

## CV for Greg Shaver

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### Summary, Impact & Vision.

Greg Shaver is a Full Professor, University Faculty Scholar, College of Engineering Early Career Research Award recipient, and ASME Fellow. He joined the Purdue Faculty in 2006. He is focused on creating challenging, interesting, relevant, career-launching research and learning opportunities for Purdue students. His research program is dedicated to clean, safe, and efficient commercial vehicles – via advanced diesel & natural gas engine systems/controls/electrification, powertrain electrification, and vehicle automation/connectivity. His efforts are well known in the industry and regulatory agencies. As an example, his research has enabled greater compression ignition (CI) engine efficiency and emissions control through variable valve actuation (VVA). Prof. Shaver's research on VVA was heavily cited, and promoted, in June 2020 by the California Air Resources Board (CARB) as well as in Jan. 2020 by the EPA with respect to new emission standards for heavy-duty engines. These rule changes will carry significant long-term impacts for the environment, as industry leaders such as Cummins, Eaton, and many others, adopt these standards in their engine technologies and export them globally. Greg's students have published more than 130 peer-reviewed journal and conference papers. Greg has directed the research efforts of more than 135 current/former Purdue students (62 graduate, 75 undergraduate). Of his 47 former graduate students (18 PhD, 29 MSME) one-fourth are women, more than half are now working at industry partner companies, and two are tenure-track faculty (1 assistant, 1 associate). As a member of the Purdue faculty, Greg has acquired \$17.6M in research funding for projects that he has also led. \$13.3M (of the \$17.6M) has been for direct use within his own research team, and \$8.6M (of the \$17.6M) has been funding directly from industry partner companies (including John Deere (\$1.4M), Cummins (\$4.9M), Eaton (\$1.4M), and Caterpillar (\$0.5M)). Federal funding sources include DOE (EERE & ARPA-E), DOT, NSF, and EPA. Greg earned graduate (PhD 2005, MSME 2004) and undergraduate (BSME 2000 w/ highest distinction) degrees from Stanford and Purdue, respectively. His research is currently funded by DOE, Cummins, Eaton, and Deere.

### Research and Professional Experience.

- Purdue University School Mechanical Engineering Full Professor (July 1, 2016 – present), Associate Professor (July, 1, 2011 – June 30, 2016), and Assistant Professor (August 2006-June 2011)
- Stanford University Graduate Research Assistant, 2000-05
- Purdue University Co-Op Student for AlliedSignal Inc. (now Honeywell) Aerospace 1996-1999

### Honors and awards.

- Elected ASME Fellow in 2020
- 2019 SAE John Johnson Best Paper Award for Outstanding Research in Diesel Engines
- 2014 Early Career Excellence in Research Award, Purdue University College of Engineering
- 2014 Purdue University Faculty Scholar
- 2013 Ralph Teetor Educational Award
- Best paper in Journal of Automobile Engineering for year 2012
- 2011 SAE Max Bentele Award for Engine Technology Innovation
- 2003, 2004, & 2005 American Control Conference - best presentation in session award
- 2005 Best paper in the ASME Journal of Dynamic Systems Measurement and Control

### University service highlights.

- Search Committees for Purdue's current Engineering Dean & Mechanical Engineering Head
- Provost's Faculty Advisory Committee on Diversity and Inclusion (current)
- Engineering Faculty Affairs Committee (previous)
- Mechanical Engineering Leadership Team (current)
- Purdue's Inaugural Coaching and Resource Network (ongoing)
- Search Committee Chair, Autonomous and Connected Systems, Mechanical Engineering (previous)

## Education and Training

Ph.D./Masters Mechanical Engineering, Stanford University, June 2005

B.S.M.E. Mechanical Engineering, Purdue University, 2000, with highest distinction

## Publications and Presentations

**Refereed journal papers: 76** (74 published/accepted, 2 submissions eminent)

1. Gregory M. Shaver\*, Matthew J. Roelle, J. Christian Gerdes, Patrick A. Caton and Christopher F. Edwards, Dynamic Modeling of HCCI Engines Utilizing Variable Valve Actuation, *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 127, no. 3, pp. 374-381, September 2005 (Selected as the best paper published in the Journal of Dynamic Systems, Measurement and Control, 2005)
2. Gregory M. Shaver\*, Matthew J. Roelle, J. Christian Gerdes, Jean-Pierre Hathout, Jasim Ahmed, Aleksandar Kojic, Patrick A. Caton and Christopher F. Edwards, A Physics-Based Approach to Control of HCCI Engines with Variable Valve Actuation, *International Journal of Engine Research*, vol. 6, no. 4, pp. 361-375(15), July 2005
3. Gregory M. Shaver\*, Matthew J. Roelle, J. Christian Gerdes, Modeling Cycle-to-Cycle Dynamics and Mode Transition in HCCI Engines with Variable Valve Actuation, *IFAC Journal on Control Engineering Practice (CEP)*, vol. 14, no. 3, pp. 213-222, March 2006
4. Gregory M. Shaver\*, Matthew J. Roelle and J. Christian Gerdes, Physics-based Modeling and Control of Residual-Affected HCCI Engines, *ASME Journal of Dynamic Systems, Measurement and Control*, Volume 131, Issue 2, March 2009
5. David Snyder\*, Gayatri Adi\*, Mike Bunce, and Gregory M. Shaver, Steady-state Biodiesel Blend Estimation via a Wideband Oxygen Sensor, *The ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 131, no. 4, July 2009
6. Gayatri Adi\*, Carrie Hall\*, David Snyder\*, Mike Bunce, Chris Satkoski, Shankar Kumar, Phanindra Garimella, Donald Stanton and Gregory M. Shaver, Soy-Biodiesel Impact on NOx Emissions and Fuel Economy for Diffusion Dominated Combustion in a Turbo-Diesel Engine Incorporating EGR and Common Rail Fuel Injection, *Energy and Fuels*, 23 (12), pp.5821–5829, October 2009
7. Gregory M. Shaver, Stability Analysis of Residual-Affected HCCI using Convex Optimization, *IFAC Control Engineering Practice Special Issue – Advance in Automotive Control*, Volume 17, Issue 12, pp. 1454-1460, December 2009
8. Aman Yadav\*, Gregory M. Shaver\*, and Peter Meckl, Lessons learned: Implementing the case teaching method in a mechanical engineering course, *Journal of Engr. Education*, 99(1), pp. 55-69, Jan 2010
9. Anup Kulkarni\*, Sriram S. Popuri, Gregory M. Shaver, Tim R. Frazier, and Donald W. Stanton, Computationally Efficient Whole-Engine Model of a Cummins 2007 Turbocharged Diesel Engine, *The ASME Journal of Engineering for Gas Turbines and Power*, Volume 132, Issue 2, February 2010
10. Mike Bunce\*, David Snyder\*, Gayatri Adi\*, Carrie Hall, Jeremy Koehler, Bernie Davila, Shankar Kumar, Phanindra Garimella, Don Stanton, and Greg Shaver, Stock and Optimized Performance and Emissions with 5 and 20% Soy-Biodiesel Blends in a Modern Common Rail Turbo-Diesel Engine, *Energy and Fuels*, 24 (2), pp. 928–939, February 2010
11. David Snyder\*, Gayatri Adi, Mike Bunce, Chris Satkoski, and Gregory M. Shaver, Fuel Blend Fraction Estimation for Fuel-Flexible Combustion Control: Uncertainty Analysis, *IFAC Control Engineering Practice*, Volume 18, Issue 4, pp. 418-432, April 2010
12. Anup Kulkarni\*, Karla Stricker, Angeline Blum, and Gregory M. Shaver, PCCI Control Authority of a Modern Diesel Engine Outfitted with Flexible Intake Valve Actuation, *ASME Journal of Dynamic Systems, Measurement and Control*, Volume 132, Issue 5, 15 pages, September 2010
13. Chris Satkoski\*, Greg Shaver, Piezoelectric Fuel Injection - Pulse-to-Pulse Coupling and Flow Rate Estimation, *ASME/IEEE Transactions on Mechatronics*, volume 16, issue 4, August 2011
14. Chris Satkoski\*, Greg Shaver, Ranjit More, Peter Meckl, Douglas Memering, Shankar Venkataraman, Jalal Syed, and Jesus Carmon-Valdes, Dynamic Modeling of a Piezoelectric Actuated Fuel Injector, *ASME Journal of Dynamic Systems, Measurement, and Control*, vol. 133 (5), 2011.

