

TIMOTHY JOHN JACOBS, Ph.D

Professor and Department Head
Department of Multidisciplinary Engineering

Professor
Department of Mechanical Engineering

Texas A&M University
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March 19, 2023

EDUCATION

University of Michigan, Ann Arbor, Michigan	
<u>Doctor of Philosophy in Mechanical Engineering</u>	April, 2005
<u>Master of Science in Engineering in Mechanical Engineering</u>	April, 2002
<u>Bachelor of Science in Engineering in Mechanical Engineering</u>	April, 1999

POSITIONS

Texas A&M University (College Station, TX)

Department of Multidisciplinary Engineering

Professor and Department Head July 2021 – Present
Founding Interim Department Head September 2020 – June 2021

Department of Mechanical Engineering

Professor September 2017 – Present
Steve Brauer, Jr. '02 Faculty Fellow May 2015 – August 2021
Co-Director, Institute for
Engineering Education Innovation
March 2019 – August 2020
Director, Interdisciplinary
Engineering for Undergraduate and Graduate Programs
January 2017 – August 2020
Eppright University Professorship
for Undergraduate Teaching Excellence
September 2015 – August 2018
Associate Professor
September 2012 – August 2017
Undergraduate Program Director
September 2014 – December 2016
Undergraduate Program Coordinator
September 2013 – August 2014
Assistant Professor
September 2006 – August 2012

Texas A&M Transportation Institute (College Station, TX)

Research Associate	September 2010 – Present
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University of Michigan (Ann Arbor, MI)

Research Fellow	February 2005 – August 2006
Instructor	September 2005 – December 2005
	January 2005 – May 2005
Graduate Student Research Asst.	January 2000 – February 2005
Graduate Student Teaching Asst.	September 2004 – December 2004
	September 2001 – December 2001
	September 2000 – December 2000
Undergraduate Student Res. Asst.	September 1998 – May 1999

General Motors Research, Development, and Planning (Warren, MI)

Summer Intern	May 2002 – August 2002
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Detroit Diesel Corporation (Detroit, MI)

Summer Intern	May 2000 – August 2000
Summer Intern	May 1999 – August 1999

Delphi Saginaw Steering Systems (Saginaw, MI)

Summer Intern	May 1998 – August 1998
Summer Intern	May 1997 – August 1997

John M. Jacobs Plumbing & Heating, Inc. (Bay City, MI)

Part time student worker	July 1991 – August 1996
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RESEARCH CONTRACTS AND GRANTS

1. Principal Investigator. Reducing Compressor Station Methane Emissions through Advanced Lean Burn Combustion Employing Radical Ignition and Feed-Forward Cycle Control. Department of Energy Advanced Research Projects Agency – Energy. T. Jacobs (PI), S. Biswas (co-PI), S. Krishnan (co-PI), M. Patterson (co-PI), K. Srinivasan (co-PI), M. Viele (co-PI). August 15, 2022 – August 14, 2025. \$3,138,682 (Jacobs share = \$656,194).
2. Principal Investigator. Reduced Cyclic Variability for Improved GHG Emissions. Pipeline Research Council, Int. T. Jacobs (PI). December 16, 2022 – December 20, 2023. \$75,000.
3. Principal Investigator. CFD Study of Prechamber NOx Production Mechanisms. Pipeline Research Council, Int. T. Jacobs (PI). September 1, 2021 – August 31, 2023. \$105,000.
4. Principal Investigator. Evaluation of New Ignition Concepts on Large Bore NG Engines for Methane Emission Reduction: Phase 1 Engine Simulation. Pipeline Research Council, Int. T. Jacobs (PI). August 1, 2021 – December 31, 2022. \$80,000.
5. Principal Investigator. Residual Gas Fraction Estimation Based on Measured In-Cylinder Pressure. Pipeline Research Council, Int. T. Jacobs (PI). February 6, 2017 – December 31, 2021. \$283,000.

6. Principal Investigator. CFD Study of Prechamber Ignition Mechanisms for GHG Reduction. Pipeline Research Council, Int. T. Jacobs (PI). June 1, 2020 – January 31, 2021. \$50,000.
7. Principal Investigator. Pump Station Efficiency Improvement. Pipeline Research Council, Int. T. Jacobs (PI). June 1, 2020 – November 30, 2020. \$35,000.
8. Principal Investigator. Predictive Combustion Modeling of Large Bore Two Stroke Natural Gas Engine Experiencing Variable Fuel Composition Events: Phase IV. Pipeline Research Council, Int. T. Jacobs (PI). July 1, 2018 – August 1, 2020. \$100,000.
9. Principal Investigator. Combustion and Engine Improvements of a Large Bore Single-Cylinder 2-Stroke Natural Gas Engine for Lower Emission and Higher Efficiency. Baker-Hughes, a GE Company. T. Jacobs (PI). October 1, 2015 – May 31, 2020. \$333,000.
10. Principal Investigator. Fundamental Study of Spark-Ignition for the Control of Natural Gas Engine Cyclic Variability and Emissions. Hoerbiger Corporation of America. T. Jacobs (PI). April 1, 2018 – May 31, 2020. \$103,000.
11. Principal Investigator. Engine Response from and Controller Design Guidelines to Address Variable Fuel Composition of Lean-Burn Engines. Pipeline Research Council, Int. T. Jacobs (PI). March 1, 2014 – June 30, 2018. \$291,167.
12. Principal Investigator. Control of Fugitive Methane Emissions from Compressor Stations Through Combustion of Compressor Vent and Engine Crankcase Emissions. Pipeline Research Council, Int. T. Jacobs (PI). January 1, 2016 – August 31, 2017. \$81,000.
13. Principal Investigator. Assessing Potential Differences of Fuel Effects on Combustion and Engine Behavior Between Differently-sized Engines. Shell Oil Corporation. T. Jacobs (PI). September 1, 2013 – August 31, 2017. \$225,000.
14. Principal Investigator. AIR Option 1: Technology Translation – Enabling High Efficiency and Clean Combustion through the Integration of Low Heat Rejection Concepts with Advanced Low Temperature Combustion Engines. National Science Foundation. T. Jacobs (PI), J. Caton (co-PI). September 15, 2013 – June 30, 2017. \$181,326 (Jacobs share = \$90,663).
15. Principal Investigator. Model Based Determination of CFD Initial Conditions and NO Predictions. John Deere. T. Jacobs (PI). July 1, 2014 – October 31, 2016. \$80,000.
16. Principal Investigator. Study of Conjugate Heat Transfer of a Spark-Ignited Natural Gas Engine Cylinder. GE Oil and Gas. T. Jacobs (PI). January 1, 2014 – June 30, 2016. \$97,000.
17. Principal Investigator. Single-Cylinder Natural Gas Engine Combustion and Emissions Research and Development. GE Oil and Gas. T. Jacobs (PI). April 1, 2013 – June 30, 2016. \$246,781.
18. Principal Investigator. Low temperature diesel combustion. General Motors Corporation. T. Jacobs (PI). November 15, 2010 – December 31, 2015. \$185,000.
19. Principal Investigator. EAGER: Biodiesel / Ethanol RCCI Combustion Exploration at Multiple Engine Loads and Speeds. National Science Foundation. T. Jacobs (PI). January 1, 2013 – December 31, 2014. \$60,000.
20. Principal Investigator. TUES: Comprehensive Course Redesign: Thermodynamics for Next Generation Engineers. National Science Foundation. T. Jacobs (PI), J. Froyd (co-PI), J. Caton (co-PI), K. Rajagopal (co-PI). August 1, 2011 – July 31, 2014. \$200,000 (Jacobs portion = \$150,000).

