

CV for Greg Shaver

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Greg Shaver is a Full Professor, University Faculty Scholar, and College of Engineering Early Career Research Award recipient. His research focus is model-based design and control of clean, high efficiency, low CO₂ ground vehicle powertrains and engines. Greg's students have published more than 100 peer-reviewed journal and conference papers. Thirty students (9 PhD, 21 MSME) have graduated from his group, 10 of which are women. He has demonstrated leadership in facilitating collaborative research, with examples including leading i.) Purdue's DOE-funded Hoosier Heavy Hybrid Center of Excellence to fund more than 20 faculty-advised fellowship students from 5 different Schools of Engineering, ii.) development of a Hybrid Vehicle Systems Certificate (Purdue's 1st multi-disciplinary certificate program), and iii.) a significant number of industry/Purdue meetings and collaborations. Greg has attracted Purdue external support in excess of \$13.5M (\$8M for use within his team) during his 10 years as a faculty member – with a ~50/50 split between industrial and federal funding sources, including ARPA-E, DOE, Cummins, Eaton, NSF, EPA, Caterpillar, and GM. Greg is also a Purdue alum, receiving a BSME with highest distinction in 2000.

Education and Training

Ph.D./Masters Mechanical Engineering, Stanford University, *Dynamic Modeling and Control of HCCI Engines*, completion: June 2005, Major area: Dynamics, systems and control, Minor area: Fluid Mechanics

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

Research and Professional Experience.

Purdue University Professor of Mechanical Engineering (July 1, 2016 – present)

Purdue University Associate Professor of Mechanical Engineering (July, 1, 2011 – June 30, 2016)

Purdue University Assistant Professor of Mechanical Engineering, August 2006-June 2011

- Modeling, integration and control of variable valve actuation (VVA) systems in IC engines.
- Engine algorithm development for closed-loop control and virtual sensing

Stanford University Dynamic Design Lab Graduate Research Assistant, 2000-05 (5 years)

- Primary advisor: J. Christian Gerdes, Secondary advisor: Christopher S. Edwards
- Develop modeling and control strategies for Homogeneous Charge Compression Ignition (HCCI) Engines with VVA.
- Research highly multidisciplinary, with significant overlap of the following areas: Dynamics, systems and control; Fluid mechanics; Combustion & thermodynamics

Stanford University Course Assistant, Department of Mechanical Engineering 00-01 (5 months)

- Maintained and developed laboratory systems for identification and control for the upper division/graduate course: System Identification of Mechanical Systems for Control.

Purdue University Teaching Assistant, Mechanical Engineering 1999-2000 (1 year)

- Provided technical mentoring for students in two upper division courses: Systems and Measurement; Systems Modeling and Analysis. Responsible for evaluation and feedback of student performance.

Palomar Technologies 1999-2000, Vista, California (3 months)

- Developed an automated closed-loop control synthesis strategy for Palomar's premiere wire-bonding machines.

Purdue University Cooperative Education Student for AlliedSignal Inc. (now Honeywell) Aerospace 1996-1999, South Bend, IN (2 years)

- Designed, analyzed and tested aerospace grade fuel and flight surface control hardware.

Honors and awards.

- 2011 Max Bentele Award for Engine Technology Innovation
- 2013 Ralph Teetor Educational Award
- Graduated with highest distinction, Purdue University 2000 (4.0 in Mech. Engr. coursework)
- 2003, 2004, & 2005 American Control Conference - best presentation in session award
- Best paper in Journal of Dynamic Systems Measurement and Control for year 2005
- Best paper in Journal of Automobile Engineering for year 2012
- 2014 Early Career Excellence in Research Award, Purdue University College of Engineering
- 2014 Purdue University Faculty Scholar

Publications and Presentations

Refereed journal papers: 42 accepted/in-print, 9 under review

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 Kuklarni*, 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, accepted for publication in the *International Journal of Engine Research*, accepted June 29th, 2015 (likely to appear in print in 2016)
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. 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, accepted, *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*, revision submitted to *International Journal of Engine Research*, Sept. 4th, 2016
43. Xiaohui Liu, Shubham Agrawal, Xing Jin, Ashish Vora, Srinivas Peeta, Gregory Shaver, and James Dietz, Quantifying EV battery lifespan and its impact on battery warranty strategy through an integrated

