Residential Distribution Transformer Life." In *Smart Grid, IEEE Transactions on*, 3:404-12, 2012.
24. Gong, Q., S. Midlam-Mohler, V. Marano, and G. Rizzoni. "Distribution of PEV Charging Resources to Balance Transformer Life and Customer Satisfaction." In *Electric Vehicle Conference (IEVC), 2012 IEEE International*, 1-7. IEEE, 2012. [Student Presented at Conference]
25. Gong, Q., S. Midlam-Mohler, E. Serra, V. Marano, and G. Rizzoni. "Distribution Transformer Tests for PEV Smart Charging Control." In *Energytech, 2012 IEEE*, 1-6. IEEE, 2012. [Student Presented at Conference]
26. Skarke, Philipp, Shawn Midlam-Mohler, and Marcello Canova. "Waste Heat Recovery From Internal Combustion Engines: Feasibility Study on an Organic Rankine Cycle With Application to the Ohio State EcoCAR PHEV." In *ASME 2012 Internal Combustion Engine Division Fall Technical Conference*, 609-15. American Society of Mechanical Engineers, 2012.
27. Q. Gong, S. Midlam-Mohler, V. Marano, G. Rizzoni, "Optimal Control of PEV Charging Based on Residential Base Load Prediction", ASME Dynamic Systems and Control Conference (DSCC), 2011. [Student Presented at Conference]
28. J. Meyer, S. Midlam-Mohler, S. Yurkovich, "In-cylinder Oxygen Concentration Estimation for Diesel Engines Via Transport Delay", American Control Conference, 2011. [Student Presented at Conference]
29. K. Follen, M. Canova, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, B. Lee, G. Matthews, "A High Fidelity Lumped-Parameter Engine Model for Powertrain Control Design and Validation.", ASME Dynamic Systems and Control Conference, Cambridge, MA, United States, 2011. [Student Presented at Conference]
30. Cooley, Robert, Davide Veza, Shawn Midlam-Mohler, and Giorgio Rizzoni. "Model Based Engine Control Development and Hardware-in-the-Loop Testing for the EcoCAR Advanced Vehicle Competition." SAE Technical Paper, 2011. [Student Presented at Conference]
31. Gong, Qiuming, Shawn Midlam-Mohler, Vincenzo Marano, and Giorgio Rizzoni. "An Iterative Markov Chain Approach for Generating Vehicle Driving Cycles." SAE Technical Paper, 2011.
32. Gong, Q., S. Midlam-Mohler, V. Marano, and G. Rizzoni. "PEV Charging Impact on Residential Distribution Transformer Life." In *Energytech, 2011 IEEE*, 1-6. IEEE, 2011. [Student Presented at Conference]
33. Gong, Q., P. Tulpule, V. Marano, S. Midlam-Mohler, and G. Rizzoni. "The Role of ITS in PHEV Performance Improvement." In *American Control Conference (ACC), 2011*, 2119-24. IEEE, 2011.
34. Marano, V., P. Tulpule, Q. Gong, A. Martinez, S. Midlam-Mohler, and G. Rizzoni. "Vehicle Electrification: Implications on Generation and Distribution Network." In *Electrical Machines and Systems (ICEMS), 2011 International Conference on*, 1-6. IEEE, 2011.
35. Meyer, Jason, Shawn Midlam-Mohler, and Stephen Yurkovich. "In-Cylinder Oxygen Concentration Estimation for Diesel Engines via Transport Delay Modeling." In *American Control Conference (ACC), 2011*, 396-401. IEEE, 2011. [Student Presented at Conference]
36. Bayar, Kerem, Beth Bezaire, Brad Cooley, John Kruckenberg, Eric Schacht, Shawn Midlam-Mohler, and Giorgio Rizzoni. "Design of an Extended-Range Electric Vehicle for the EcoCAR Challenge." In *ASME 2010 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, 687-700. American Society of Mechanical Engineers, 2010. [Student Presented at Conference]