21. Co-Principal Investigator. GAP Project: Use of Oxide Nanoparticles in Soot Reduction. University of Central Florida. E. Petersen (PI), T. Jacobs (co-PI). June 3, 2013 – June 1, 2014. \$15,000 (Jacobs portion = \$9,765).
22. Co-Principal Investigator. Fleet equipment performance measurement preventive maintenance model (PM²). Texas Department of Transportation. T. Ramani (PI), J. Zietsman (co-PI), M. Farzaneh (co-PI), J. Johnson (co-PI), C. Spiegelman (co-PI), T. Jacobs (co-PI). September 1, 2010 – August 31, 2012. \$255,414 (Jacobs' portion = \$10,000 and major advisor of graduate student funded by project).
23. Co-Principal Investigator. Development of low emissions, high efficiency natural gas engine: Implementation of homogenous charge compression ignition (HCCI) technologies. Qatar National Research Foundation. J. Caton (PI), T. Jacobs (co-PI), R. Tafreshi (co-PI), R. Langari (co-PI). May 1, 2008 – November 30, 2011. \$747,824 (Jacobs portion = \$400,000).
24. Principal Investigator. Simultaneous and substantial reductions in nitric oxide and particulate matter emissions via the development of low temperature combustion in a diesel engine. Houston Advanced Research Center. T. Jacobs (PI), J. Caton (co-PI). September 1, 2008 – May 31, 2011. \$746,153 (Jacobs portion = \$500,000).
25. Principal Investigator. Radiation heat transfer and its effect on NO formation in diesel combustion with biodiesel fuel. Texas Higher Education Coordinating Board 2007 ARP Norman Hackerman Advanced Research Program. T. Jacobs (PI), J. Caton (co-PI). November 9, 2008 – January 31, 2011. \$47,192 (Jacobs portion = \$47,192).
26. Co-Principal Investigator. Development of a NO_x verification protocol and actual testing of onboard idle reduction technologies. Houston Advanced Research Center. J. Zietsman (PI), B. Bochner (co-PI), D. Lee (co-PI), M. Farzaneh (co-PI), T. Jacobs (co-PI), B. Guo (co-PI), J. Storey (co-PI). September 1, 2008 – December 31, 2010. \$749,708 (Jacobs portion = \$15,000).
27. Principal Investigator. Root cause analysis of changes in NO_x emissions due to biodiesel combustion in diesel engines. Houston Advanced Research Center. T. Jacobs (PI), S. Capareda (co-PI), J. Caton (co-PI). September 1, 2007 – August 31, 2009. \$600,000 (Jacobs portion = \$200,000).

PUBLICATIONS

Book Chapters

1. Jacobs, T. (2020). Internal Combustion Engines and Gas Turbines. In *A Gallery of Combustion and Fire* (Ed. C.E. Baukal, A.K. Agrawal, S. Olson, M.J. Gollner, T.J. Jacobs, and M. Vaccari). Cambridge: Cambridge University Press.
2. Jacobs, T. (2020). Developments in Internal Combustion Engines. In *Encyclopedia of Sustainability Science and Technology* (Ed. R. Meyers). New York: Springer, Inc.
3. Assanis, D., Cole, D., Jacobs, T., Patterson, D, Mamalis, S. (2017). Internal Combustion Engines. In *Marks' Standard Handbook for Mechanical Engineers* (12th Edition, Eds. A. Sadegh, W. Worek). New York: McGraw-Hill, Inc.

4. Klett, D., Afify, E., Srinivasan, K., Jacobs, T. (2017). Internal Combustion Engines. In *Energy Conversion* (2nd Edition, Eds. D.Y. Goswami, F. Kreith). Boca Raton: Taylor and Francis Group.
5. Jacobs, T. (2012). Developments in Internal Combustion Engines. In *Encyclopedia of Sustainability Science and Technology* (Ed. R. Meyers). New York: Springer, Inc.
6. Assanis, D., Cole, D., Jacobs, T., Patterson, D. (2007). Internal Combustion Engines. In *Marks' Standard Handbook for Mechanical Engineers* (11th Edition, Eds. E. Avallone, T. Baumeister, A. Sadegh). New York: McGraw-Hill, Inc. pp. 9-93 – 9-127.

Refereed Journal Articles

1. Ashok, A., Katebah, M.A., Linke, P., Kumar, D., Arora, D., Fischer, K., Jacobs, T., Al-Rawashdeh, M. (2023). Review of piston reactors for the production of chemicals. *Reviews in Chemical Engineering* **39** (1), pp. 297 – 328.
2. Bajwa, A., Patterson, M., Jacobs T. (2022). Experimental investigation of scavenging in two-stroke engines using continuous CO₂ sampling. *Proceedings of the Institute of Mechanical Engineering Part D: Journal of Automobile Engineering* **236** (7), pp. 1443 – 1459.
3. Bajwa, A., Patterson, M., Jacobs, T. (2021). Using gas dynamic models to improve exhaust system design for large-bore, two-stroke engines. *International Journal of Engine Research* **22** (8), pp. 2622 – 2638.
4. Fieseler, K., Linker, T., Patterson, M., Rem, D., Jacobs, T. (2020). Estimating laminar flame speed and ignition delay for a series of natural gas mixtures at IC engine-relevant conditions. *ASME Journal of Energy Resources Technology* **142** (6), pp. 062301-1 – 062301-6.
5. Paul, D., Nepal, B., Johnson, M., Jacobs, T. (2018). Examining validity of general self-efficacy scale for assessing engineering students' self-efficacy. *International Journal of Engineering Education* **34** (5), pp. 1671 – 1686.
6. Li, J., Jacobs, T., Bera, T., Parkes, M. (2018). Comparison of diesel engine efficiency and combustion characteristics between different bore engines. *ASME Engineering Journal of Gas Turbines and Power* **140** (10), pp. 102807-1 – 102807-13.
7. Fieseler, K., Jacobs, T., Patterson, M. (2018). Kinematics of an articulated connecting rod and its effect on simulated compression pressure and port timings. *ASME Engineering Journal of Gas Turbines and Power* **140** (9), pp. 092803-1 – 092803-7
8. Mashayekh, A. Jacobs, T., Patterson, M., Etcheverry, J. (2017). Prediction of air-fuel ratio control of a large-bore natural gas engine using computational fluid dynamic modeling of reed valve dynamics. *International Journal of Engine Research* **18** (9), pp. 900 – 908.
9. Li, T., Caton, J., Jacobs, T. (2017). A numerical investigation on the influence of engine coolant temperature under low temperature combustion in a diesel engine. *Combustion Science and Technology* **189** (11), pp. 1992 – 2011.
10. Penny, M., Jacobs, T. (2017). Energy balance analysis to assess efficiency improvements with low heat rejection concepts applied to low temperature combustion. *Combustion Science and Technology* **189** (4), pp. 595 – 622.
11. Li, T., Caton, J., Jacobs, T. (2016). Energy distributions in a diesel engine using low heat rejection (LHR) concepts. *Energy Conversion and Management* **130**, pp. 14 – 24.