- battery aging model and a microscopic traffic network simulation model, submitted to the Journal of ACS Sustainable Chemistry and Engineering, June 28th, 2016
44. Ashish P. Vora, Xing Jin, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, Subbarao Varigonda, Oleg Wasynczuk, Wallace E. Tyner, Vivek Sujun, 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, submitted for review to Applied Energy, June 2016
 45. 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, submitted for review to IFAC Control Engineering Practice, July 4th, 2016
 46. Aswin Ramesh et al, Utilizing low airflow strategies, including cylinder deactivation, to improve fuel efficiency and aftertreatment thermal management during high speed, low load operating conditions, submitted to the International Journal of Engine Research, Sept. 2nd, 2016
 47. Dheeraj Gosala et al, , Cylinder deactivation during dynamic diesel engine operating conditions, International Journal of Engine Research, revision submitted 12-23-2016
 48. 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, revision submitted 12-24-2016
 49. 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, accepted 12-24-2016
 50. 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, submitted to Journal of Power Sources, Sept. 25th, 2016
 51. Jialiang Tang, Arthur D. Dysart, Dong Hee Kim, Ram Saraswar, Gregory M. Shaver, and Vilas G. Pol, Engineered Silicon Nanoguests in Carbon Hotels: Accommodating Volume Expansion of Silicon Anode during Lithiation and Minimizing Pulverization during Contraction, in review, ACS Applied Materials and Interfaces, October, 2016

Refereed conference or symposium papers (50 have appears, 3 in review) – 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 1st 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 2008
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, *3rd 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 Plug-in Hybrid Electric Vehicle, 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. 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*, submitted as invited paper to 2017 ACC, 9-18-2016
52. 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*, submitted as invited paper to 2017 ACC, 9-18-2016
53. Ashish P. Vora, Xing Jin, Vaidehi Hoshing, Tridib Saha, Gregory M. Shaver, Oleg Wasynczuk, Wallace E. Tyner, *Impact of Battery Degradation and Ownership Economics on Design of Series Plug-In Hybrid Electric Medium-Duty Trucks*, submitted as regular paper to 2017 ACC, 9-18-2016

Books and chapters in books.

1. Gregory M. Shaver, *Enabling Simultaneous Reductions in Fuel Consumption, NO_x, and CO₂ 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, 20th 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, September 15-16, 2006, *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_x, and CO₂ 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 in 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 in assessing the risk of chemical-induced skin sensitization, Poster, 8th 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. (24, including: 5 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_x, and CO₂ 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 18th, 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*, 2nd 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 9th, 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 16th, 2011
20. *Plenary Pres.* - Model-Based Closed-Loop Control of IC Engine Fuel Injection, Gas Exchange, and Combustion Processes, 3rd 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 9th, 2012
23. Fuel Adaptive Diesel Engine Control, John Zink Company, February 20th, 2012
24. Model-Based Closed-Loop Control of Advanced Engine Systems and Combustion Strategies, University of Houston, March 29th, 2012
25. Engine Model and Control Research at Purdue, Advanced Engine Control Symposium, University of Michigan, April 23rd, 2012
26. Development of High Efficiency, Environmentally Friendly Vehicles, Science on Tap, August 23rd, 2012
27. Automotive Research at Purdue, VIT (Vellore India), January 20th, 2013
28. Model-Based Engine Algorithm Dev. for Control and Virtual Sensing, Mich. Tech Univ. April 4th, 2013
29. Model-Based Engine Algorithm Development for Control and Virtual Sensing, 2013 University of Wisconsin Engine Research Center Symposium, June 5th, 2013

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	
	Adaptive Control	689	11/25	4.0	3.9	

S13	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
Mean				4.3	4.4
Standard Deviation				0.41	0.41