15. Rajani Modiyani\*, Lyle Kocher\*, Dan Van Alstine\*, Ed Koeberlein, Karla Stricker, Paul Meckl, and Gregory M. Shaver, Effect of Intake Valve Closure Modulation on Effective Compression Ratio and Gas Exchange in Modern, Multi-Cylinder Diesel Engines, *International Journal of Engine Research*, vol. 12 (6), 2011
16. Michael Bunce\*, David Snyder\*, Gayatri Adi\*, Carrie Hall, Jeremy Koehler, Bernabe Davila, Phanindra Garimella, Shankar Kumar, Donald Stanton, and Gregory M. Shaver, Optimization of Soy-Biodiesel Combustion in a Modern Diesel Engine, *Fuel*, vol. 90 (8), pp. 2560-2570, 2011
17. David Snyder\*, Gayatri Adi, Carrie Hall, Michael Bunce, and Gregory M. Shaver, Control-Variable-Based Accommodation of biodiesel blends, *International Journal of Engine Research*, vol. 12 (6), pgs 564-579, December 2011
18. Karla Stricker\*, Lyle Kocher\*, Ed Koeberlein, Dan Van Alstine, and Gregory M. Shaver, Turbocharger Map Reduction for Control-Oriented Modeling, *Journal of Dynamic Systems, Measurement, and Control* Volume 136 (4), April 2014, 13 pages.
19. Lyle Kocher, Ed Koeberlein, Dan Van Alstine, Karla Stricker, and Gregory M. Shaver, Physically-Based Volumetric Efficiency Model for Diesel Engines Utilizing Variable Intake Valve Actuation, *International Journal of Engine Research*, vol. 13, 2, pgs. 169-184, April 2012
20. Gayatri Adi\*, Carrie Hall\*, David Snyder, Whitney Belt, and Gregory M. Shaver, Fuel Flexible Combustion Control of Biodiesel Blends During Mixing-Controlled Combustion, *ASME Journal of Dynamic Systems, Measurement, and Control*, 135 (6), August 2013
21. Chris A. Satkoski\*, Neha S. Ruikar, Scott D. Biggs, and Gregory M. Shaver, Piezo-electric Fuel Injection – Cycle-to-Cycle Control of Tightly Space Injections, Accepted, to appear in, *IFAC Control Engineering Practice*, vol. 20, issue 11, pgs 1175-1182, November 2012
22. Karla Stricker\*, Lyle Kocher\*, Ed Koeberlein, Dan Van Alstine, and Gregory M. Shaver, Estimation of Effective Compression Ratio for Engines Utilizing Flexible Intake Valve Actuation, *Journal of Automobile Engineering*, Volume 226 Issue 8 August 2012 pp. 1003 - 1017. (Selected as the best paper published in the Journal of Automobile Engineering, 2012)
23. Lyle Kocher\*, Ed Koeberlein, Karla Stricker, D.G. Van Alstine, and Gregory M. Shaver, Control-Oriented Gas Exchange Model for Diesel Engines Utilizing Flexible Intake Valve Actuation, *Journal of Dynamic Systems, Measurement, and Control*, tech. brief, 136 (6), August, 2014
24. Carrie Hall\*, Gregory M. Shaver, Jonathan Chauvin, and Nicolas Petit, Control-Oriented Modeling of Combustion Phasing for a Fuel-Flexible Spark-Ignited Engine with Variable Valve Timing, *International Journal of Engine Research*, vol. 13, no. 5, pp. 448-463, October 2012
25. Dan Van Alstine\*, Lyle Kocher\*, Ed Koeberlein, Karla Stricker, and Gregory M. Shaver, Control-Oriented PCCI Combustion Timing Model for a Diesel Engine Utilizing Flexible Intake Valve Modulation, *International Journal of Engine Research*, vol. 14, no. 3, pp. 211-230, June 2013.
26. Karla Stricker\*, Lyle Kocher, Dan Van Alstine, and Gregory M. Shaver, Input Observer Convergence and Robustness: Application to Compression Ratio Estimation, *IFAC Control Engineering Practice*, vol 21, pp 565-582, 2013
27. Carrie Hall\*, Dan Van Alstine, Lyle Kocher, and Gregory M. Shaver, Closed-Loop Combustion Control of Biodiesel-Diesel Blends in Premixed Operating Conditions Enabled via High EGR Rates, *Journal of Automobile Engineering*, vol. 227 (7), pp. 966-985, July 2013
28. Carrie Hall\*, Gayatri Adi\*, Gregory M. Shaver, and Bernard Tao, A Robust Fuel Flexible Combustion Control Strategy for Biodiesel with Variable Fatty Acid Composition During Mixing Controlled Combustion, *International Journal of Engine Research*, vol. 15, no. 2, pp 165-179, Feb. 2014
29. Dat Le\*, Jin Shen, Neha Ruikar, Gregory M. Shaver, Dynamic Modeling of a Piezoelectric Fuel Injector During Rate Shaping, *International Journal of Engine Research*, vol. 15, issue 4, June 2014, pp. 471-487
30. Jin Shen\*, Bradley W. Peitzak, Neha Ruikar, Dat Le, and Gregory M. Shaver, Model-Based Within-a-Cycle Estimation of Rate Shaping for a Piezoelectric Fuel Injector, *IFAC Control Engineering Practice*, vol. 27, May 2014
31. Lyle Kocher\*, Carrie Hall, Karla Stricker, David Fain, Dan Van Alstine, and Gregory M. Shaver, Robust Oxygen Fraction Estimation for Conventional land Premixed Charge Compression Ignition Engines with

- Variable Valve Actuation, *IFAC Control Engineering Practice for a Special Issue Entitled: "Engine and Powertrain Control, Simulation, and Modeling"*, vol. 29, August, 2014
32. Lyle Kocher\*, Carrie Hall, Dan Van Alstine, Mark Magee, and Gregory M. Shaver, Nonlinear Model-Based Control of Combustion Timing in Premixed Charge Compression Ignition, *Journal of Automobile Engineering*, vol. 228, issue 7, June 2014, pp. 703-723.
  33. Yadav, A., Arnold, M., Shaver, G. M., & Meckl, P. Case-based Instruction: Improving Student's Conceptual Understanding Through Cases in a Mechanical Engineering Course, *Journal of Research in Science Teaching*, 51(5), pp. 659-677, May 2014
  34. Gurneesh Jatana, Sameer Naik, Robert Lucht, and Gregory M. Shaver, High-speed diode laser measurements of temperature and water vapor concentration in the intake manifold of a diesel engine, *International Journal of Engine Research*, October 2014, volume 15, no. 7, 773-788
  35. Akash Garg, Mark Magee, Chuan Ding, Leighton Roberts, and Gregory M. Shaver, Fuel-Efficient Exhaust Thermal Management Using Cylinder Throttling via Intake Valve Closing Timing Modulation, *Journal of Automobile Engineering*, March 2016, 230: 470-478
  36. Dat Le, Brad Pietrzak, and Gregory M. Shaver, Dynamic Surface Control of a Piezoelectric Fuel Injector During Rate Shaping, *IFAC Control Engineering Practice*, Volume 30, September 2014, pages 12-26
  37. Leighton Roberts, Mark Magee, Akash Garg, Gregory M. Shaver, Eric Holloway, Edward Koeberlein, Raymond Shute, David Koeberlein, James McCarthy Jr., and Douglas Nielsen, Modeling the Impact of Early Exhaust Valve Opening on Exhaust Aftertreatment Thermal Management and Efficiency for Compression Ignition Engines, *International Journal of Engine Research*, September 2015, vol 16, 6, pp 773-794
  38. Gurneesh S Jatana, Sameer V Naik, Gregory M Shaver, and Robert P Lucht, Simultaneous high-speed gas property measurements in the turbocharger inlet, the EGR cooler exit, and the intake manifold of a multi-cylinder diesel engine using diode-laser-absorption-spectroscopy. *Applied Optics*, 54 (5), pp. 1109-1113, Feb. 2015
  39. Chuan Ding, Leighton Roberts, David J. Fain, Aswin K. Ramesh, and Gregory M. Shaver, Fuel Efficient Exhaust Thermal Management for Compression Ignition Engines During Idle via Cylinder Deactivation and Flexible Valve Actuation, *International Journal of Engine Research*, 2016, Vol.17(6), pp.619-630
  40. Richard Simmons, Gregory M. Shaver, Wallace E. Tyner, and Suresh Garimella, A benefit-cost assessment of new vehicle technologies and fuel economy in the U.S. Market, *Applied Energy*, vol. 157, issue C, pp 940-952, 2015
  41. Sylvia Lu, Chuan Ding, Sylvia Lu, Greg Shaver, Eric Holloway, Jim McCarthy, Ray Shute, David Koeberlein, Edward Koeberlein, and Douglas Nielsen, Impact of Cylinder Deactivation on Diesel Engine Aftertreatment Thermal Management and Efficiency at Highway Cruise Conditions, *Frontiers in Engine and Automotive Engineering*, Volume 1, Article 9, August, 2015
  42. Mayura Halbe, David Fain, Gregory M. Shaver, Lyle Kocher, and David Koeberlein, Control-oriented premixed charge compression ignition CA50 model for diesel engines utilizing variable valve actuation, *International Journal of Engine Research*, *International Journal of Engine Research*, vol. 18(8), 847-857
  43. Ashish P. Vora, Xing Jin, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, Subbarao Varigonda, Oleg Wasynczuk, Wallace E. Tyner, Vivek Sujana, and Gary Parker, Design-space exploration of series plug-in hybrid electric vehicles for medium-duty truck applications in a total cost-of-ownership framework, *Applied Energy*, Volume 2020, September 2017, pp 662-672
  44. Xing Jin, Ashish P. Vora, Vaidehi Hoshing, Tridib Saha, Oleg Wasynczuk, Gregory M. Shaver, and Subbarao Varigonda, Applicability of available Li-Ion battery degradation models for system and control algorithm design, *IFAC Control Engineering Practice*, *IFAC Control Engineering Practice*, vol. 71, Feb. 2018
  45. Aswin K. Ramesh, Gregory M. Shaver, Cody M. Allen, Soumya Nayyar, Dheeraj B. Gosala, Dina Caicedo Parra, Edward Koeberlein, James McCarthy, and Doug Nielsen, Utilizing low airflow strategies, including cylinder deactivation, to improve fuel efficiency and aftertreatment thermal management during high speed, low load operating conditions, *International Journal of Engine Research*, pp. 1005-1016, vol. 18, issue 10, First Published March 14<sup>th</sup>, 2017