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38. Gong, Qiuming, Shawn Midlam-Mohler, Vincenzo Marano, Giorgio Rizzoni, and Yann Guezennec. "Statistical Analysis of Phev Fleet Data." In *Vehicle Power and Propulsion Conference (VPPC), 2010 IEEE*, 1–6. IEEE, 2010.
39. Meyer, Jason, Stephen Yurkovich, and Shawn Midlam-Mohler. "Architectures for Phase Variation Compensation in AFR Control." In *American Control Conference (ACC), 2010*, 1447–52. IEEE, 2010.
40. R. Maringanti, S. Midlam-Mohler, M. Fang, F. Chiara, M. Canova, "Set-Point Generation using Kernel-Based Methods for Closed-Loop Combustion Control of a CIDI Engine," ASME DSCC2009, September, 2009.
41. J. Meyer, S. Rajagopalan, S. Midlam-Mohler, Y. Guezennec, S. Yurkovich, "Application of an Exhaust Geometry Based Delay Prediction Modal to an Internal Combustion Engine," ASME DSCC2009, September, 2009.
42. M. Fang, S. Midlam-Mohler, R. Maringanti, F. Chiara, M. Canova, "Optimal Performance of Cylinder-by-Cylinder and Fuel Bank Controllers for a CIDI Engine," ASME DSCC2009, September, 2009.
43. S. Midlam-Mohler, E. Marano, S. Ewing, D. Ortiz, G. Rizzoni, "PHEV Fleet Data Collection and Analysis," IEEE VPPC09, 2009.
44. L. Headings, G. Washington, S. Midlam-Mohler, J. Heremans, "Thermoelectric Power Generation for Hybrid-Electric Vehicle Auxiliary Power," Proc. SPIE Int. Conference on Smart Structures and Materials, Vol. 7290, No. 13, 2009.
45. L. Headings, G. Washington, S. Midlam-Mohler, and J. Heremans, "High temperature multi-fuel combustion-powered thermoelectric auxiliary power unit", Proceedings of SMASIS2009: ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, Oxnard, CA, USA, ASME, 123-130, 2009.
46. M. Canova, S. Midlam-Mohler, G. Rizzoni, F. Steimle, D. Boland, M. Bargende, "A Simulation Study of an E85 Engine APU for a Series Hybrid Electric Vehicle," 9th Stuttgart International Symposium on Automotive and Engine Technology, Stuttgart, Germany, 2009.
47. K. Koprubasi, A. Pezzini, B. Bezaire, R. Cooley, P. Tulpule, G. Rizzoni, Y. Guezennec, S. Midlam-Mohler, "Application of Model-Based Design Techniques for the Control Development and Optimization of a Hybrid-Electric Vehicle", SAE World Congress 2009, Detroit, MI.
48. S. Rajagopalan, S. Midlam-Mohler, S. Yurkovich, Y. Guezennec, K. Dudek, "Control Oriented Modeling of a Three Way Catalyst Coupled with Oxygen Sensors," ASME Dynamic System and Controls Conference, Ann Arbor, MI, 2008.
49. L. Headings, S. Midlam-Mohler, G. Washington, and J. P. Heremans, "High Temperature Thermoelectric Auxiliary Power Unit for Automotive Applications," ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems, 2008, Paper #610.
50. K. Sevel, M. Arnett, K. Koprubasi, C. Coburn, M. Shakiba-Heref, K. Bayar, G. Rizzoni, Y. Guezennec, S. Midlam-Mohler, "Cleaner Diesel Using Model-Based Design and Advanced Aftertreatment," SAE 2008-01-0868, 2008 International Congress, Detroit, MI, April 2008.
51. K. Dudek, B. Montello, J. Meyer, S. Midlam-Mohler, Y. Guezennec, and S. Yurkovich, "Rapid Engine Calibration for Volumetric Efficiency and Residuals by Virtual Engine Mapping," International Congress on Virtual Power Train Creation 2007, Munich, Germany, October 24-25, 2007.
52. M. Canova, S. Midlam-Mohler, Y. Guezennec, A. Soliman, and G. Rizzoni, "Control-Oriented Modeling of NOx Aftertreatment Systems," SAE ICE'07 Conference, Capri, Italy, September 2007.
53. M. Canova, F. Chiara, J. Cowgill, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, "Experimental Characterization of Mixed-Mode HCCI/DI Combustion on a Common Rail Diesel Engine," 8<sup>th</sup> International Conference on Engines for Automobile (ICE2007), Capri, Italy.
54. M. Canova, F. Chiara, M. Flory, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, "Experimental Characterization of Mixed Mode HCCI/DI Combustion on a Common Rail Diesel Engine," submitted to SAE ICE'07 Conference, Capri, Italy, September 2007.
55. M. Canova, M. Flory, Y. Guezennec, S. Midlam-Mohler, G. Rizzoni, and F. Chiara, "Dynamics and Control of DI and HCCI Combustion in a multi-cylinder Diesel engine," Paper 44, submitted to 5th IFAC Symposium on Advances in Automotive Control, Pajaro Dunes/Seascape, CA, August 2007.
56. A. Vosz, S. Midlam-Mohler, and Y. Guezennec, "Experimental Investigation of Switching Oxygen Sensor Behavior Due to Exhaust Gas Effects," Proc. of IMECE '06, Paper IMECE 2006-14915, Chicago, IL, November 2006.