12. Penny, M., Jacobs, T. (2016). Efficiency improvements with low heat rejection concepts applied to diesel low temperature combustion. *International Journal of Engine Research* **17** (6), pp. 631 – 645.
13. Bittle, J.A., Jacobs, T. (2016). A computationally efficient combustion trajectory prediction model developed for real-time diesel combustion control. *International Journal of Engine Research* **17** (2), pp. 246 – 258.
14. Kader, M.K., Ramani, T., Jacobs, T. (2015). Effect of extended idle on oil degradation rates of heavy-duty vehicles. *International Journal of Heavy Vehicle Systems* **22** (3), pp. 193 – 212.
15. Narayanan, A., Jacobs, T. (2015). Observed differences in low-temperature heat release and their possible effect on efficiency between petroleum diesel and soybean biodiesel operating in low-temperature combustion mode. *Energy and Fuels* **29** (7), pp. 4510 – 4521.
16. Jacobs, T. (2015). Waste heat recovery potential of advanced internal combustion engine technologies. *ASME Journal of Energy Resources Technologies* **137**(4), pp. 042004-1 – 042004-14.
17. Ramani, T., Kader, M., Johnson, J., Jacobs, T., Spiegelman, C., Zietsman, J. (2015, January). Incorporating onboard diagnostics into fleet preventative maintenance practices. *Transportation Research Record* **2482**, pp. 1 – 7.
18. Song, H., Jacobs, T. (2015). An analytical model to predict nitric oxide concentration in a diesel engine for potential use as feedback for model-based engine control. *International Journal of Powertrains* **4**(1), pp. 1 – 15.
19. Song, H., Jacobs, T. (2014). The influence of soot radiation on NO emission in practical biodiesel combustion. *Fuel* **128**(1), pp. 281 – 287.
20. Tompkins, B., Song, H., Jacobs, T. (2014). Low temperature heat release of palm and soy biodiesel in late injection low temperature combustion. *SAE International Journal of Fuels and Lubricants* **7**(1), pp. 106 – 115.
21. Bittle, J., Zhang, J., Xue, X., Song, H., Jacobs, T. (2014). Cylinder-to-cylinder variation sources in diesel low temperature combustion and the influence they have on emissions. *International Journal of Engine Research* **15**(1), pp. 112 – 122.
22. Tompkins, B., Jacobs, T. (2013). Low-temperature combustion with biodiesel: Its enabling features in improving efficiency and emissions. *Energy and Fuels* **27**(5), pp. 2794 – 2803.
23. Bittle, J., Jacobs, T. (2012). On the relationship between fuel injection pressure and two-stage ignition behavior of low temperature diesel combustion. *ASME Journal of Energy Resources Technology* **134**(4), pp. 042201-1 – 042201-6.
24. Tompkins, B., Song, H., Bittle, J., Jacobs, T. (2012). Efficiency considerations for the use of blended biofuel in diesel engines. *Applied Energy* **98**(1), pp. 209 – 218.
25. Song, H., Tompkins, B., Bittle, J., Jacobs, T. (2012). Comparisons of NO emissions and soot concentrations from biodiesel-fuelled diesel engine. *Fuel* **96**(1), pp. 446 – 453.
26. Rathore, G., Jacobs, T. (2012). Formation kinetics of nitric oxide of a biodiesel surrogate relative to *n*-heptane under comparable oxygen equivalence ratio in a homogeneous reactor. *Fuel* **93**(1), pp. 319 - 328.
27. Shyani, R., Jacobs, T., Caton, J. (2011). Quantitative reasons why ideal air standard engine cycles are deficient. *International Journal of Mechanical Engineering Education* **39**(3), pp. 232 – 248.

28. Knight, B., Bittle, J., Jacobs, T. (2011). The role of system responses on biodiesel nitric oxide emissions in a medium-duty diesel engine. *International Journal of Engine Research* **12**(4), pp. 336 – 352.
29. Bittle, J., Knight, B., Jacobs, T. (2011). Two-stage ignition as an indicator of low-temperature diesel combustion. *Combustion Science and Technology* **183**(9), pp. 947 – 966.
30. Bittle, J., Knight, B., Jacobs, T. (2011). Investigation into the use of ignition delay as an indicator of low-temperature diesel combustion attainment. *Combustion Science and Technology* **183**(2), pp. 138 – 153.
31. Bittle, J., Younger, J., Jacobs, T. (2010). Biodiesel effects on influencing parameters of brake fuel conversion efficiency in a medium duty diesel engine. *Journal of Engineering for Gas Turbines and Power* **132**(12), pp. 122801-1 – 122801-10.
32. Bittle, J., Knight, B., Jacobs, T. (2010). Interesting behavior of biodiesel ignition delay and combustion duration. *Energy & Fuels* **24**(8), pp. 4166-4177.
33. Sun, J., Caton, J., Jacobs, T. (2010). Oxides of nitrogen emissions from biodiesel-fuelled diesel engines. *Progress in Energy and Combustion Science* **36**(6), pp. 677 – 695.
34. Bittle, J., Knight, B., Jacobs, T. (2010). The impact of biodiesel on injection timing and pulsewidth in a common-rail medium-duty diesel engine. *SAE International Journal of Engines* **2**(SAE Paper No. 2009-01-2782), pp. 312 – 325.
35. Jacobs, T., Jagmin, C., Williamson, W., Filipi, Z., Assanis, D., Bryzik, W. (2008). Performance and emission enhancements of a variable geometry turbocharger on a heavy-duty diesel engine. *International Journal of Heavy-Vehicle Systems* **15**(2-4), pp. 170 – 187.
36. Jung, D., Wang, W., Knafl, A., Jacobs, T., Hu, S., Assanis, D. (2008). Experimental investigation of the abrasive flow machining effects on injector nozzle geometries, engine emissions performance and emissions in a DI diesel engine. *International Journal of Automotive Technology* **9**(1), pp. 9 - 15.
37. Han, M., Assanis, D., Jacobs, T., Bohac, S. (2008). Method and detailed analysis of individual hydrocarbon species from diesel combustion modes and diesel oxidation catalyst. *Journal of Engineering for Gas Turbines and Power* **130**(4), pp. 042803-1 – 042803-10.
38. Jacobs, T., Assanis, D. (2008). Characteristic response of a production diesel oxidation catalyst exposed to lean and rich PCI exhaust. *Journal of Engineering for Gas Turbines and Power* **130**(4), pp. 042805-1 – 042805-9.
39. Northrop, W., Jacobs, T., Assanis, D., Bohac, S. (2007). Deactivation of a diesel oxidation catalyst due to exhaust species from rich premixed compression ignition combustion in a light-duty diesel engine. *International Journal of Engine Research* **8**(6), pp. 487 – 498.
40. Depcik, C., Jacobs, T., Hagen, J., Assanis, D. (2007). Instructional use of a single zone, premixed charge, spark-ignition engine heat release simulation. *International Journal of Mechanical Engineering Education* **35**(1), pp. 1 - 31.
41. Jacobs, T., Assanis, D. (2007). The attainment of premixed compression ignition low-temperature combustion in a compression ignition direct injection engine. *Proceedings of the Combustion Institute* **31**(2), pp. 2913-2920. Presented at the 31st International Symposium on Combustion, Heidelberg, Germany, 2006.
42. Bohac, S., Han, M., Jacobs, T., Lopez, A., Assanis, D., Szymkowitz, P. (2006). Speciated hydrocarbon emissions from an automotive diesel engine and DOC utilizing conventional