46. Dheeraj B. Gosala, Cody M. Allen, Aswin K. Ramesh, Gregory M. Shaver, James McCarthy, Dale Stretch, Edward Koeberlein, and Lisa Farrell, Cylinder deactivation during dynamic diesel engine operation, *International Journal of Engine Research*, 991-1004, vol. 18, issue 10, Published Feb. 1<sup>st</sup>, 2017
47. Mayura Halbe, Bradley Pietrzak, David Fain, Aswin Ramesh, Gregory M. Shaver, James McCarthy Jr., Michael Ruth, and Edward Koeberlein, Oil Accumulation and First Fire Readiness Analysis of Cylinder Deactivation in Diesel Engines, *Frontiers in Mechanical Engineering: Engine and Automotive Engineering*, published March 6<sup>th</sup>, 2017, vol. 3, 1-12
48. Xing Jin, Ashish Vora, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, Edwin Garcia, Oleg Wasynczuk, and Subba Varigonda, Physically-based reduced-order capacity loss model for graphite anodes in Li-Ion Battery Cells, *Journal of Power Sources*, Journal of Power Sources, 28 February 2017, Vol.342, pp.750-761
49. Ashish P. Vora, Xing Jin, Vaidehi Hoshing, Gregory M. Shaver, Subbarao Varigonda, and Wallace E. Tyner, Integrating Battery Degradation in a Cost of Ownership Framework for HEV Design Optimization, *Journal of Automobile Engineering*, online October 21, 2018.
50. J. Tang, A. D. Dysart, D. H. Kim, R. Saraswat, G. M. Shaver, V. G. Pol, "Fabrication of Carbon/Silicon Composite as Lithium-ion Anode with Enhanced Cycling Stability" *Electrochimica Acta*, 247, 626–633, 2017.
51. Kalen Vos, Gregory M. Shaver, Sylvia Lu, Cody Allen, Jim McCarthey Jr., Lisa Farrell, Improving Diesel Engine Efficiency at High Speeds and Loads Through Improved Breathing via Delayed Intake Valve Closure Timing, *International Journal of Engine Research*, online, Vol 20(2), 194-202, First Published December 8<sup>th</sup>, 2017.
52. Dheeraj Gosala, Aswin Ramesh, Cody Allen, Mrunal Joshi, Alexander Taylor, Matthew Van Voorhis, Gregory M. Shaver, Lisa Farrell, Edward Koeberlein, James McCarthy Jr., and Dale Stretch, Diesel Engine Aftertreatment Warmup Through Early Exhaust Valve Opening and Internal EGR During Idle Operation, *International Journal of Engine Research* 19(7), 758-773, Published September 20<sup>th</sup>, 2017
53. Mrunal Joshi, Dheeraj Gosala, Cody Allen, Kalen Vos, Matthew VanVoorhis, Alexander Taylor, Gregory M. Shaver, James McCarthy Jr., Lisa Farrell, Dale Stretch, and Edward Koeberlein, Reducing Diesel Engine Drivecycle Fuel Consumption Through use of Cylinder Deactivation for Aftertreatment Component Temperature Maintenance During Idle Operating and Low Load Operating Conditions, *Frontiers in Engine and Automotive Engineering*, August 2017, vol. 3, 1-15
54. Aswin K. Ramesh, Troy E. Odstreil, Dheeraj B. Gosala, Gregory M. Shaver, Soumya Nayyar, Edward Koeberlein, and James McCarthy Jr., Reverse Breathing in Diesel Engines for Aftertreatment Thermal Management, online, *International Journal of Engine Research*, First Published July, 13<sup>th</sup>, 2018
55. Kalen R. Vos, Gregory M. Shaver, Dheeraj B. Gosala, James McCarthy Jr., and Lisa Farrell, Utilizing Production Viable Valve Strategies at High Speeds and Loads to Improve Volumetric Efficiency via Intake Valve Modulation, *Frontiers in Engine and Automotive Engineering*, vol. 4, Jan. 27<sup>th</sup>, 2018
56. Cody M. Allen, Dheeraj B. Gosala, Gregory M. Shaver, and James McCarthy Jr., Comparative Study of Diesel Engine Cylinder Deactivation Transition Strategies, *International Journal of Engine Research*, online, vol. 20, 5: pp. 570-580, First Published April 13, 2018
57. Dheeraj Gosala, Cody M. Allen, Gregory M. Shaver, Lisa Farrell, Edward Koeberlein, Brian Franke, Dale Strech, and James McCarthy Jr., Dynamic cylinder activation in diesel engines, First Published July 2018, *International Journal of Engine Research*
58. Xing Jin, Oleg Wasynczuk, and Gregory M. Shaver, Computationally Efficient and Flexible Magnetic-Field-Analysis-Based Electric Machine Scaling Strategy, *IEEE Transactions on Energy Conversion* 33(3) (2018) 1222-1232
59. Ana Guerrero de la Pena, Navindran Deavendralingam, Ali Raz, Daniel DeLaurentis, Gregory Shaver, Vivek Sujjan, and Neera Jain, Projecting Line-Haul Truck Technology Adoption: How Heterogeneity Among Fleets Impacts System-Wide Adoption, *Transportation Research Part E* 124 (2019) 108-127
60. Aniruddha Jana, Gregory M. Shaver, R. Edwin Garcia, Physcial, on the Fly, Capacity Degradation Prediction of LiNiMnCoO<sub>2</sub>- graphite cells, *Journal of Power Sources* 422, 185-195, 2019

61. Ana Guerrero de la Pena, Navindran Davendralingam, Ali K. Raz, Daniel D. DeLaurentis, Gregory Shaver, Vivek Sujan, and Neera Jain, Projecting Adoption of Truck Powertrain Technologies and CO2 emissions in Line-Haul Networks, *Transportation Research Part D*, accepted April 8<sup>th</sup>, 2020.
62. Alexander H. Taylor, Miles J. Droege, Gregory M. Shaver, Jairo A. Sandoval, Stephen Erlien and James Kuszmaul, Capturing the Impact of Speed, Grade and Traffic on Class 8 Truck Platooning, *IEEE Transactions on Vehicular Technology*, online, July 17<sup>th</sup>, 2020.
63. Alexander H. Taylor, Troy E. Odstrcil, Aswin K. Ramesh, Gregory M. Shaver, Edward Koeberlein, Lisa Farrell, and James McCarthy Jr., Model-Based Compressor Surge Avoidance Algorithm for IC Engines Utilizing Cylinder Deactivation During Motoring Conditions, *International Journal of Engine Research*, online 9-2019
64. Kalen R. Vos, Gregory M. Shaver, Aswin K. Ramesh, and James McCarthy Jr., Impact of Cylinder Deactivation and Cylinder Cutout via Flexible Valve Actuation on Fuel Efficient Aftertreatment Thermal Management at Curb Idle, *Frontiers in Mechanical Engineering – Engine and Automotive Engineering*, published 8-2019
65. Dheeraj B. Gosala, Gregory M. Shaver, James McCarthy Jr., and Tim Lutz, Fuel-Efficient Thermal Management in Diesel Engines via Valvetrain-enabled Cylinder Ventilation Strategies, *International Journal of Engine Research* (First Published online August 2<sup>nd</sup>, 2019), Volume 22, Issue 2, 2021
66. Dheeraj B. Gosala, Harikrishnan Raghukumar, Cody M. Allen, Gregory M. Shaver, James McCarthy Jr., Tim Lutz, Model-Based Design of Dynamic Firing Patterns for Supervisory Control of Diesel Engine Vibration, accepted by the *IFAC Control Engineering Practice* journal, Nov. 12<sup>th</sup>, 2020
67. Cody M. Allen, Dheeraj B. Gosala, Mrunal C. Joshi, Gregory M. Shaver, Lisa Farrell, and James McCarthy Jr., Experimental Assessment of Diesel Engine Cylinder Deactivation Performance during Low Load Transient Operations, *International Journal of Engine Research* (First Published June 24<sup>th</sup>, 2019), Volume 22, Issue 2, 2021
68. Kalen R. Vos, Gregory M. Shaver, Mrunal C. Joshi, and James McCarthy Jr., Implementing Variable Valve Actuation on a Diesel Engine During High-Speed Idle Operation for Improved Aftertreatment Warm-Up, *International Journal of Engine Research*, First Published October 16<sup>th</sup>, 2019
69. Mrunal C. Joshi, Dheeraj Gosala, Gregory M. Shaver, James McCarthy Jr. and Lisa Farrell, Exhaust Valve Profile Modulation for Improved Diesel Engine Curb Idle Aftertreatment Thermal Management, accepted 09-22-2020, *International Journal of Engine Research*
70. Kalen R. Vos, Gregory M. Shaver, Mrunal C. Joshi, Aswin K. Ramesh, and James McCarthy Jr., Strategies for Using Valvetrain Flexibility Instead of Exhaust Manifold Pressure Modulation for Diesel Engine Gas Exchange and Thermal Management Control, *International Journal of Engine Research*, First Published October 17<sup>th</sup>, 2019
71. Vaidehi Hoshing, Ashish Vora, Tridib Saha, Xing Jin, Gregory M. Shaver, Oleg Wasynczuk, R. Edwin Garcia, and Subbarao Varigonda, Comparison of Economic Validity of Series and Parallel PHEVs for Medium-Duty Truck and Transit Bus Applications, Vol. 234(10-11) 2458–2472, July 2020
72. Vaidehi Hoshing, Ashish Vora, Tridib Saha, Xing Jin, Gregory M. Shaver, Oleg Wasynczuk, R. Edwin Garcia, and Subbarao Varigonda, Evaluating Emissions and Sensitivity of Economic Gains for Series Plug-In Hybrid Electric Vehicle Powertrains for Transit Bus Applications, online 07-25-2020, *Journal of Automobile Engineering*
73. Long Horizon Predictive Cruise Control for Enhanced Class 8 Truck Platooning on Hilly Terrain, Miles Droege, Brady Black, Ifeoluwa Ibitayo, Shubham Ashta, John Foster, and Gregory M. Shaver, submission eminent
74. Mrunal Joshi, Gregory M. Shaver, Kalen Vos, Jim McCarthy, Lisa Farrell, Internal exhaust gas recirculation via reinduction and negative valve overlap for fuel efficient aftertreatment thermal management at curb idle in a diesel engine, accepted by *IJER* Nov. 13<sup>th</sup>, 2020
75. Sensor System and Observer Algorithm Co-Design for Modern Internal Combustion Engine Air Management Based on H2 Optimization, Xu Zhang, Gregory M. Shaver, Carlos A. Lana, Dheeraj Gosala, and David Langenderfer, accepted Feb. 2021, *Frontiers in Mechanical Engineering: Engine and Automotive Engineering*

76. Sensor System and Controller Design for Robust Air-Fuel Ratio and Flow Controls in Turbocharged Stoichiometric Spark-Ignited Engines with Low Pressure EGR, Xu Zhang, Gregory M. Shaver, Carlos A. Lana, Dheeraj Gosala, and David Langenderfer, under review at Cummins