57. S. Midlam-Mohler and Y. Guezennec, "A Temperature-Based Technique for Temporally and Spatially Resolved Lean NO<sub>x</sub> Trap Catalyst NO<sub>x</sub> Measurements," Proc. of IMECE '06, Paper IMECE 2006-14887, Chicago, IL, November 2006.
58. M. Canova, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, L. Garzarella, M. Ghisolfi, and F. Chiara, "Experimental Validation for Control-Oriented Modeling of Multi-Cylinder HCCI Diesel Engines," Proc. of IMECE '06, Paper IMECE 2006-14110, Chicago, IL, November 2006.
59. A. Soliman, S. Midlam-Mohler, Z. Zou, Y. Guezennec, and G. Rizzoni, "Modeling and Diagnostics of NO<sub>x</sub> Aftertreatment Systems," Proc. FISITA '06, Yokohama, Japan, October 2006.
60. Z. Zou, S. Midlam-Mohler, R. Annamalai, Y. Guezennec, V. Subramaniam, "Literature Survey of On-Board Hydrogen Generation Methods for Diesel Powertrains," Global Powertrain Conference, Novi, MI, Not Peer Reviewed, September 2006.
61. S. Midlam-Mohler and Y. Guezennec, "Regeneration Control for a Bypass-Regeneration Lean NO<sub>x</sub> Trap System," American Control Conference '06, Minneapolis, MN, Invited paper, June 2006.
62. A. Soliman, I. Choi, S. Midlam-Mohler, Y. Guezennec, G. Rizzoni, "Modeling and Diagnostics of NO<sub>x</sub> After-Treatment Systems," SAE Paper 2006-05-0208, 2006 International Congress, Detroit, MI, April 2006.
63. S. Midlam-Mohler and Y. Guezennec, "Design, Modeling and Validation of a Flame Reformer for LNT External By-Pass Regeneration," SAE Paper 2006-01-1367, 2006 SAE International Congress, Detroit, MI, April 2006.
64. S. Midlam-Mohler, and Y. Guezennec, "Modeling of a Partial Flow Diesel, Lean NO<sub>x</sub> Trap System," Proc. of IMECE '05, Paper IMECE 2005-80834, Orlando, FL, November 2005.
65. M. Canova, L. Garzarella, M. Ghisolfi, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "A Control-Oriented Mean-Value Model of HCCI Diesel Engines with External Mixture Formation," Proc. of IMECE '05, Paper IMECE 2005-79571, Orlando, FL, November 2005.
66. A. Soliman, P. Jackson, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "Diagnosis of a NO<sub>x</sub> Aftertreatment System," ICE 2005 7th International Conference on Engines for Automobiles, Capri, Italy, September 2005.
67. M. Canova, L. Garzarella, M. Ghisolfi, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "A Mean-Value Model of a Turbo-Charged HCCI Diesel Engine with External Mixture Formation," ICE 2005 7th International Conference on Engines for Automobiles, Capri, Italy, September 2005.
68. M. Canova, R. Garcin, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "A Control-Oriented Model of Combustion Process in HCCI Diesel Engines," American Control Conference '05, Portland, OR, June 2005.
69. C. Musardo, B. Staccia, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "Supervisory Control for NO<sub>x</sub> Reduction of an HEV with a Mixed-Mode HCCI/CIDI Engine," American Control Conference '05, Portland, OR, June 2005.
70. M. Canova, A. Vosz, D. Dumbauld, R. Garcin, S. Midlam-Mohler, Y. Guezennec, and G. Rizzoni, "Model and Experiments of Diesel Fuel HCCI Combustion with External Mixture Formation," 6th Stuttgart International Symposium on Motor Vehicles and Combustion Engines, Stuttgart, Germany, Not peer reviewed, February 2005.
71. S. Midlam-Mohler, S. Haas, Y. Guezennec, M. Bargende, G. Rizzoni, S. Haas, and H. Berner, "Mixed-Mode Diesel HCCI/DI with External Mixture Preparation," Paper F2004V258, Proc. FISITA '04 World Congress, Barcelona, Spain, May 2004.
72. Y. Guezennec, C. Musardo, B. Staccia, S. Midlam-Mohler, E. Calo, P. Pisu, and G. Rizzoni, "Supervisory Control for NO<sub>x</sub> Reduction of an HEV with a Mixed-Mode HCCI/DI Engine," Paper F2004F233, Proc. FISITA '04 World Congress, Barcelona, Spain, May 2004.
73. M. Gilstrap, G. Anceau, C. Hubert, M. Keener, S. Midlam-Mohler, K. Stockmeier, J-M Vespasien, Y. Guezennec, F. Ohlemacher, and G. Rizzoni, "The 2002 Ohio State University FutureTruck – The BuckHybrid002," 2003 SAE International Congress and Exposition, Detroit, MI, March 2003.
74. Y. Guezennec, S. Midlam-Mohler, M. Tateno, and M. Hopka, "A 2-Stage Approach to Diesel Emission Management in Diesel Hybrid Electric Vehicles," Proc. 2002 IFAC Meeting, Barcelona, Spain, July 2002.