Activities to promote diversity

- Of Dr. Shaver’s 29 current and past graduate students, 9 are women.
- Dr. Shaver and graduate students in the team have mentored 3 female undergraduate research assistants – Elena Washington (SURF), Angeline Blum (SURF), and May Yen.
- Development of a 30 minute engine research demonstration for Women in Engineering Program at Purdue. Delivered to 4 groups of 5 high school women interested in science, math, and engineering on June 20th, 2007.
- Presentation and lab tour at Herrick Labs, *Fuel Flexible Combustion for the Clean & Efficient Use of Biodiesel*, for Purdue Univ. Women in Engineering Program - Innovation to Reality Program, 2-19-2009
- Demonstration and mini-lecture at Frontier Junior/Senior High School (Dr. Shaver students - Carrie Hall and Karla Stricker) - the basic engine cycle, benefits of new combustion strategies, benefits of bio-diesel as an alternative fuel and how it differs from diesel, and how bio-diesel is made, including a hands-on activity making bio-diesel from vegetable oil. May 11, 2010.
- Women in Engineering Program (WIEP) “Exciting Discoveries for Girls in Engineering” (EDGE) camp. “Mini-courses” - i) making biodiesel from vegetable oil, ii.) engine operation – with students inspecting a “rotating”, partially disassembled engine, and iii.) the concept of torque – with students using a torque wrench to get familiar with the more common concept of force and its relationship with torque. With instances including: July 23rd, 2009; July 30th, 2009; July 17th, 2010; July 24th, 2010.
- MINDS (Mastering Ideas Necessary for Developing Students) Program – demo: “*Next Generation Engine Modeling and Control Research at Purdue University*”, October 18th, 2008

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

- 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

Outreach activities.

- *Advances in Clean and Efficient Engine Technology*, Purdue ME290 Seminar, 2-12-2009
- *Modeling, Design, & Control of Novel Combustion Systems*, Purdue ASME Luncheon, 1/10/2008
- *Energy Research at Purdue*, Presentation, on behalf of the Energy Center at Discovery Park, to the Kokomo (IN) Rotary, June 2nd, 2009
- Blood and bone marrow donor – Spring 2005

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-present
- 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 4th-5th, 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)

- **12 current, including: 4MSME, 1PhD and 7DPhD**
- **31 past, including: 21 MSME, 2PhD, and 8 DPhD**

NAME	DEG.	GRAD. DATE	CO-CHAIR	THESIS TITLE or EFFORT DESCRIPTION
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
Gayatri Adi	MSME	12/2008	----	An Experimental and Simulation Study of Fuel Consumption and NOx Emission from Bio-fueled Diesel Engines
Michael Bunce	MSME	7/2009	----	Opt. of Soy-Biodiesel Combustion in a Modern Diesel Engine
Rajani Modiyani	MSME	3/2010	----	Effect of Intake Valve Closure Timing on Effective Compression Ration and Gas Exchange Process of a Modern Diesel Engine
David Snyder	DPhD	8/2010	----	Soy-Based Biodiesel Blend Estimation and Accommodation in a Modern Diesel Engine
Chris Satkoski	MSME	12/2010	----	Modeling, Estimation, and Closed Control of Piezo-electric Actuate Fuel Injector
Edward Koeberlein	MSME	12/2011	----	Physics-Based Modeling & Estimation of Exhaust Manifold Filling Dynamics on a Diesel Engine Equipped with Flexible Intake Valve Actuation