**Refereed conference or symposium papers (57 have appeared) – based on a review of full paper by multiple peers.**

1. Gregory M. Shaver\*, J. Christian Gerdes, Parag Jain and P.A. Caton and C.F. Edwards, Modeling for Control of HCCI Engines. *In the Proc. of the American Control Conference, 2003*, pp. 749-754, Denver
2. Gregory M. Shaver\* and J. Christian Gerdes, Cycle-to-cycle control of HCCI Engines, *In the Proceeding of the 2003 ASME International Mechanical Engineering Congress and Exposition, IMECE2003-41966*, Washington D.C.
3. Gregory M. Shaver\*, J. Christian Gerdes and Matthew Roelle, Modeling Cycle-to-Cycle Coupling in HCCI Engines Utilizing Variable Valve Actuation, *In the Proceedings of the 1<sup>st</sup> IFAC Symposium on Advances in Automotive Control, 2004*, pp. 244-249, Salerno, Italy (Selected for special issue of IFAC Journal of Control Engineering Practice)
4. Gregory M. Shaver\*, J. Christian Gerdes and Matthew Roelle, Physics-Based Closed-Loop Control of Phasing, Peak Pressure and Work Output in HCCI Engines Utilizing Variable Valve Actuation, *Proceedings of the American Control Conference*, pp. 150-155, 2004, Boston, Mass. (Best pres. in session award)
5. Gregory M. Shaver\*, Aleksandar Kojic\*, J. Christian Gerdes, Jean-Pierre Hathout, and Jasim Ahmed, Contraction and Sum of Squares Analysis of HCCI Engines, *In the Proceedings of the 2004 IFAC Symposium on Nonlinear Control Systems*, Stuttgart, Germany
6. Matthew J. Roelle\*, Gregory M. Shaver and J. Christian Gerdes, Tackling the Transition: A Multi-Mode Combustion Model of SI and HCCI for Mode Transition Control, *In the Proceedings of the ASME International Mechanical Engineering Congress, 2004*, IMECE2004-62188, Anaheim, California
7. Gregory M. Shaver\*, Matthew J. Roelle, J. Christian Gerdes, Decoupled Control of Combustion Timing and Work Output on an HCCI Engine, *Proceedings of the American Control Conference*, pp. 3871-3876 2005, Portland, Oregon (Best presentation in session award)
8. Gregory M. Shaver\*, Matthew J. Roelle, J. Christian Gerdes, A 2-Input, 2-Output Model of Residual-Affected HCCI Engines, *In the proceedings of the 2006 American Control Conference*, Minneapolis, Minnesota
9. Gregory M. Shaver, Stability Analysis of Residual-Affected HCCI using Convex Optimization, *IFAC Advances in Automotive Control*, August 2007, Monterey Coast, CA
10. Anup Kulkarni\*, Gayatri Adi\*, and Gregory M. Shaver, Modeling Cylinder-to-Cylinder Coupling in Multi-Cylinder HCCI Engines Incorporating Reinduction, *2007 ASME IMECE*, IMECE2007-42487, November 2007, Seattle WA
11. David B. Snyder\*, Elena G. Washington, Armando P. Indrajana, and Gregory M. Shaver, Biodiesel Blend Estimation via a Wideband Oxygen Sensor, *Proceedings of the 2008 American Control Conference*, June
12. Meagan Arnold\*, Aman Yadav, Gregory M. Shaver, and Eric Nauman, E. A. (2008, June). Measuring student perceptions of case-based instruction in an engineering course. Paper presented at the American Society of Engr. Education Annual Conference and Exposition, Pittsburg, PA.
13. David B. Snyder\*, Gayatri H. Adi, Michael P. Bunce, Chris Satkoski, and Gregory M. Shaver, Uncertainty Analysis of Wideband Oxygen Sensor Based Strategy for Steady-State Biodiesel Blend Estimation, *2008 Dynamic Systems and Control Conference*, October 20-22, 2008
14. Gayatri Adi\*, Carrie Hall, Chris Satkoski, Mike Bunce, David Snyder, and Gregory M. Shaver, An experimental and simulation study of increases in fuel consumption and NOx emissions in a biofueled diesel engine, *ASME Internal Combustion Engine Division 2009 Spring Technical Conference*, Milwaukee, Wisconsin, May 2009
15. Aman Yadav and Gregory M. Shaver, Comparing the lecture method with case teaching method in a mechanical engineering course, ASEE Annual Conference, Austin, TX June 2009

16. Anup Kulkarni\*, Karla Stricker, Angeline Blum, and Gregory M. Shaver, PCCI control authority of a modern diesel engine outfitted with flexible intake valve actuation, *2009 SAE International Powertrains, Fuels and Lubricants Meeting*, Florence, Italy, June 2009
17. Anup Kulkarni\*, Gayatri Adi, Sriram S. Popuri, Gregory M. Shaver, Tim R. Frazier, and Donald W. Stanton, Development and validation of a flexible and computationally efficient whole engine model of a Cummins 2007 turbocharged diesel engine, *2009 SAE International Powertrains, Fuels and Lubricants Meeting*, Florence, Italy, June 2009
18. Chris Satkoski\*, Gregory M. Shaver, Ranjit More, Peter Meckl, and Douglas Memering, Dynamic Modeling of a Piezo-electric Actuated Fuel Injector, *IFAC Workshop on Engine and Powertrain Control Simulation and Modeling*, 11/30-12/2/2009, IFP, Rueil-Malmaison, France
19. Gayatri Adi\*, Carrie Hall\*, David Snyder\*, Michael Bunce, and Gregory M. Shaver, Clean and Efficient Fuel-Flexible Combustion of Alternative Diesel Fuels via Closed-Loop Control, *2nd International Conference and Exhibition on Advances in Energy Research*, 12/2009, IIT Bombay
20. David Snyder\*, Gayatri Adi, Michael Bunce, Carrie Hall, and Gregory M. Shaver, Dynamic exhaust oxygen based biodiesel blend estimation with an extended Kalman filter, *2010 American Control Conference*, Baltimore, MD on June 30-July 02, 2010
21. Christopher Satkoski and Gregory M. Shaver, Design of a Dynamic Fuel Flow Estimator For a Piezoelectric Fuel Injector, *6th IFAC Symposium Advances in Automotive Control*, Munich – Schwabing, Germany, July 12-14, 2010.
22. Mike Bunce\*, David Snyder\*, Gayatri Adi\*, Carrie Hall, Bernie Davila, and Gregory M. Shaver, Optimization of the performance and emissions of soy biodiesel blends in a modern diesel engine, *2010 ASME Internal Combustion Engine Division Fall Technical Conference*, September 12-15, 2010, San Antonio, TX, USA
23. David Snyder\*, Gayatri Adi\*, Carrie Hall, Mike Bunce, and Gregory M. Shaver, Closed-Loop Control Framework for Fuel-Flexible Combustion of Biodiesel Blends, *2010 ASME Internal Combustion Engine Division Fall Technical Conference*, September 12-15, 2010, San Antonio, TX, USA
24. Chris Satkoski\*, Scott D. Biggs, and Gregory M. Shaver, Cycle-to-Cycle Estimation and Control of Multiple Pulse Profiles for a Piezoelectric Fuel Injection, *2011 American Control Conference*
25. Lyle Kocher\*, Ed Koeberlein\*, Karla Stricker, Daniel Van Alstine, and Gregory M. Shaver, Control-Oriented Modeling of Diesel Engine Gas Exchange, *2011 Amer. Control Conf.*
26. Ed Koeberlein\*, Lyle Kocher, Daniel Van Alstine, Karla Stricker, and Gregory M. Shaver, Physics-based Control-Oriented Modeling of Exhaust Gas Enthalpy for Engines Utilizing Variable Valve Actuation, *2011 Dyn. Systems and Control Conference*.
27. Karla Stricker\*, Lyle Kocher, Ed Koeberlein, Daniel Van Alstine, and Gregory M. Shaver, Turbocharger Map Reduction for Control-Oriented Modeling, *2011 Dynamics Systems and Control Conference*.
28. Lyle Kocher, Ed Koeberlein, Daniel Van Alstine, Karla Stricker, and Gregory M. Shaver, Physically-Based Volumetric Efficiency Model for Diesel Engines Utilizing Variable Intake Valve Actuation, *2011 Dynamics Systems and Control Conference*.
29. Neha Ruikar\*, Chris Satkoski\*, and Gregory M. Shaver, Control Design Amenable Model of Needle Position for a Direct Acting Piezoelectric Fuel Injector, *2011 Dyn. Systems and Control Conference*.
30. Gayatri Adi\*, Carrie Hall\*, and Gregory M. Shaver, Closed-Loop Control of Fuel-Flexible CI Engines, *3<sup>rd</sup> International Conference on Advances in Energy Research*, December, 2011.
31. Dan Van Alstine\*, Lyle Kocher, Ed Koeberlein, Karla Stricker, and Gregory M. Shaver, Control-Oriented PCCI Combustion Timing Model for a Diesel Engine Utilizing Flexible Intake Valve Actuation and Higher EGR Levels, *2012 American Control Conference*.
32. Karla Stricker\*, Lyle Kocher, Ed Koeberlein, Dan Van Alstine, and Gregory M. Shaver, Effective Compression Ratio Estimation in Engines with Flexible Intake Valve Actuation, *2012 American Control Conference*.
33. Lyle Kocher, Karla Stricker, Dan Van Alstine, Ed Koeberlein, and Gregory M. Shaver, Oxygen Fraction Estimation for Diesel Engines Utilizing Variable Intake Valve Actuation, *2012 American Control Conference*.