#### **Patents:**

In addition to the following patents, Dr. Midlam-Mohler has a number of trade secrets in use in industry around control algorithms or processes. Industry often chooses not to patent these as it offers greater protection because of the difficulty in enforcement.

1. S. Midlam-Mohler, J. Meyer, S. Yurkovich, V. Sujun, "Combustion controller for internal combustion engine", US Patent 9,353,696, issued May 31, 2016.

2. Rajagopalan, Sai SV, Kenneth P. Dudek, Sharon Liu, Stephen Yurkovich, Shawn W. Midlam-Mohler, Yann G. Guezennec, and Yiran Hu. "Universal tracking air-fuel regulator for internal combustion engines." U.S. Patent 8,571,785, issued October 29, 2013.
3. J. Meyer, S. Midlam-Mohler, K. Dudek, S. Yurkovich, Y. Guezennec, "Fuel control system and method for more accurate response to feedback from an exhaust system with an air/fuel equivalence ratio offset", U.S. Patent 8,347,866, awarded January 8, 2013.
4. S. Midlam-Mohler, S. Rajagopalan, K. Dudek, S. Yurkovich, Y. Guezennec, "Compensating for random catalyst behavior", 8,346,458, January 1, 2013.
5. J. Meyer, S. Midlam-Mohler, K. Dudek, S. Yurkovich, Y. Guezennec, "Delay calibration systems and methods", U.S. Patent 8,265,858, awarded September 11, 2012.
6. S. Rajagopalan, J. Meyer, S. Midlam-Mohler, K. Dudek, S. Yurkovich, Y. Guezennec "Control systems and methods using geometry based exhaust mixing model", U.S. Patent 8,224,557, awarded July 17, 2012.
7. J. Meyer, S. Midlam-Mohler, K. Dudek, S. Yurkovich, Y. Guezennec, "Fuel control system and method for improved response to feedback from an exhaust system", U.S. Patent 8,186,336, awarded May 29, 2012.
8. J. Meyer, S. Midlam-Mohler, K. Dudek, S. Yurkovich, Y. Guezennec, "Delay compensation systems and methods", U.S. Patent 8,113,187, awarded 2/12/2012.
9. Y. Hu, K. Dudek, S. Midlam-Mohler, Y. Guezennec, S. Yurkovich, L. Wiggins, "System and method for determining a camshaft position in a variable valve timing engine", U.S. Patent 8,096,271, awarded 1/17/2012.
10. S. Liu, K. Dudek, S. Rajagopalan, S. Yurkovich, Y. Hu, Y. Guezennec, S. Midlam-Mohler, "Off-line calibration of universal tracking air fuel ratio regulators", U.S. Patent 7,925,421, awarded 4/12/2011.
11. K. Dudek, S. Rajagopalan, S. Yurkovich, Y. Hu, Y. Guezennec, S. Midlam-Mohler, L. Avallone, I. Anilovich, "Air fuel ratio control system for internal combustion engines", U.S. Patent 7,937,209, awarded 5/3/2011.
12. S. Midlam-Mohler, B. Masterson, "System for Controlling NOx Emissions during Restarts of Hybrid and Conventional Vehicles," U.S. Patent 7,257,493, awarded 3/21/07.
13. S. Midlam-Mohler, "System and Method for Reducing NOx Emissions after Fuel Cut-Off Events," U.S. Patent 7,051,514, awarded 5/30/06.