and PCI combustion. *SAE Transactions – Journal of Engines* **115**(SAE Paper No. 2006-01-0201), pp. 41 - 52.

43. Jacobs, T., Bohac, S., Assanis, D., Szymkowicz, P. (2005). Lean and rich premixed compression ignition combustion in a light-duty diesel engine. *SAE Transactions – Journal of Engines* **114**(SAE Paper No. 2005-01-0166), pp. 382 - 393.
44. Lechner, G., Jacobs, T., Chryssakis, C., Assanis, D., Siewert, R. (2005). Evaluation of a narrow spray cone angle, advanced injection timing strategy to achieve partially premixed compression ignition combustion in a diesel engine. *SAE Transactions – Journal of Engines* **114**(SAE Paper No. 2005-01-0167), pp. 394 - 404.

Refereed Conference Papers

1. Pommier, F., Lepley, D., Beshouri, G., Jacobs, T. (2020, November). Validation of a directed energy ignition system on a large-bore single cylinder gas-fueled engine. Paper virtually presented at ASME Internal Combustion Engine Division's 2020 Fall Technical Conference, ICEF2020-2906, Virtual. Paper presented by F. Pommier.
2. Wallace, K., Caton, J., Jacobs, T. (2020, November). Use of a thermodynamic cycle simulation to identify fundamental thermodynamic factors of NO_x formation in a natural gas engine. Paper virtually presented at ASME Internal Combustion Engine Division's 2020 Fall Technical Conference, ICEF2020-2928, Virtual. Paper presented by K. Wallace.
3. Linker, T., Patterson, M., Mathews, H., Jacobs, T. (2020, October). A study of TER control with varying fuel reactivity and proposed modifications. Paper virtually presented at the 29th Gas Machinery Conference, Virtual. Paper presented by T. Linker.
4. Bajwa, A., Linker, T., Patterson, M., Beshouri, G., Jacobs, T. (2020, September). A study of cyclic combustion variations at lean SI engine operation using high-speed in-cylinder CO₂ measurements. Paper virtually presented at THIESEL 2020 Conference on Thermo- and Fluid Dynamic Processes in Direct Injection Engines, Virtual. Paper presented by A. Bajwa.
5. Newton, K., Springer, M., Dyrenfurth, M., Naimi, L., Torres-Sánchez, C., Jacobs, T., Wolf, C. (2020, June). A doctorate that works: Non-traditional populations served on both sides of the Atlantic. Paper virtually presented at the 2020 ASEE Virtual Conference. Paper presented by M. Dyrenfurth.
6. Bajwa, A., Patterson, M., Linker, T., Jacobs, T. (2019, October). A new single-zone multi-stage scavenging model for real-time emissions control in two-stroke engines. Paper presented at ASME Internal Combustion Engine Division's 2019 Fall Technical Conference, ICEF2019-7198, Chicago, Illinois. Paper presented by A. Bajwa.
7. Linker, T., Patterson, M., Beshouri, G., Bajwa, A., Jacobs, T. (2019, October). A literature review of NO_x formation kinetics and a prediction method for lean-burn, two-stroke natural gas engines. Paper presented at ASME Internal Combustion Engine Division's 2019 Fall Technical Conference, ICEF2019-7193, Chicago, Illinois. Paper presented by T. Linker.
8. Beshouri, G., Olsen, D., Jacobs, T., Patterson, M. (2019, October). Status of industry-sponsored precombustion chamber research and the plan forward. Paper presented at the 28th Gas Machinery Conference, San Antonio, Texas. Paper co-presented by all authors.
9. Linker, T., Beshouri, G., Patterson, M., Bajwa, A., Jacobs, T. (2019, October). Improving trapped equivalence ratio control to maintain emissions for changing gas compositions.