Gayatri Adi	PhD	5/2012	----	Closed-Loop Control for Biodiesel Blends During Mixing Controlled Combustion
Karla Stricker	DPhD	5/2012	----	Turbocharger Map Reduction and Estimation of Effective Compression Ratio in a Modern Diesel Engine Utilizing Flexible Intake Valve Modulation
Bryan Whitney Belt	MSME	12/2012	----	High Voltage Energy Storage System Design for a Parallel-Through-the-Road Plug-In Hybrid Electric Vehicle
Neha Ruikar	MSME	12/2012	----	FPGA/Model – Based Within-a-Cycle Flow Rate Estimation for a Piezo-electric Fuel Injector
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
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
Carrie Hall	DPhD	12/2012	----	Fuel-Flexible Combustion Control of Modern Compression-Ignition and Spark-Ignition Engines
Jin Shen	MSME	12/2012	----	Within-a-Cycle Flow Rate Estimation for Piezoelectric Fuel Injection
Dat Le	DPhD	3/2014	----	Model-Based Control of Piezo-Electric Fuel Injection During Rate Shaping Operation
Ashish Vora	DPhD	6/2016	Meckl	TBD, related to: PHEV powertrain control
Nishi Railkar	MSME	12/2013	----	Investigation of Operating Range Capability of Gasoline-Fueled Compression Ignition
Chuan Ding	PhD	8/2014	----	Thermal Efficiency and Emission Analysis of Advanced Thermodynamic Strategies in Multi-cylinder Diesel Engines Utilizing Valve Train Flexibility
Mark Magee	MSME	12/2013	----	Exhaust Thermal Management Using Cylinder Deactivation (deposited 1/2014)
Leighton Robert	MSME	7/2014	----	TBD, related to: Variable Valve Actuation in CI engines
Adam Fogarty	MSME	8/2014	Meckl	High Voltage Rear Electric Drivetrain Design for a Parallel-Through-the-Road PHEV
Bilwa Jadhav	MSME	7/2014	Meckl	Integration and Implementation of High-Voltage Energy Storage Sub-System for a Parallel-Through-The-Road PHEV
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
Akash Garg	MSME	12/2013	----	Exhaust Thermal Management Using Intake Valve Closing Timing Modulation
Brad Pietrzak	MSME	12/2014	----	Algorithm Development and Analysis for Advanced Engine Technologies Including Piezoelectric Fuel Injection and Variable Valve Actuation
Xing Jin	PhD	12/2015 (est.)	----	TBD, related to: Design and Control of Heavy Hybrid Powertrains
Aswin Ramesh	DPhD	12/2017 (est.)	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
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

Lucius Wang	MSME	8/2015	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
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
Sylvia Lu	MSME	8/2016	----	Improving Fuel Economy During High Load Diesel Engine System Operation Through Valve-Train Flexibility
Chaitu Panuganti	MSME	8/2016	----	Control-Oriented Modeling, Validation, and Analysis of a Natural Gas Engine Architecture
Cody Allen	DPhD	12/2018 (est.)	----	TBD, related to: Connected and Automated Class 8 Trucks
Dheeraj Gosala	DPhD	12/2018 (est.)	----	TBD, related to: Model-based Control Design for High Efficiency, Medium-Duty Gasoline Engines
Vaidehi Hoshing	MSME	8/2016 (est.)	----	TBD, related to: Design and Control of Heavy Hybrid Powertrains
Kalen Vos	DPhD	8/2020 (est.)	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
Alex Taylor	MSME	8/2016	----	Test Cell Set-Up to Enable Drive-Cycle Testing of a Variable Valve Actuation Enabled Camless Diesel Engine
Mrunal Joshi	MSME	8/2017 (est.)	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
Matthew Van Voorhis	DPhD	8/2020 (est.)	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
Troy Odstrcil	MSME	8/2018 (est.)	----	TBD, related to: Enabling High Efficiency Engine Combustion with Flexible Valve Actuation
Sree Harsha Rayasam	MSME	8/2018 (est.)	----	TBD, related to: Control Architecture Selection for Natural Gas Engines with Five or More Inputs and Outputs
Alex Taylor	PhD	12/2019 (est.)	----	TBD, related to: Connected and Automated Class 8 Trucks
Sharon Zhang	MSME	8/2017 (est.)	----	TBD, related to: Control Architecture Selection for Natural Gas Engines with Five or More Inputs and Outputs

Undergraduate special projects directed (33).