34. Carrie M. Hall\*, Gregory M. Shaver, Jonathan Chauvin, and Nicolas Petit, Combustion Phasing Model for Control of a Gasoline-Ethanol Fueled SI Engine with Variable Valve Timing, *2012 American Control Conference*.
35. Gayatri Adi\*, Carrie Hall\*, and Gregory M. Shaver, Diesel Engine Control Strategy for Biodiesel Blend Accommodation Independent of Fuel Fatty Acid Structure, *2012 IFAC Workshop*
36. Lyle Kocher\*, Karla Stricker, Dan Van Alstine, and Gregory M. Shaver, Robust Oxygen Fraction Estimation for Diesel Engines Utilizing Variable Intake Valve Actuation, *2012 IFAC Workshop*
37. Karla Stricker\*, Lyle Kocher, Dan Van Alstine, and Gregory M. Shaver, Guaranteed Convergence of a High-Gain Input Observer Robust to Measurement Uncertainty: Application to Effective Compression Ratio Estimation, *2012 IFAC Workshop*
38. Carrie M. Hall, Dan Van Alstine, Lyle Kocher, and Greg Shaver, Combustion Timing Modeling & Control Framework for Biodiesel/Diesel Blends During Pre-mixed Combustion, *2012 Dynamic Systems and Control Conference*.
39. Dat Le\*, Jin Shen\*, Neha S. Ruikar, and Gregory M. Shaver, Dynamic Modeling of Piezo-Electric Injector-Enabled Rate Shaping, *American Control Conference*, 2013.
40. Jin Shen\*, Neha Ruikar\*, Dat Le and Gregory M. Shaver, Model-based Within-a-Cycle Estimation of Rate Shaping for a Piezoelectric Fuel Injector, *American Control Conference*, 2013.
41. Lyle Kocher\*, Mark Magee, Dan Van Alstine, Gregory M. Shaver, A Nonlinear Model-Based Controller for Premixed Charge Compression Ignition Combustion Timing in Diesel Engines, *American Control Conference*, 2013.
42. Dat Le\*, Bradley W. Pietrzak, and Gregory M. Shaver, Rate Shaping Estimation and Control of a Piezoelectric Fuel Injector, *2013 Dynamics Systems and Control Conference*, 2-2013
43. Carrie M. Hall\*, Dan Van Alstine, and Gregory M. Shaver, Flatness-Based Control of Mode Transitions between Conventional and Premixed Charge Compression Ignition on a Modern Diesel Engine with Variable Valve Actuation, *2013 Dynamics Systems and Control Conference*, 2-2013
44. Bradley Pietrzak\*, Dat Le, and Gregory M. Shaver, Model-Based Estimation of Piezoelectric Fuel Injector Parameters, 2014 American Control Conference
45. Adam Fogarty, Kevin Oswald, Gregory M. Shaver, Peter Meckl, and Vahid Motevallii, Design of a Rear Suspension Cradle for usage in a Parallel-Through-the-Road PHEV, 2014-01-1928
46. Ashish Vora, Haotian Wu, Chuang Wang, Yili Qian, Gregory M. Shaver, Peter Meckl, Haiyan Zhang, Development of a SIL, HIL and Vehicle Test-Bench for Model-Based Design and Validation of Hybrid Powertrain Control Strategies, 2014-01-1906, in review
47. Leighton Roberts, Mark Magee, David Fain, Greg Shaver, Eric Holloway, Raymond Shute, James McCarthy, Douglas Nielsen, Edward Koeberlein, Raymond Shute, and David Koeberlein, Impact of Cylinder Deactivation at Idle on Thermal Management and Efficiency, 2014 SAE COMVEC
48. Leighton Roberts, Mark Magee, David Fain, Greg Shaver, Eric Holloway, Raymond Shute, James McCarthy, Douglas Nielsen, Edward Koeberlein, Raymond Shute, and David Koeberlein, Impact of Early Exhaust Valve Opening on Exhaust Thermal Management and Efficiency for Compression Ignition Engines, 2014 SAE COMVEC
49. Dat Le\*, Bradley Pietrzak, and Gregory M. Shaver, Stability Analysis of Dynamic Surface Control for Piezoelectric Fuel Injection During Rate Shaping, 2014 Dynamic Systems and Control Conference
50. Ashish P. Vora, Xing Jin, Vaidehi Hoshing, Xiaofan Guo, Gregory M. Shaver, Wallace Tyner, Eric Holloway, Subbarao Varigonda, and Joachim Kupe, Simulation Framework for the Optimization of HEV Design and Control Parameters: Incorporating Battery Degradation in a Lifecycle Economic Analysis, to appear in the 2015 IFAC Workshop on Engine and Powertrain Control, Simulation and Modeling, August, 2015
51. Shubham Agrawal, Xiaohui Liu, Xing Jin, Ashish Vora, Gregory Shaver, Srinivas Peeta, J. Eric Dietz, and Joseph Pekny, Quantifying the Impacts of Electric Vehicle Travel Patterns on Battery Life Span, 96<sup>th</sup> Annual Meeting of the Transportation Research Board, January 8<sup>th</sup> – 12<sup>th</sup>, 2017, Washington D.C.
52. Xing Jin, Ashish P. Vora, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, Oleg Wasynczuk, and Subbarao Varigonda, Applicability of Available Li-Ion Battery Degradation Models for System and Control Algorithm Design, 2017 ACC,

53. Xing Jin, Ashish P. Vora, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, R. Edwin Garcia, Oleg Wasynczuk, and Subbarao Varigonda, Physically-based Reduced-Order Capacity Loss Model for Graphite Anodes in Li-Ion Battery Cells, 2017 ACC,
54. Ana Guerrero de la Pena, Navin Davendralingam, Ali K. Raz, Vivek Sujjan, Daniel DeLaurentis, Gregory M. Shaver, and Neera Jain, Modeling Freight Transportation as a System-of-Systems to Determine Adoption of Emerging Vehicle Technologies, Proceedings of the 2018 International Conference on Transportation and Development, Pittsburgh, PA, July 15-18 2018
55. Joshi, M., Gosala, D., Allen, C., Srinivasan, S., Ramesh, A., VanVoorhis, M., Taylor, A., Vos, K., Shaver, G., McCarthy, J. Jr., Farrell, L. and Koeberlein, E., "Diesel Engine Cylinder Deactivation for Improved System Performance over Transient Real-World Drive Cycles," SAE 2018-01-0880, 4/3/2018.
56. Ramesh, A. K., Gosala, D. B., Allen, C., Joshi, M., McCarthy, J. Jr., Farrell, L., Koeberlein E. and Shaver, G., "Cylinder Deactivation for Increased Engine Efficiency and Aftertreatment Thermal Management in Diesel Engines," SAE 2018-01-0384, 4/3/2018,
57. A. Guerrero de la Peña, N. Davendralingam, A. Raz, G. Shaver, D. DeLaurentis, Vivek A. Sujjan, and N. Jain "Modeling the Combined Effect of Powertrain Options and Autonomous Technology on Vehicle Adoption and Utilization by Line-haul Fleets." *Proceedings of the 2019 IEEE Intelligent Transportation Systems Conference*, Auckland, New Zealand, October 27-30, 2019

### **Books and chapters in books.**

1. Gregory M. Shaver, *Enabling Simultaneous Reductions in Fuel Consumption, NO<sub>x</sub>, and CO<sub>2</sub> via Modeling and Control of Residual-Affected Low Temperature Combustion*, Chapter in: Emerging Environmental Technologies, Springer 2008 (peer-reviewed)

### **Other publications.**

1. Gavin Maxwell\*, Cameron Mackay, Ian Jowsey, Seema Bajaria, Katherine Kudrycki, Saroja Ramanujan, Gregory M. Shaver, Christina Friedrich, David Lockley, F. Reynolds, and J. Fentem, In- silico Modelling of Skin Sensitization, 20<sup>th</sup> Meeting of the European Research Group on Experimental Contact Dermatitis, Lyon, October 20-22, 2006
2. Cameron Mackay\*, Seema Bajaria\*, Gregory M. Shaver, Katherine Kudrycki, Saroja Ramanujan, Thomas Paterson, Christina Friedrich, G. Maxwell, I. Jowsey, D. Lockley, F. Reynolds, and J. Fentem, In silico modeling of skin sensitization, Proceedings of the Joint Meeting of The British Toxicology Society & The In Vitro Toxicology Society, University of York, York, UK, Toxicology 231 (2007) 100-103
3. David B. Snyder and Gregory M. Shaver, Biodiesel Sensing Technology Development for Fuel Flexible Diesel Engine, Transportation Research Board 87th Annual Meeting, 1/13/2008
4. Gregory M. Shaver, *Enabling Simultaneous Reductions in Fuel Consumption, NO<sub>x</sub>, and CO<sub>2</sub> via Modeling and Control of Residual-Affected Low Temperature Combustion*, Invited talk, 236th American Chemical Society National Meeting, Philadelphia, PA, August 17-21, 2008

### **Contributed conference/symposium presentations.**

1. Gavin Maxwell\*, C. Mackay, S. Bajaria, K. Kudrycki, G. Shaver, S. Ramanujan, I. Jowsey, D. Lockley, C. Friedrich, *Poster* - An in silico approach to aid is assessing the risk of chemical-induced skin sensitization, Poster, 6th World Congress on Alternatives & Animal Use in the Life Sciences, August 21st-25th, 2007 Tokyo, Japan.
2. Cameron Mackay\*, Seema Bajaria, G. Maxwell, K. Kudrycki, G. Shaver, S. Ramanujan, I. Jowsey, D. Lockley, C. Friedrich, *Poster* - An in silico approach to aid is assessing the risk of chemical-induced skin sensitization, Poster, 8<sup>th</sup> International Conf. on Systems Biology, October 1-6, 2007, Long Beach, CA
3. Gavin Maxwell\*, Cameron MacKay, Seema Bajaria, Katherine Kudrycki, Gregory M. Shaver, Saroja Ramanujan, Ian Jowsey, Dave Lockley, and Christina Friedrich, *Poster* - Assuring safety without animal testing: Skin allergy case study – Application of an in silico modeling approach, Poster, EPAA 2007 Annual Conference, November 5, 2007, Brussels
4. Karla Stricker\*, Dan Van Alstine, Lyle Kocher, Rajani Modiyani, Ed Koeberlein, and Paul Meckl, Gregory Shaver, *Poster* - Reducing Emissions and Fuel Consumption via Advanced Mode Combustion Control in

*Engines with Flexible Valve Actuation*, Symposium on Control and Modeling of Alternative Energy Systems, Univ. of Illinois at Urbana-Champaign, 4/2/2009

5. David Snyder\*, Michael Bunce, Carrie Hall, Gayatri Adi, Jeremy Koehler, Bernie Davila, Gregory Shaver, *Poster - Clean and Efficient Fuel-Flexible Combustion of Alternative Diesel Fuels Via Closed-Loop Control*, Symposium on Control and Modeling of Alternative Energy Systems, Univ. of Illinois at Urbana-Champaign, 4/2/2009