- Paper presented at the 28th Gas Machinery Conference, San Antonio, Texas. Paper presented by T. Linker.
10. Beshouri, G., Jacobs, T., Choquette, G. (2019, April). The impact of varying fuel speciation on engines using “virtual sensor” air/fuel ratio controls. Paper presented at the WTZ 11th Dessau Gas Engine Conference, Dessau-Roslau, Saxony-Anhalt. Paper co-presented by G. Beshouri and T. Jacobs
 11. Bajwa, A., Mashayekh, A., Patterson, M., Jacobs, T. (2018, September). Interactions among 3D, 1D, and 0D Models for Natural Gas Fueled Two-Stroke SI Engines. Paper presented at THIESEL 2018 Conference on Thermo- and Fluid Dynamic Processes in Direct Injection Engines, Valencia, Spain.
 12. Nepal, B., Johnson, M., Jacobs, T., Weichold, M. (2018, June). First generation engineering student mentoring program: A case study of a large engineering school in the US. Paper presented at the 125th ASEE Annual Conference and Exposition, Salt Lake City, Utah. Paper presented by B. Nepal.
 13. Fieseler, K., Jacobs, T., Patterson, M. (2017, October). Kinematics of an articulated connecting rod and its effect on simulated compression pressures and port timings. Paper presented at the ASME Internal Combustion Engine Division’s 2017 Fall Technical Conference, ICEF2017-3670, Seattle, Washington. Paper presented by K. Fieseler.
 14. Fieseler, K., Jacobs, T., Patterson, M. (2017, October). Effects of modeling the kinematics of an articulated connecting rod to match in-cylinder compression pressures and port timings. Paper presented at the 26th Gas Machinery Conference, Pittsburgh, Pennsylvania. Paper presented by K. Fieseler.
 15. Li, J., Bera, T., Parkes, M., Jacobs, T. (2017, April). A study on the effects of cetane number on the energy balance between differently sized engines. Paper presented at the 2017 SAE World Congress, Detroit, Michigan, 2017-01-0805. Paper presented by J. Li.
 16. Griffin, A., Mashayekh, A., Jacobs, T., Etcheverry, J., Patterson, M. (2016, October). Impact of cyclic variation on emissions in a two-stroke large bore natural gas spark-ignited engine. Paper presented at the 25th Gas Machinery Conference, Denver, Colorado. Paper presented by A. Mashayekh.
 17. Jacobs, T., Strzelec, A., Froyd, J. (2016, June). Improvement in second law concept retention in students taking redesigned entropy centered FTC. Paper presented at the 123rd ASEE Annual Conference and Exposition, New Orleans, Louisiana.
 18. Li, T., Caton, J., Jacobs, T. (2016, April). Use of an engine simulation to study low heat rejection (LHR) concepts in a multi-cylinder light-duty diesel engine. Paper presented at the 2016 SAE World Congress, Detroit, Michigan, 2016-01-0668. Paper presented by T. Li.
 19. Bandura, R., Jacobs, T. (2015, November). Zero dimensional quasi-predictive thermodynamic simulation for establishing initial cylinder conditions for CFD simulation of diesel combustion. Paper presented at the ASME Internal Combustion Engine Division’s 2015 Fall Technical Conference, ICEF2015-1166, Houston, Texas.
 20. Bittle, J., Jacobs, T. (2015, November). Combustion trajectory visualization model for study of conventional and advanced direct injection combustion modes. Paper presented at the ASME Internal Combustion Engine Division’s 2015 Fall Technical Conference, ICEF2015-1031, Houston, Texas.

21. Griffin, A., Jacobs, T. (2015, November). Combustion characteristics of a 2-stroke large bore natural gas spark-ignited engine. Paper presented at the ASME Internal Combustion Engine Division's 2015 Fall Technical Conference, ICEF2015-1010, Houston, Texas.
22. Griffin, A., Mashayekh, A., Jacobs, T. (2015, October). Experimental and simulated pressure measurements of a two-stroke large bore natural gas spark-ignited engine. Paper presented at the 24th Gas Machinery Conference, Austin, Texas. Paper presented by A. Mashayekh.
23. Jacobs, T., Baukal, C. (2015, June). Example of academia / industry professional organization engagement in STEM outreach activities. Paper presented at the 122nd ASEE Annual Conference and Exposition, Seattle, Washington.
24. Ramani, T., Kader, M., Johnson, J., Jacobs, T., Spiegelman, C., Zietsman, J. (2015, January). Incorporating onboard diagnostics into fleet preventative maintenance practices. Paper presented at the Transportation Research Board of the National Academies 205 Annual Meeting, Washington, DC. Paper presented by T. Ramani.
25. Jacobs, T., Camilli, L., Neubauer, M. (2014, October). High power discharge combustion effects on fuel consumption, emissions, and catalyst heating. Paper presented at the 2014 SAE Powertrain, Fuels, and Lubricants Conference, Birmingham, England, UK, 2014-01-2625. Paper presented by L. Camilli.
26. Jacobs, T., Caton, J. (2014, June). An inventory to assess students' knowledge of second law concepts. Paper presented at the 121st ASEE Annual Conference and Exposition, Indianapolis, Indiana.
27. Jacobs, T., Caton, J., Froyd, J., Rajagopal, K. (2014, June). Redesigning the first course of thermodynamics to improve student conceptualization and application of entropy and second law concepts. Paper presented at the 121st ASEE Annual Conference and Exposition, Indianapolis, Indiana.
28. Tompkins, B., Song, H., Jacobs, T. (2014, April). Low temperature heat release of palm and soy biodiesel in late injection low temperature combustion. Paper presented at the 2014 SAE World Congress, Detroit, Michigan, 2014-01-1381. Paper presented by B. Tompkins.
29. Bittle, J., Gao, Z., Jacobs, T. (2013, October). Validation and results of a pseudo-multi-zone combustion trajectory prediction model for capturing soot and NO_x formation on a medium duty diesel engine. Paper presented at the ASME Internal Combustion Engine Division's 2013 Fall Technical Conference, Dearborn, Michigan, ICEF2013-19069. Paper presented by J. Bittle.
30. Sun, J., Bittle, J., Jacobs, T. (2013, October). Cyclic variability in diesel / gasoline dual-fuel combustion on a medium-duty diesel engine. Paper presented at the ASME Internal Combustion Engine Division's 2013 Fall Technical Conference, Dearborn, Michigan, ICEF2013-19095. Paper presented by J. Sun.
31. Sun, J., Bittle, J., Jacobs, T. (2013, April). Influencing parameters of brake fuel conversion efficiency with diesel / gasoline operation in a medium-duty diesel engine. Paper presented at the 2013 SAE World Congress, Detroit, Michigan, 2013-01-0273. Paper presented by J. Sun.
32. Jacobs, T., Camilli, L., Gonnella, J. (2012, September). Improvement in lean homogenous spark-ignition combustion with pulsed energy spark plug. Paper presented at the ASME IC Engine Division's 2012 Fall Technical Conference, Vancouver, BC, Canada, ICEF2012-92165.