- Will Glewen – Spring 2007 (ME497)
- Justin Ervin – Spring 2007 (ME497)
- Matthew Carroll – Summer 2007 (ME497), alternative fuels combustion/estimation
- Elena Washington – Summer 2007 (SURF), alternative fuels combustion/estimation
- Armando Indrajuaana – Summer 2007 (SURF) , alternative fuels combustion/estimation
- Fang Li – Spring 2008 (ME497)
- Angeline Blum – Summer 2008 (SURF), VVA/PCCI research project
- Paul Lang – Fall 2008 (ME497) , VVA/PCCI research project
- Chris Satkoski – Fall 2008 (ME497), alternative fuels combustion/estimation
- Jeremy Koehler – Summer 2008, Spring 2009, alternative fuels combustion/estimation
- Ed Koeberlein – Fall 2008 (ME497), Spring 2009, VVA/PCCI research project
- Bernie Davila – Fall 2008, Spring 2009 (ME497), , alternative fuels combustion
- Paul Meckl – Spring 2009, Fall 2009 (ME497), Spring 2011 (ME497), VVA/PCCI research project
- Wei Yang – Spring 2009
- Augustine Zhou – Spring 2010 (GEARE), modeling of piezo-electric fuel injection measurements
- May Yen – Spring 2010, alternative fuels combustion control

- Keith Jones – Spring 2010 (ME497), VVA/PCCI research project
- Scott Biggs – Spring 2010 (ME497), Summer 2010, modeling/estimation of piezo-electric fuel injection
- Brandon Biller – Spring 2010 (ME497), Summer 2010 (SURF), Spring 2011 (ME497), VVA engine
- Jin Shen (3+1+1 student) – Fall 2010 (ME497), Spring 2011 (ME597), Piezo-electric fuel injection
- Yuntian Wang – Summer 2011, Fall 2011, Spring 2012, modeling VVA engine gas exchange
- Mark Molewyk – Fall 2011 (ME497), piezo fuel injection experiments, Spring 2012 (ME497) VVA
- Alex Wolfe – Fall 2011 (ME497), Spring 2012 (ME497) - VVA
- Maximilian Harr – Fall 2011, modeling gas exchange for partial valve lifts
- Derek Lee- Spring 2012 (ME497), fuel adaptive diesel engine control
- Nandan Vora – Summer 2013
- Austin Dollar – Spring 2013, Fall 2014, & Spring 2014 (ME497), modeling of SI engine
- Sharang Kulkarni – Summer 2014, IIT-H exchange student, exhaust aftertreatment dynamic modeling
- Brett Rasmus – Summer 2014, Fall 2014, VVA engine experiments
- Xiaofan Guo – Fall 2014, Spring 2015, heavy-duty hybrid electric vehicle powertrain design/control
- Troy Odstrcil – Summer 2015, SURF, CI engine efficiency improvements via VVA
- Dina Caicedo-Parra – Summer 2015, SURF, CI engine efficiency improvements via VVA
- Sree Harsha Rayasam – Summer 2015, IIT-H exchange student, heavy-duty hybrid electric vehicle powertrain design/control

Short courses and workshops taught.

- Short Course for Delphi (Kokomo, IN): HEV 101 Introduction to Electric Vehicle Systems, Module 1 - Introduction to HEV (hybrid electric vehicle), PHEV (plug-in hybrid electric vehicle), EV (electric vehicle), and FCEV (fuel cycle electric vehicle) configurations, with John Abraham (ME), May 11th, 2010, Kokomo, IN - course material preparation & presentation, enrollment: 19 Delphi employees
- Short Course for Delphi (Kokomo, IN): HEV 101 Introduction to Electric Vehicle Systems, Module 1 - Introduction to HEV (hybrid electric vehicle), PHEV (plug-in hybrid electric vehicle), EV (electric vehicle), and FCEV (fuel cycle electric vehicle) configurations, with John Abraham (ME), September 21st, 2010, Kokomo, IN - course material preparation & presentation

Research funding summary.

Greg has attracted Purdue external support in excess of \$13.5M (\$8M for use within his team) during his 10 years as a faculty member – with a ~50/50 split between industrial and federal funding sources, including ARPA-E, DOE, Cummins, Eaton, NSF, EPA, Caterpillar, and GM.