**Invited colloquium, seminar series, and conf. presentations. (40, including: 6 international)**

1. "Modeling for Control of HCCI Engines" –Robert Bosch Corporation Research and Technology Center, Palo Alto, CA August 15th 2003
2. *Contraction and Sum of Squares Analysis of HCCI Engines*, Robert Bosch Corporation, Stuttgart, Germany, 9/2004
3. "Physics-based Modeling and Control of HCCI Engines" – Mechanical Engineering Department, California Polytechnic State University, June 2005
4. "Physics-based Modeling and Control of HCCI Engines" – Entelos, Foster City, CA 6/2005
5. *Physics-based Modeling and Control of HCCI Engines*, Center for Automotive Research, The Ohio State Univ., 8/2005
6. "From Physics-based Modeling & Control of HCCI to Physiology-based Modeling & Control of Human Disease" Stanford University, October 14th, 2005 ME201 Seminar: Introduction to research in mechanical engineering & strategies for getting involved. Audience M.S. students and undergraduates
7. *Modeling, Design, Utilization & Control of Novel Combustion Systems*, Oak Ridge Nat. Lab, 11/29/2006
8. *Modeling, Design, & Control of Novel Combustion Systems*, Purdue ASME Luncheon, 1/10/2008
9. Clean and Efficient Fuel-Flexible Combustion of Alternative Diesel Fuels via Closed-loop Control, IUPUI, 4/22/2008
10. Gregory M. Shaver, *Enabling Simultaneous Reductions in Fuel Consumption, NO<sub>x</sub>, and CO<sub>2</sub> via Modeling and Control of Residual-Affected Low Temperature Combustion*, Invited talk, 236th American Chemical Society National Meeting, Philadelphia, PA, August 17-21, 2008
11. *Purdue IndyGo Biodiesel Study*, Indiana MPO Annual Statewide Conference on Freight, Fiber, and Fuel – Planning for Transportation, Mobility and Resources in a Global Economy, Century Center, South Bend, IN 10/9/2008
12. Demo to middle school students for MINDS (Mastering Ideas Necessary for Developing Students) Program "*Next Generation Engine Modeling and Control Research at Purdue University*", October 18<sup>th</sup>, 2008, event held at Purdue for middle school students to give them a better understanding of engineering.
13. *Advances in Clean and Efficient Engine Technology*, Purdue ME290 Seminar, 2-12-2009
14. Presentation and lab tour at Herrick Labs, *Fuel Flexible Combustion for the Clean & Efficient Use of Biodiesel*, for Purdue University Women in Engr. Program - Innovation to Reality Program, 2-19-2009
15. *Plenary Presentation – Modeling and Control of Next Generation IC Engines*, 2<sup>nd</sup> Intl. Conf. and Exhibition on Advances in Energy Research, December 2009, IIT Bombay
16. Advanced Mode & Fuel-Flexible Combustion Control Activities at Purdue University, March 9<sup>th</sup>, 2010, IFP, Paris, France
17. Model-Based Closed-Loop Control of IC Engine Fuel Injection, Gas Exchange, and Combustion Processes, Lindbergh Lecture, University of Wisconsin – Madison, March 10, 2011
18. Model-Based Closed-Loop Control of IC Engine Fuel Injection, Gas Exchange and Combustion Processes; Flow, Heat Transfer and Combustion Workshop, Shanghai Jiao Tong Univ., June 2-3, 2011
19. Fuel Adaptive Diesel Engine Control, 2011 Adv. Engine Control Symposium, Tianjin University, November 16<sup>th</sup>, 2011
20. *Plenary Pres.* - Model-Based Closed-Loop Control of IC Engine Fuel Injection, Gas Exchange, and Combustion Processes, 3<sup>rd</sup> Intl. Conf. and Exhibition on Adv. in Energy Res., Dec. 2011, IIT Bombay
21. Model-Based Closed-Loop Control of Advanced Engine Systems and Combustion Strategies, Ford Research and Innovation Center, Dearborn, MI, January 23, 2012
22. Model-Based Closed-Loop Control of Advanced Engine Systems and Combustion Strategies, The Ohio State University, February 9<sup>th</sup>, 2012

23. Fuel Adaptive Diesel Engine Control, John Zink Company, February 20<sup>th</sup>, 2012
24. Model-Based Closed-Loop Control of Advanced Engine Systems and Combustion Strategies, University of Houston, March 29<sup>th</sup>, 2012
25. Engine Model and Control Research at Purdue, Advanced Engine Control Symposium, University of Michigan, April 23<sup>rd</sup>, 2012
26. Development of High Efficiency, Environmentally Friendly Vehicles, Science on Tap, August 23<sup>rd</sup>, 2012
27. Automotive Research at Purdue, VIT (Vellore India), January 20<sup>th</sup>, 2013
28. Model-Based Engine Algorithm Dev. for Control and Virtual Sensing, Mich. Tech Univ. April 4<sup>th</sup>, 2013
29. Model-Based Engine Algorithm Development for Control and Virtual Sensing, 2013 University of Wisconsin Engine Research Center Symposium, June 5<sup>th</sup>, 2013
30. Engine Systems Integration and Control Research at Purdue (Invited Talk), Ford, August 2014
31. Using Cylinder Deactivation to Improve Diesel Engine Fuel Efficiency via Improved Aftertreatment Thermal Management, Chicago, September 2017
32. Improving Heavy-Duty Diesel Engine System Fuel Economy via Cylinder Deactivation for Fuel-Efficient Aftertreatment System Temperature Maintenance, DOE Crosscut Meeting, Detroit, July 2017
33. Opportunities and Benefits of Commercial Truck Platooning, Indiana Department of Transportation Connected and Autonomous Vehicle Summit, Indianapolis, June 2017
34. (Invited Talk & Panelist), Work Truck Show, Indianapolis, March 2018
35. Control Challenges for CI Engines Incorporating Valvetrain Flexibility for Efficiency and Aftertreatment Thermal Management (Keynote), Symposium for Combustion Control, Aachen Germany, May 2018
36. Standards Role in Managing Technology Disruptions (Invited Talk & Panelist), 2018 SAE COMVEC
37. High-Efficiency Control Systems Development for Connected and Automated Class 8 Trucks (Invited Talk), ASME Connected & Automated Vehicle Workshop, Atlanta, September 2018
38. PHEV Viability for MD Trucks & Transit Buses & Expected Engine Operation in Them (Invited Talk & Panelist), ASME Internal Combustion Engine Fall Conference, San Diego, November 2018
39. Fuel-efficient Diesel Engine Thermal Management via Cylinder Deactivation (Invited Talk), Integer Emissions Conference, Indianapolis, December 2018
40. Cummins/Purdue Research Partnership (Invited Talk & Panelist), National Academic of Science and Engineering, Washington D.C., December 2018
41. High-Efficiency Control Systems for Connected Class 8 Trucks, 2019 Work Truck Show, March 6<sup>th</sup>, 2019
42. Commercial Vehicle Research at Purdue, Alumni Event hosted by GM, Detroit, April 14<sup>th</sup>, 2019
43. Class 8 Truck Platooning, 2019 MAASTO
44. Class 8 Truck Platooning, 2019 SAE COMVEC, Sept. 10<sup>th</sup>, 2019

## Course Instruction

SE M	COURSE TITLE	COURSE #	# RESPONSES/ # IN COURSE	COURSE EVAL SCORE	PROF EVAL SCORE	DEPT* AVE. PROF. SCORE
F06	Measurement Systems	365	??/??	NA	4.2	3.96
S07	System Modeling and Analysis	375	65/68	4.1	4.3	4.15
F07	System Modeling and Analysis	375	60/72	4.1	4.7	4.15
S08	System Modeling and Analysis	375	51/68	3.9	4.4	4.15
F08	Automatic Control Systems	475	32/35	4.1	4.9	3.95
S09	Automatic Control Systems	475	28/32	4.4	4.6	3.95
F09	Theo. and Des. of Control Sys.	575	27/38	4.2	4.5	4.49
S10	System Modeling and Analysis	375	45/76	3.7	3.4	4.15
F10	Theo. and Des. of Control Sys.	575	25/33	4.6	4.6	
S11	Sys. Modeling and Analysis	375	56/69	3.8	3.9	
F11	Theo. and Des. of Control Sys.	575	28/37	4.3	4.4	
	EcoCAR-Juniors	497	6/8	4.5	4.5	
	EcoCAR-Seniors	497	4/6	3.5	4.5	
S12	Senior Design – EcoCAR	463	4/7	4.3	4.3	
	EcoCAR-Juniors	497	3/4	4.0	4.3	
	EcoCAR-Seniors	497	1/2	5	5	
	Multivariable Control Systems	675	14/20	4.4	4.4	
F12	Theo. and Des. of Control Sys.	575	22/37	4.1	4.3	
	EcoCAR-Juniors	497	2/4	5	4	
S13	Adaptive Control	689	11/25	4.0	3.9	
	Senior Design – EcoCAR	463	3/6	4.8	5.0	
	EcoCAR – Juniors	497	3/3	4.8	4.0	
F13	Theory and Des. of Control Sys.	575	31/39	4.3	4.5	
	EcoCAR – Juniors	497	2/9	5	5	
S14	Multivariable Control Systems	675	9/18	3.8	3.3	
	EcoCAR	497	2/5	4.5	4.5	
F14	Theory and Des. Of Cntl Sys	575	28/34	4.5	4.5	
	Theory and Des. Of Cntl Sys – EPE	575	24/50	4.6	4.7	
S15	Sys. Modeling and Analysis	375	46/96	3.9	4.2	
F15	Measure Control Systems I	365	60/80	3.6	3.4	
S16	Engineering Design	463	15/19	4.6	4.7	
F16	Internal Combustion Engines	540	17/29	4.1	4.3	
F17	Theory and Design of Control Systems	575	37/58	4.6	4.5	
S18	Multivariable Control Systems	675	17/34	4.1	4.3	
F18	Internal Combustion Engines	540	18/25	3.9	4.2	
F19	Measurement & Control Systems II	375	50/54	4.2	4.3	
S20	Measurement & Control Systems II	375				
F20	Measurement & Control Systems II	375				
Mean				4.3	4.4	
Standard Deviation				0.40	0.42	