33. Tompkins, B., Song, H., Bittle, J., Jacobs, T. (2012, April). Biodiesel later-phased low temperature combustion ignition and burn rate behavior on engine torque. Paper presented at the 2012 SAE World Congress, Detroit, Michigan, 2012-01-1305. Received SAE Excellence in Oral Presentation.
34. Camilli, L., Gonnella, J., Jacobs, T. (2012, April). Improvement in spark-ignition engine fuel consumption and cyclic variability with pulsed energy spark plug. Paper presented at the 2012 SAE World Congress, Detroit, Michigan, 2012-01-1151. Paper presented by L. Camilli.
35. Song, H., Tompkins, B., Jacobs, T. (2012, April). Investigations of nitric oxide formation through the use of barium additive and two-stage model. Paper presented at the 2012 SAE World Congress, Detroit, Michigan, 2012-01-0861. Paper presented by H. Song.
36. Tompkins, B., Song, H., Jacobs, T. (2011, October). Particulate matter emissions from late injection high EGR low temperature diesel combustion. Paper presented at the ASME Internal Combustion Engine Division 2011 Fall Technical Conference, Morgantown, WV, ICEF2011-60067. Paper presented by B. Tompkins.
37. Song, H., Tompkins, B., Jacobs, T. (2011, October). An analytical model to predict nitric oxide concentration and soot emissivity in a diesel engine. Paper presented at the ASME Internal Combustion Engine Division 2011 Fall Technical Conference, Morgantown, WV, ICEF2011-60112.
38. Bittle, J., Jacobs, T. (2011, October). On the relationship between fuel injection pressure and two-stage ignition behavior of low temperature diesel combustion. Paper presented at the ASME Internal Combustion Engine Division 2011 Fall Technical Conference, Morgantown, WV, ICEF2011-60075. Paper presented by J. Bittle.
39. Bittle, J., Knight, B., Jacobs, T. (2011, April). Heat release parameters to assess low temperature combustion attainment. Paper presented at the 2011 SAE World Congress, Detroit, Michigan, 2011-01-1350. Paper presented by J. Bittle.
40. Knight, B., Bittle, J., Jacobs, T. (2011, April). Characterizing the influence of EGR and fuel pressure on the emissions in low temperature diesel combustion. Paper presented at the 2011 SAE World Congress, Detroit, Michigan, 2011-01-1354.
41. Knight, B., Bittle, J., Jacobs, T. (2010, September). Efficiency considerations of later-phased low temperature diesel combustion. Paper presented at the ASME Internal Combustion Engine Division 2010 Fall Technical Conference, San Antonio, Texas, ICEF2010-35070.
42. Knight, B., Bittle, J., Jacobs, T. (2010, April). Biodiesel imposed system responses in a medium-duty diesel engine. Paper presented at the 2010 SAE World Congress, Detroit, Michigan, 2010-01-0565. Paper presented by B. Knight.
43. Bittle, J., Knight, B., Jacobs, T. (2010, April). Biodiesel effects on cycle-to-cycle variability of combustion characteristics in a common-rail medium-duty diesel engine. Paper presented at the 2010 SAE World Congress, Detroit, Michigan, 2010-01-0867. Paper presented by J. Bittle.
44. Bittle, J., Knight, B., Jacobs, T. (2009, November). The impact of biodiesel on injection timing and pulsewidth in a medium-duty diesel engine. Paper presented at the SAE Powertrains, Fuels, & Lubricants Meeting, San Antonio, Texas, 2009-01-2782.
45. Bittle, J., Younger, J., Jacobs, T. (2009, May). Biodiesel fuel's effects on influencing parameters of brake fuel conversion efficiency in a medium duty diesel engine. Paper

- presented at the ASME Internal Combustion Engine Division 2009 Spring Technical Conference, Milwaukee, Wisconsin, ICES2009-76081.
46. Tompkins, B., Esquivel, J., Jacobs, T. (2009, April). Performance parameter analysis of a biodiesel-fuelled medium duty diesel engine. Paper presented at the 2009 SAE World Congress, Detroit, Michigan, 2009-01-0481.
 47. Han, M., Bohac, S., Jacobs, T., Assanis, D. (2007, October). Method and detailed analysis of individual hydrocarbon species from diesel combustion modes and diesel oxidation catalyst. Paper presented at the ASME Internal Combustion Engine Division 2007 Fall Technical Conference, Charleston, South Carolina, ICEF2007-1632.
 48. Jacobs, T., Assanis, D. (2007, October). Characteristic response of a production diesel oxidation catalyst exposed to lean and rich PCI exhaust. Paper presented at the ASME Internal Combustion Engine Division 2007 Fall Technical Conference, Charleston, South Carolina, ICEF2007-1733.
 49. Knafl, A., Jacobs, T., Bohac, S., Assanis, D. (2006, July). The load limits of low temperature premixed compression ignition diesel combustion. Paper presented at The 2nd International Symposium on Clean and High-Efficiency Combustion in Engines, Tianjin, China. Presentation delivered by A. Knafl.
 50. Bohac, S., Han, M., Jacobs, T., Lopez, A., Assanis, D., Szymkowicz, P. (2006, April). Speciated hydrocarbon emissions from an automotive diesel engine and DOC utilizing conventional and PCI combustion. Paper presented at 2006 SAE World Congress, Detroit, Michigan, 2006-01-0201. Presentation delivered by S. Bohac.
 51. Jacobs, T., Knafl, A., Bohac, S., Assanis, D., Szymkowicz, P. (2006, April). The development of throttled and unthrottled PCI combustion in a light-duty diesel engine. Paper presented at 2006 SAE World Congress, Detroit, Michigan, 2006-01-0202.
 52. Jacobs, T., Bohac, S., Assanis, D., Szymkowicz, P. (2005). Lean and rich premixed compression ignition combustion in a light-duty diesel engine. Paper presented at 2005 SAE World Congress, Detroit, Michigan, 2005-01-0166.
 53. Lechner, G., Jacobs, T., Chryssakis, C., Assanis, D., Siewert, R. (2005). Evaluation of a narrow spray cone angle, advanced injection timing strategy to achieve partially premixed compression ignition combustion in a diesel engine. Paper presented at 2005 SAE World Congress, Detroit, Michigan, 2005-01-0167. Received SAE Excellence in Oral Presentation.
 54. Jacobs, T., Assanis, D., Filipi, Z. (2003). The impact of exhaust gas recirculation on performance and emissions of a heavy-duty diesel engine. Paper presented at 2003 SAE World Congress, Detroit, Michigan, 2003-01-1068. Received SAE Excellence in Oral Presentation.

Non-Refereed Conference Papers / Presentations

1. Kroeger, T., Jacobs, T. (2022, May). Compression ignition combustion of a gasoline-diesel blend in a light-duty engine. Paper presented at the 2022 Spring Technical Meeting of The Central States Section of the Combustion Institute, Detroit, Michigan. Paper presented by T. Kroeger.
2. Wallace, K., Jacobs, T. (2021, May). The effects of cyclic variability on zero-dimensional cycle simulations of NO_x emissions from integral compressor engines. Paper presented at the 12th US National Combustion Meeting, virtual. Presentation delivered by K. Wallace.