### **Intellectual Property Royalties:**

The following five research projects involved royalty payments to OSU for exclusive rights to IP from the research project. None of these projects resulted in patents, instead, the company uses the IP as a trade secret.

1. Model-based optimization and control methodology for the design of Chrysler's next generation powertrain control systems, 12/01/2013 - 11/30/2015, Co-PI
2. Model-Based Gasoline Particulate Filter System Design, Control, And Diagnosis 07/01/2014 - 07/15/2016, Sole PI
3. Engine Startability Simulation, Modeling, And Control 09/01/2014 - 02/28/2017, Sole PI
4. Engine Calibration Using Eigenvariables, 10/15/2014 - 09/15/2016, Lead PI
5. Model-Based Heat Flux Sensor Development, 09/01/2017 - 12/31/2018, Lead PI

### **Applied R&D Projects Judged in Juried Competitions:**

The following table contains awards earned by the EcoCAR team which Dr. Midlam-Mohler advises. Entry into the competition is competitive and has included many well-regarded engineering schools.. Awards are decided by either quantitative evaluation of vehicle performance or via qualitative assessment by panels of ~6 to ~12 experts from industry, the Department of Energy, and Argonne National Lab.

#### EcoCAR Mobility Challenge

2019

Competition Sponsors: U.S. Department of Energy, General Motors, and The Mathworks

1. 1st Place Overall
2. 1st place: Target Market Presentation
3. 1st place: Controls and Systems Modeling & Simulation Presentation
4. 2nd place: Connected and Automated Vehicle Systems Presentation
5. 3rd place: Propulsion System Integration Presentation
6. Best Final Technical Report
7. 2nd Place in Connected and Automated Vehicle Systems Deliverables

8. 2nd Place: NSF Excellence in Connected and Automated Vehicles
9. 1st Place NSF Diversity in Engineering Award

EcoCAR 3 Competition

2018

Competition Sponsors: U.S. Department of Energy and General Motors

10. 1st Place Overall
11. Best Emissions Testing Event Performance
12. NSF Best Innovation Research Papers
13. 1st TRC Best Total Energy Consumption Award
14. 1st TRC Best Wheel-to-Well Petroleum Energy Usage
15. 1st Over the Road Event
16. 1st dSPACE Embedded Success Award
17. General Motors Women in Engineering Rookie Award
18. NSF Diversity in Engineering Award
19. 1st Vehicle Design Report
20. 1st Consumer Appeal
21. 1st Innovation Presentation
22. 2nd Control and SMS Presentation
23. 2nd Mechanical Presentation
24. 2nd Mathwork Modeling Award
25. 3rd ADAS Presentation

EcoCAR 3 Competition

2017

Competition Sponsors: U.S. Department of Energy and General Motors

26. Overall Competition, 1st Place
27. Overall Project Management, 1st Place
28. Vehicle Design Report, 1st Place
29. Project Status Presentation, 1st Place
30. Innovation Presentation, 3rd Place
31. Consumer Appeal Event, 2nd Place
32. ECE Presentation, 1st Place
33. Mechanical Presentation, 2nd Place
34. E&EC UFW Total Energy Consumption, 1st Place
35. E&EC UFW WTW Criteria Emissions, 1st Place
36. E&EC UFW WTW GHG Emissions, 1st Place
37. E&EC UFW WTW PEU, 1st Place