### **Major committee assignments in the Department, School, and/or University.**

- Transportation Research Area Chair, Mechanical Engineering, Fall 2020 – present
- Provost's Faculty Advisory Committee on Diversity and Inclusion, Fall 2020 – present
- Academic Area Chair, Mechanical Engineering Systems, Measurement and Control, Spring 2019 – present
- College of Engineering Faculty Affairs Committee, Fall 2018 – Summer 2020
- Mechanical Engineering Head Search Committee, Fall 2018 – Spring 2019
- Engineering Dean Search Committee, 2017
- Mechanical Engineering Leadership Team (MELT), Fall 2014 – present
- Mechanical Engineering Graduate Admissions Committee, Fall 2015- present
- Safety Committee (member), Herrick Labs, School of Mechanical Engineering, Spring 2007-present
- Communications Committee (member), School of Mechanical Engineering, Fall 2006-Spring 2008
- Grade Appeals Committee (member), College of Engineering, Spring 2007-Spring 2009
- Graduate Committee (member), School of Mechanical Engineering, Fall 2009-January 2013
- Mechanical Engineering Leadership Team (MELT), Fall 2011-present
- ME Search Committee (member) - November 2012- Spring 2013
- ME Search Committee (member) – October 2014 – April 2015

### **Administrative duties at Purdue.**

- Faculty advisor, Theta Tau Engr. Fraternity (Organizer of the Local and National Rube Goldberg Machine Contest Competitions)
- Faculty advisor, Purdue University EcoCar2 team – designing a plug-in hybrid electric vehicle powertrain for a 2012 Chevy Malibu

### **Service to government or professional organization.**

- Associate Editor, International Federation of Automatic Control (IFAC) Control Engineering Practice Journal, March 2009 – December 2013
- Associate Editor, International Journal of Engine Research, August 2014 – present
- Associate Editor, Frontiers in Engine and Automotive Research, November 2014 - present
- Associate Editor, ASME Journal of Dynamics Systems Measurement and Control, July 2012-2016
- Editorial board, ASME Dynamics Systems and Control Magazine, 1/2012-present
- Session Co-chair and Organizer (Automotive Propulsion Systems) for the 2006 American Control Conference
- Editor, 2007 IFAC Advances in Automotive Control Symposium and Special Journal Issue
- 2008 Purdue Pugwash Undergraduate Research Symposium Poster Judge, 3/20/2008
- Proposal Review Panel Member, NSF Control Systems Program, May 4<sup>th</sup>-5<sup>th</sup>, 2008
- ASME Fuels Program Peer Review Panel Member for U.S. Dept. of Energy, National Energy Technology Laboratory, Feb. 2009
- 2009 Sigma Xi Graduate Student Research Awards, Poster Judge, 2/18/2009
- Paper reviewer for: IFAC Control Engineering Practice; Journal of Dynamic Systems, Measurement, and Control; IEEE/ASME Transactions on Mechatronics; IEEE Control Systems Technology; Journal of SAE International; American Control Conference, ASEM International Mechanical Engineering Congress and Exposition; IFAC Symposium on Advances in Automotive Control
- Chairman, Automotive and Transportation Panel, ASME Division of Dynamic Systems and Control, July 2013 – November 2014

**Graduate Thesis Committees Chaired (i.e., student for which I am the major professor)**

- 15 current, including: 6MSME, 9PhD
- 47 past, including: 29 MSME and 18 PhD

	NAME	DEG.	START DATE	GRAD. DATE	CO-CHAIR	TITLE
1	Anup Kulkarni	MSME		8/2008	----	Investigation of high efficiency, ultra-low emission, advanced model diesel combustion in a validated, flexible and computationally efficient whole engine model
2	Gayatri Adi	MSME		12/2008	----	An Experimental and Simulation Study of Fuel Consumption and NOx Emission from Bio-fueled Diesel Engines
3	Michael Bunce	MSME		7/2009	----	Opt. of Soy-Biodiesel Combustion in a Modern Diesel Engine
4	Rajani Modiyani	MSME		3/2010	----	Effect of Intake Valve Closure Timing on Effective Compression Ratio and Gas Exchange Process of a Modern Diesel Engine
5	David Snyder	DPhD		8/2010	----	Soy-Based Biodiesel Blend Estimation and Accommodation in a Modern Diesel Engine
6	Chris Satkoski	MSME		12/2010	----	Modeling, Estimation, and Closed Control of Piezo-electric Actuate Fuel Injector
7	Edward Koeberlein	MSME		12/2011	----	Physics-Based Modeling & Estimation of Exhaust Manifold Filling Dynamics on a Diesel Engine Equipped with Flexible Intake Valve Actuation
8	Gayatri Adi	PhD		5/2012	----	Closed-Loop Control for Biodiesel Blends During Mixing Controlled Combustion
9	Karla Stricker	DPhD		5/2012	----	Turbocharger Map Reduction and Estimation of Effective Compression Ratio in a Modern Diesel Engine Utilizing Flexible Intake Valve Modulation
10	Bryan Whitney Belt	MSME		12/2012	----	High Voltage Energy Storage System Design for a Parallel-Through-the-Road Plug-In Hybrid Electric Vehicle
11	Neha Ruikar	MSME		12/2012	----	FPGA/Model – Based Within-a-Cycle Flow Rate Estimation for a Piezo-electric Fuel Injector
12	Lyle Kocher	DPhD		12/2012	----	Physically-Based Modeling, Estimation, and Control of the Gas Exchange and Combustion Processes for Diesel Engines Utilizing Variable Intake Valve Actuation
13	Dan Van Alstine	DPhD		5/2013	----	Control-Oriented Modeling and Operating Range Expansion of PCCI Combustion in a Multi-Cylinder Diesel Engine with Flexible Valve Actuation and Variable Fuel Reactivity
14	Carrie Hall	DPhD		12/2012	----	Fuel-Flexible Combustion Control of Modern Compression-Ignition and Spark-Ignition Engines
15	Jin Shen	MSME		12/2012	----	Within-a-Cycle Flow Rate Estimation for Piezoelectric Fuel Injection
16	Dat Le	DPhD		3/2014	----	Model-Based Control of Piezo-Electric Fuel Injection During Rate Shaping Operation
17	Ashish Vora	DPhD		6/2016	Meckl	Modeling the Impact of Battery Degradation Within Lifecycle Cost Based Design Optimization of Heavy-Duty Hybrid Electric Vehicles

18	Nishi Railkar	MSME		12/2013	----	Investigation of Operating Range Capability of Gasoline-Fueled Compression Ignition
19	Chuan Ding	PhD		8/2014	----	Thermal Efficiency and Emission Analysis of Advanced Thermodynamic Strategies in Multi-cylinder Diesel Engines Utilizing Valve Train Flexibility
20	Mark Magee	MSME		12/2013	----	Exhaust Thermal Management Using Cylinder Deactivation (deposited 1/2014)
21	Leighton Robert	MSME		7/2014	----	Analysis of the Impact of Early Exhaust Valve Opening and Cylinder Deactivation on Aftertreatment Thermal Management and Efficiency for Compression Ignition Engines
22	Adam Fogarty	MSME		8/2014	Meckl	High Voltage Rear Electric Drivetrain Design for a Parallel-Through-the-Road PHEV
23	Bilwa Jadhav	MSME		7/2014	Meckl	Integration and Implementation of High-Voltage Energy Storage Sub-System for a Parallel-Through-The-Road PHEV
24	David Fain	MSME		6/2014	----	Operating Range Characterization and Expansion of PCCI in a Multi-Cylinder Diesel Engine w. VVA, Variable Fuel Reactivity and Revised Turbomachinery
25	Akash Garg	MSME		12/2013	----	Exhaust Thermal Management Using Intake Valve Closing Timing Modulation
26	Brad Pietrzak	MSME		12/2014	----	Algorithm Development and Analysis for Advanced Engine Technologies Including Piezoelectric Fuel Injection and Variable Valve Actuation
27	Xing Jin	PhD		12/2017	----	Physics-Based Computationally Efficient Battery Degradation Model and Electric Machine Scaling Strategy for Hybrid Electric Vehicle Design Optimization
28	Aswin Ramesh	DPhD		8/2018	----	Utilization of Variable Valve Actuation to Improve Fuel Efficiency and Aftertreatment Thermal Management in Diesel Engines
29	Mayura Halbe	MSME		8/2015	----	Analysis and Algorithm Development for Diesel Engine Systems Utilizing Variable Valve Actuation to Enable Premixed Charge Compression Ignition and Cylinder Deactivation
30	Lucius Wang	MSME		8/2015	----	Increasing the High Load Limit of Effective Premixed Charge Compression Ignition via Intake Valve Closure Modulation and Late Injection
31	Soumya Nayyar	MSME		5/2016	----	Implementation and Analysis of Reverse Breathing, Rebreathing, and Cylinder Deactivation for Aftertreatment Thermal Management and Overall Efficiency Benefit on Diesel Engines
32	Sylvia Lu	MSME		8/2016	----	Improving Fuel Economy During High Load Diesel Engine System Operation Through Valve-Train Flexibility
33	Chaitu Panuganti	MSME	08/2014	8/2016	----	Control-Oriented Modeling, Validation, and Analysis of a Natural Gas Engine Architecture
34	Dheeraj Gosala	DPhD	08/2014	12/2018	----	Fuel-Efficient Emissions Reduction from Diesel Engines via Advanced Gas Exchange Management