3. Nowlin, J., Jacobs, T. (2021, May). Implementation of a full oxides of nitrogen formation mechanism in a zero-dimensional model of a natural gas fueled engine. Paper presented at the 12th US National Combustion Meeting, virtual. Presentation delivered by J. Nowlin.
4. Bajwa, A., Jacobs, T. (2018, July). Residual gas estimation in two-stroke natural-gas engines. Paper presented at the 37th International Symposium on Combustion, Dublin, Ireland.
5. Fieseler, K., Jacobs, T. (2018, July). Variable NG composition effects on large bore 2SC compressor engines – Predictive combustion modeling. Poster presented at the 37th International Symposium on Combustion, Dublin, Ireland.
6. McKeathen, B., Jacobs, T. (2018, May). Diesel fuel cetane number effects on engine emissions and efficiency. Paper delivered at the 2018 Spring Technical Meeting of the Central States Section of the Combustion Institute, Minneapolis, Minnesota.
7. Jacobs, T. (2018, February). The automobile of 2030 (no, it won't be flying . . . most likely). Presentation at 2018 CIMAC CASCADES, College Station, Texas.
8. Jacobs, T. (2017, August). Efficiency and emissions improvements with low temperature combustion and low heat rejection in a light-duty diesel engine. Presentation delivered at the 14th International Conference on Engines for Vehicles (invitation only), Lake Toya of Hokkaido, Japan.
9. Boehm, R., Melton, D., Hurtado, J., Jacobs, T. (2017, June). Engineering Entrepreneurship. Panel presentation delivered at the 124th ASEE Annual Conference and Exposition, Columbus, Ohio.
10. Mashayekh, A., Brown, J., Jacobs, T., Patterson, M., Etcheverry, J. (2017, April). Numerical and experimental investigation of cyclic variability of a large bore spark-ignited natural gas engine. Paper delivered at the 10th US National Combustion Meeting, College Park, Maryland. Presentation delivered by A. Mashayekh.
11. Kroeger, T., Jacobs, T. (2017, April). Reducing the emissions and efficiency penalties of low temperature combustion (LTC) through low heat rejection (LHR). Paper delivered at the 10th US National Combustion Meeting, College Park, Maryland. Presentation delivered by T. Kroeger.
12. Li, T., Caton, J., Jacobs, T. (2017, April). Simulated investigations of low heat rejection concepts applied to low temperature combustion. Paper delivered at the 10th US National Combustion Meeting, College Park, Maryland. Presentation delivered by T. Li.
13. Li, J., Jacobs, T., Bera, T., Parkes, M. (2016, September). Preliminary review of cetane number effects on combustion characteristics between differently-sized engines. Poster presented at THIESEL 2016 Conference on Thermo- and Fluid Dynamic Processes in Direct Injection Engines, Valenica, Spain.
14. Mashayekh, A., Jacobs, T., Patterson, M., Etcheverry, J. (2016, May). CFD simulations and modeling of reed valve air-fuel ratio control system of a large-bore natural gas engine. Paper delivered at the 2016 Spring Technical Meeting of the Central States Section of the Combustion Institute, Knoxville, Tennessee. Presentation delivered by A. Mashayekh.
15. Bajwa, A., Jacobs, T. (2016, May). First and second law analyses of a large bore two stroke spark ignition engine fueled with natural gas. Paper delivered at the 2016 Spring Technical Meeting of the Central States Section of the Combustion Institute, Knoxville, Tennessee. Presentation delivered by A. Bajwa.
16. Li, T., Caton, J., Jacobs, T. (2016, May). A simulation-based study of energy distributions in a diesel engine using low heat rejection (LHR) concepts. Paper delivered at the 2016

- Spring Technical Meeting of the Central States Section of the Combustion Institute, Knoxville, Tennessee. Presentation delivered by T. Li.
17. Sun, J., Li, J., Bittle, J., Griffin, A., Li, T., Hedrick, J., Jacobs, T. (2015, May). Using DOE method to identify settings for better efficiency and emissions in diesel/gasoline dual-fuel operation in a diesel engine. Paper presented at 9th US National Combustion Meeting, Cincinnati, Ohio.
 18. Griffin, A., Jacobs, T., Ashraph, K., Mendez, G. (2014, October). AJAX E-565 engine installation for research and development. Presentation delivered at the 2014 Gas Machinery Research Conference, Nashville, Tennessee. Presentation delivered by A. Griffin.
 19. Mashayekh, A., Jacobs, T., Etchevery, J. (2014, October). Study of conjugate heat transfer of a spark-ignited natural gas engine cylinder. Presentation delivered at the 2014 Gas Machinery Research Conference, Nashville, Tennessee. Presentation delivered by A. Mashayekh.
 20. Penny, M., Bittle, J., Jacobs, T. (2014, March). Efficiency improvements with low heat rejection concepts applied to low temperature combustion. Paper delivered at the 2014 Spring Technical Meeting of the Central States Section of the Combustion Institute, Tulsa, Oklahoma. Presentation delivered by M. Penny.
 21. Li, J., Ashraph, K., Mendez, G., Jacobs, T. (2014, March). Study of natural gas engine combustion characteristics under various ignition timings. Paper delivered at the 2014 Spring Technical Meeting of the Central States Section of the Combustion Institute, Tulsa, Oklahoma. Presentation delivered by J. Li.
 22. Bittle, J., Jacobs, T. (2014, March). A versatile computationally efficient combustion trajectory prediction model for diesel combustion. Paper delivered at the 2014 Spring Technical Meeting of the Central States Section of the Combustion Institute, Tulsa, Oklahoma. Presentation delivered by J. Bittle.
 23. Bittle, J., Jacobs, T. (2013, May). Diesel engine combustion model for real-time emissions reduction control. Poster delivered at the 2013 8th US National Combustion Meeting, Park City, Utah.
 24. Jacobs, T., Caton, J., Froyd, J., Rajagopal, K. (2013, January). Thermodynamics for Next Generation Engines. Poster delivered at the 2013 NSF TUES PI Conference, Washington, DC.
 25. Jacobs, T. (2012, October). Load expansion with diesel / gasoline RCCI for improved engine efficiency and emissions. Poster delivered at the 2012 Directions in Engine-Efficiency and Emissions Research Conference sponsored by US Department of Energy's Office of Vehicle Technologies, Dearborn, Michigan.
 26. Jacobs, T. (2012, May). The role of unconventional fuels in altering engine exhaust conditions. Presentation delivered at the 2012 DOE Crosscut Workshop on Lean Emissions Reduction Simulation, Dearborn, Michigan.
 27. Tompkins, B., Jacobs, T. (2012, April). Low temperature combustion with biodiesel: The role of oxygenation in improving efficiency and emissions. Paper delivered at the Spring Technical Meeting of the Central States Section of the Combustion Institute, Dayton, Ohio.
 28. Song, H., Jacobs, T. (2012, April). The influence of soot radiation on NO emission in conventional diesel and biodiesel combustion. Paper delivered at the Spring Technical Meeting of the Central States Section of the Combustion Institute, Dayton, Ohio. Presented delivered by H. Song.