EcoCAR 3 Competition

2016

Competition Sponsors: U.S. Department of Energy and General Motors

38. Overall Competition, 1st Place
39. Overall Project Management, 2nd Place
40. Competition Project Status Presentation, 2nd Place
41. Controls Presentation, 1st Place
42. Electrical Presentation, 1st Place
43. Final Technical Report, 2nd Place
44. Mechanical Presentation, 2nd Place
45. Vehicle Design Report, 1st Place
46. Vehicle Design Review, 3rd Place
47. WW HIL Review, 1st Place

EcoCAR 3 Competition

2015

Competition Sponsors: U.S. Department of Energy and General Motors

48. 1st Place Overall
49. Best Final Stakeholder Status Presentation

- 50. Best Winter Workshop Innovation Topic Review
- 51. Best Innovation Presentation
- 52. Best Control Systems Presentation
- 53. Best Trade Show Presentation
- 54. SMS Presentation and Demonstration
- 55. Best Consumer Market Research Report
- 56. 2nd Place Project Management
- 57. dSPACE Embedded Success Award, 1st Place
- 58. MathWorks Modeling Award, 2nd Place

EcoCAR 2 Competition

2014

Competition Sponsors: U.S. Department of Energy and General Motors

- 59. 1st Place Overall
- 60. Lowest Petroleum Energy Use
- 61. Lowest Criteria Emissions
- 62. Best Final Technical Report
- 63. Best Static Consumer Acceptability
- 64. Best Controls Presentation
- 65. Best Electrical Presentation
- 66. Best Progress Reports
- 67. ETAS ECU Excellence Award, 1st Place
- 68. dSPACE Embedded Success Award, 1st Place
- 69. MathWorks Modeling Award, 2nd Place

EcoCAR 2 Competition

2013

Competition Sponsors: U.S. Department of Energy and General Motors

- 70. 3rd Place Overall
- 71. Best Final Technical Report
- 72. Best Electrical Presentation
- 73. Best Progress Reports
- 74. Women in Engineering Award
- 75. MathWorks Modeling Award, 2nd Place

EcoCAR 2 Competition

2012

Competition Sponsors: U.S. Department of Energy and General Motors

- 76. 2nd Place Overall
- 77. Best Winter Workshop Controller HIL Evaluation, 2nd Place
- 78. Best Project Initiation Approval Presentation, 2nd Place
- 79. Best Controls Presentation, 3rd Place
- 80. Best Final Controller HIL Evaluation, 1st Place
- 81. Best Trade Show Evaluation, 2nd Place
- 82. dSPACE Embedded Success Awards, 1st Place
- 83. MathWorks Modeling Award, 1st Place
- 84. Women in the Winner's Circle Foundation Women in Engineer Awards

EcoCAR Competition

2011

Competition Sponsors: U.S. Department of Energy and General Motors

- 85. 2nd Place Overall
- 86. Best Controls Presentation
- 87. Freescale Innovation Award
- 88. The MathWorks Modeling Award, 2nd Place
- 89. dSPACE Embedded Success Award, 2nd Place
- 90. BOSCH Diversity in Engineering Award, 1st Place

EcoCAR Competition

2010

Competition Sponsors: U.S. Department of Energy and General Motors

91. 5th Place Overall
92. HIL Evaluation Event, 1st Place
93. Dynamic Consumer Acceptability, 1st Place
94. Freescale Silicon on the Move Award
95. The MathWorks Modeling Award, 1st Place
96. dSPACE Embedded Success Award, 1st Place
97. BOSCH Diversity in Engineering Award, 3rd Place
98. Women in the Winner's Circle Foundation, Women in Engineering Award

EcoCAR Competition

2009

Competition Sponsors: U.S. Department of Energy and General Motors

99. 1st Place Overall
100. Best Written Design Report
101. HIL Evaluation Event, 1st Place
102. Controls Event Presentation, 1st Place
103. Best Trade Show Display and Presentation
104. Best Technical Success Story
105. Freescale Silicon on the Move Award, 3rd Place
106. dSPACE Embedded Success Award, 1st Place
107. BOSCH Diversity in Engineering Award, 1st Place