35	Vaidehi Hoshing	DPhD	08/2014	12/2018	----	Augmented Framework for Economic Viability-Based Powertrain Design and Emissions Analysis of Medium/Heavy-Duty Plug-In Hybrid Electric Vehicles
36	Alex Taylor	MSME		8/2016	----	Test Cell Set-Up to Enable Drive-Cycle Testing of a Variable Valve Actuation Enabled Camless Diesel Engine
37	Troy Odstreil	MSME		1/2018	----	Variable Valve Actuation Strategies for Improving Aftertreatment System Efficiency in Modern Diesel Engines Over the Heavy-Duty Federal Test Procedure Certification Cycle
38	Alex Taylor	PhD		12/2018	----	Diesel Engine Air Handling Strategies for Fuel Efficient Aftertreatment Thermal Management & Connected and Automated Class 8 Trucks
39	Matthew Van Voorhis	MSME	08/2015	08/2017	----	Implementation of Aftertreatment System to Enable Tailpipe Emissions Measurements of a Variable Valve Actuation Enabled Camless Diesel Engine
40	Cody Allen	DPhD	08/2014	3/2019	----	Advancing Diesel Engines via Cylinder Deactivation
41	Kalen Vos	DPhD	08/2015	8/2019	----	Utilizing Valvetrain Flexibility to Influence Gas-Exchange and Reduce Reliance on Exhaust Manifold Pressure Control for Efficient Diesel Engine Operation
42	Sharon Zhang	DPhD	08/2016	12/2020	----	TBD – Natural Gas Engine/Aftertreatment Control for Commercial PHEVs
43	Sree Harsha Rayasam	MSME	01/2017	12/2018	----	Evaluation of Fuel Savings Due to Powertrain Electrification of Class 8 Trucks
44	Mrunal Joshi	PhD	08/2015	12/2019	----	Diesel Engine Cylinder Deactivation for Improved System Efficiency while Maintaining Elevated Aftertreatment Temperatures
45	Brady Black	MSME	08.2018	8/2020 (est.)		TBD – Combining Long-Horizon Predictive Cruise Control and Truck Platooning for Improved Fuel Savings
46	Ifeoluwa Ibitayo	MSME	08/2017	8/2019	----	Enhanced Class 8 Truck Platooning via Simultaneous Shifting and Model Predictive Control
47	Shveta Dhamankar	DPhD	08/2018	12/2022 (est.)	----	TBD -
48	John Foster	MSME	08/2018	7/2020	----	Advanced Control Strategies for Diesel Engine Thermal Management and Class 8 Truck Platooning
49	Weijin Qiu	DPhD	08/2018	8/2022 (est.)	----	TBD
50	Ziping Liu	DPhD	08/2017 12/18	12/2021 (est.)	Evans (ABE)	TBD
51	Chisom Emegoakor	DPhD	08/2018	12/2022 (est.)	----	TBD
52	Shubham Ashta	DPhD	01/2019	12/2022 (est.)	----	TBD
53	Sree Harsha Rayasam	PhD	01/2019	8/2021 (est.)	----	TBD
54	Miles Droege	MSME	08/2019	8/2021 (est.)	----	TBD
55	Tyler Swedes	MSME	08/2019	8/2021 (est.)	----	TBD

56	Chufan Jiang	PhD	08/2015 5/19	12/2021 (est.)	----	TBD
57	Shubham Agnihotri	MSME	10/2019	8/2021 (est.)	----	TBD
58	Vrushali Deshmukh	MSME	08/2019	8/2021 (est.)	----	TBD
59	Doni Thomas	MSME	8/2020	8/2022 (est.)	----	TBD
60	Michael Robert Anthony	MSME	8/2020	8/2022 (est.)	----	TBD
61	Devarshi Patel	DPhD	1/2021	8/2025	----	TBD
62	Adil Shaikh	DPhD	1/2020	8/2025	----	TBD

### Undergraduate special projects directed (75).

1. Will Glewen – Spring 2007 (ME497)
2. Justin Ervin – Spring 2007 (ME497)
3. Matthew Carroll – Summer 2007 (ME497), alternative fuels combustion/estimation
4. Elena Washington – Summer 2007 (SURF), alternative fuels combustion/estimation
5. Armando Indrajuaana – Summer 2007 (SURF) , alternative fuels combustion/estimation
6. Fang Li – Spring 2008 (ME497)
7. Angeline Blum – Summer 2008 (SURF), VVA/PCCI research project
8. Paul Lang – Fall 2008 (ME497) , VVA/PCCI research project
9. Chris Satkoski – Fall 2008 (ME497), alternative fuels combustion/estimation
10. Jeremy Koehler – Summer 2008, Spring 2009, alternative fuels combustion/estimation
11. Ed Koeberlein – Fall 2008 (ME497), Spring 2009, VVA/PCCI research project
12. Bernie Davila – Fall 2008, Spring 2009 (ME497), , alternative fuels combustion
13. Paul Meckl – Spring 2009, Fall 2009 (ME497), Spring 2011 (ME497), VVA/PCCI research project
14. Wei Yang – Spring 2009
15. Augustine Zhou – Spring 2010 (GEARE), modeling of piezo-electric fuel injection measurements
16. May Yen – Spring 2010, alternative fuels combustion control
17. Keith Jones – Spring 2010 (ME497), VVA/PCCI research project
18. Scott Biggs – Spring 2010 (ME497), Summer 2010, modeling/estimation of piezo-electric fuel injection
19. Brandon Biller – Spring 2010 (ME497), Summer 2010 (SURF), Spring 2011 (ME497), VVA engine
20. Jin Shen (3+1+1 student) – Fall 2010 (ME497), Spring 2011 (ME597), Piezo-electric fuel injection
21. Yuntian Wang – Summer 2011, Fall 2011, Spring 2012, modeling VVA engine gas exchange
22. Mark Molewyk – Fall 2011 (ME497), piezo fuel injection experiments, Spring 2012 (ME497) VVA
23. Alex Wolfe – Fall 2011 (ME497), Spring 2012 (ME497) - VVA
24. Maximilian Harr – Fall 2011, modeling gas exchange for partial valve lifts
25. Derek Lee- Spring 2012 (ME497), fuel adaptive diesel engine control
26. Aswin Ramesh – Summer 2012, Modeling VVA engine gas exchange
27. Nandan Vora – Summer 2013
28. Austin Dollar – Spring 2013, Fall 2014, & Spring 2014 (ME497), modeling of SI engine
29. Sharang Kulkarni – Summer 2014, IIT-H exchange student, exhaust aftertreatment dynamic modeling
30. Brett Rasmus – Summer 2014, Fall 2014, VVA engine experiments
31. Xiaofan Guo – Fall 2014, Spring 2015, heavy-duty hybrid electric vehicle powertrain design/control
32. Troy Odstreil – Summer 2015, SURF, CI engine efficiency improvements via VVA
33. Dina Caicedo-Parra – Summer 2015, SURF, CI engine efficiency improvements via VVA
34. Sree Harsha Rayasam – Summer 2015, IIT-H exchange student, heavy-duty HEV powertrains

35. Anant Dugar – Fall 2015, Data management from VVA engine
36. Julia Hartig – Spring 2016, VVA drive cycle data management
37. Neil Koglin – Spring 2016
38. Nianshen Zhang – Spring 2016
39. Xu (Sharon) Zhang – Spring 2016, Natural gas engine controls
40. Michael Crawford – Summer 2016, Enabling VVA engine drive-cycle testing
41. Erik Santini – Summer 2016 (SURF), CI engine efficiency improvements via VVA
42. Akanksha Baggan – Summer 2016 (IIT PURE), Modeling of battery thermal management
43. Conor Martin – Summer 2016 (SURF), In-cylinder combustion probe design
44. Harrison Senor – Summer 2016
45. David Ross – Fall 2016, Engine test data acquisition & viewing tools development
46. Yuhui Zhu – Fall 2016
47. Emerson Houck – Fall 2016
48. Nicholas Gaeta – Fall 2016, Spring 2017, Engine test cell & fuel consumption measurement design
49. Samir Solaiman – Spring 2017, VVA data management
50. Austin McDonald – Spring 2017, VVA drive-cycle data management
51. Joseph Wichlinski – Summer 2017 (SURF), Validation of a fuel consumption measurement device
52. Sirish Srinivasan – Summer 2017 (IIT PURE), VVA engine drive cycle analysis
53. Timothy Mueller, Jr. – Summer 2017, Engine testcell development
54. Miles Droege – Summer 2017, powertrain modeling; Spring 2018-Spring 2019, emissions measurement
55. Ehsan Esmaeili – Fall 2017, Enabling CAV engine testing
56. Urjayant Sangai – Fall 2017, CI engine efficiency improvements via VVA
57. Pablo Jimenez-Corredor – Fall 2017, Enabling CAV engine testing
58. Nachiket Vatkar – Spring 2018, Enabling emission prediction of HD PHEVs
59. Nishad Damle – Spring 2018, Spring 2019, VV aftertreatment thermal management analysis
60. Sean Franiak – Spring 2018, VVA engine modeling and analysis
61. Yifei (Bella) Ding – Spring 2018, Closed-loop control of engine boundary conditions
62. Manya Subbaramaiah – Spring 2018, Closed-loop control of engine boundary conditions
63. Conrad Lynch – Summer 2018, Truck Platooning
64. Sreenidh Sreekumar Praveena – Summer 2018, PURE
65. Harikrishnan Raghukumar – Summer 2018, PURE
66. Reese Holloway – Summer 2018, Spring 2019, Summer 2019, Engine testing for ARPA-E project
67. Ali Mandviwala – Fall 2018, High BMEP gasoline engine controls for PHEVs
68. Justin Rhines – Fall 2018, Spring 2019, Fall 2019 VVA/CDA in IC Engines
69. Urjayant Sangai – Fall 2018, Spring 2019, Engine testing for ARPA-E project
70. Harald Chao – Spring 2019, Simulation of novel control strategies for platooning trucks, and Fall 2019
71. Tamin Noor – Spring 2019
72. Adil Shaikh – Summer 2019, Control design, simulation & engine testing for advanced truck platooning
73. Scott Creger – Summer 2019 & Fall 2019 engine testing for advanced truck platooning
74. Aaron Villiger – Fall 2019, Variable Valve Actuation
75. Alexandre Fleisch – Fall 2019, Autonomous Truck Research

**Research funding details**

As a member of the Purdue faculty, Greg has acquired \$17.6M in research funding for projects that he has also led. \$13.3M (of the \$17.6M) has been for direct use within his own research team, and \$8.6M (of the \$17.6M) has been funding directly from industry partner companies (including John Deere (\$1.4M), Cummins (\$4.9M), Eaton (\$1.4M), and Caterpillar (\$0.5M)). Federal funding sources include DOE (EERE & ARPA-E), DOT, NSF, and EPA.

**Patents**

- Filed applications: 33
- Applications in/pending examiner review: 21
- Issued patents: 2
- Companies with rights: 3 (w/ rights to one, or more, of 12 applications/patents)