29. Bittle, J., Zheng, J., Xue, X., Jacobs, T. (2012, April). Cylinder-to-cylinder variation sources in diesel low temperature combustion and the influence they have on emissions. Paper delivered at the Spring Technical Meeting of the Central States Section of the Combustion Institute, Dayton, Ohio. Presentation delivered by J. Bittle.
30. Jacobs, T. (2012, March). Fuel-induced system response issues: The role unconventional fuels may play in altering exhaust conditions from conventional and low temperature modes of combustion. Presentation delivered at the 2012 3rd Thermoelectrics Applications Workshop, Baltimore, Maryland.
31. Tompkins, B., Bittle, J., Song, H., Jacobs, T. (2011, October). Biodiesel's enabling characteristics in attaining low temperature diesel combustion. Paper delivered at the 2011 Directions in Engine-Efficiency and Emissions Research Conference sponsored by US Department of Energy's Office of Vehicle Technologies, Detroit, Michigan.
32. Bittle, J., Jacobs, T. (2011, March). On the effect of injection pressure on two-stage ignition behavior of low temperature diesel combustion. Paper presented at the 2011 7th US National Combustion Meeting, Atlanta, Georgia. Presentation delivered by J. Bittle.
33. McLean, J. Jr., Jacobs, T. (2011, March). Brake fuel conversion efficiency study in a medium-duty diesel engine using variations in injection timing. Paper presented at the 2011 7th US National Combustion Meeting, Atlanta, Georgia. Presentation delivered by J. McLean, Jr.
34. Song, H., Tompkins, B., Jacobs, T. (2011, March). An analytical model to estimate nitric oxide emissions for a diesel engine. Paper presented at the 2011 7th US National Combustion Meeting, Atlanta, Georgia. Presentation delivered by H. Song.
35. Tompkins, B., Song, H., Jacobs, T. (2011, March). Particulate matter emissions from late injection high EGR low temperature diesel combustion. Paper presented at the 2011 7th US National Combustion Meeting, Atlanta, Georgia. Presentation delivered by B. Tompkins.
36. Bittle, J., Knight, B., Jacobs, T. (2010, September). Efficiency considerations of diesel premixed charge compression ignition combustion. Poster delivered at the 2010 Directions in Engine-Efficiency and Emissions Research Conference sponsored by US Department of Energy's Office of Vehicle Technologies, Detroit, Michigan.
37. Bittle, J., Knight, B., Jacobs, T. (2010, March). Demonstration of low temperature combustion for simultaneous and substantial reductions in NO_x and soot in a medium-duty diesel engine. Papers delivered at the Central States Section of the Combustion Institute's 2010 Spring Technical Meeting hosted by the University of Illinois at Urbana-Champaign, Urbana, Illinois.
38. Bittle, J., Esquivel, J., Knight, B., Tompkins, B., Jacobs, T. (2009, August). System-response issues imposed by biodiesel in a medium-duty diesel engine. Presentation delivered at the 2009 Directions in Engine-Efficiency and Emissions Research Conference sponsored by US Department of Energy's Office of Vehicle Technologies, Dearborn, Michigan.
39. Tompkins, B., Bittle, J., Jacobs, T. (2009, May). Nitric oxide emissions with biodiesel fuel in a medium-duty diesel engine. Poster presented at the 6th US Combustion Meeting organized by the Central States Section of the Combustion Institute and hosted by the University of Michigan, Ann Arbor, Michigan.
40. Esquivel, J., Tompkins, B., Jacobs, T. (2008, April). The development of a diesel engine experimental research facility for biodiesel combustion studies. Paper presented at the 2008

Technical Meeting of the Central States Section of The Combustion Institute, Tuscaloosa, Alabama. Presentation delivered by B. Tompkins.

41. Shyani, R., Jacobs, T., Caton, J. (2008, April). On the quantitative deficiencies of ideal air-standard engine cycles. Paper presented at the 2008 Technical Meeting of the Central States Section of the Combustion Institute, Tuscaloosa, Alabama. Presentation delivered by J. Caton.
42. Jacobs, T., Assanis, D. (2007, March). On the sensitivity of NO_x to exhaust gas recirculation in a premixed compression ignition engine. Paper presented at the 5th US Combustion Meeting organized by the Western States Section of the Combustion Institute and hosted by the University of California at San Diego, San Diego, California, E14.
43. Jacobs, T. (2002). Experimental analysis of exhaust gas recirculation effects on diesel engine combustion. Presentation delivered at the 2002 Annual Conference of the Automotive Research Center, Ann Arbor, Michigan.
44. Jacobs, T. (2001). Experimental results and analysis using videoscope technology in a heavy duty diesel engine. Presentation delivered at the 2001 Annual Conference of the Automotive Research Center, Ann Arbor, Michigan.

Invited Presentations / Lectures

1. Jacobs, T. (2021, October). Early Career Mentoring Event. Invited panelist at American Society of Mechanical Engineer's Internal Combustion Engine Fall Conference Early Career Event, Virtual.
2. Jacobs, T. (2021, February). Natural Gas Engine and Combustion Research. Invited virtual presentation to Department of Energy National Energy Technology Laboratory. Virtual.
3. Jacobs, T., (2020, September). Internal combustion engines: The good behind the power. Invited virtual presentation at the Texas A&M Student Chapter of the Society of Automotive Engineers, Virtual.
4. Jacobs, T., (2020, February). Natural gas pipeline compressor engines: State of art meets legacy technology. Presentation to faculty and students of the Sloan Automotive Laboratory at Massachusetts Institute of Technology, Cambridge, Massachusetts.
5. Jacobs, T. (2020, February). Engineering at large public universities: Challenges and opportunities. Presentation to faculty and students of the Department of Mechanical Engineering at University of Massachusetts – Lowell, Lowell, Massachusetts.
6. Jacobs, T. (2019, October). The automobile of 2030 (no, it won't be flying . . . most likely). Invited presentation at 2019 Fall Industry Speaker Series for Student Engineer's Council, College Station, Texas.
7. Jacobs, T. (2017, September). Efficiency and emissions improvements with low temperature combustion and low heat rejection in a light-duty diesel engine. Invited presentation at the CMT-Motores Termicos, Universitat Politecnica de Valencia, Valencia, Spain.
8. Jacobs, T. (2016, November). The automobile of 2030 (no, it won't be flying . . . most likely). Invited presentation at Iowa State University, Ames, Iowa.
9. Jacobs, T. (2016, July). Efficiency and emissions improvements with low temperature combustion and low heat rejection in a diesel engine. Invited presentation at Advanced Emission Control Concepts USA 2016, Ann Arbor, Michigan.

10. Jacobs, T. (2016, April). Transportation of natural gas: Advancing pipeline natural gas engine technology. Invited presentation at America's Future Natural Gas Economy: Promoting the Next Energy Breakthrough, Hudson Institute, Washington, DC.
11. Jacobs, T. (2014, September). Engine efficiency improvements with low temperature combustion and low heat rejection. Invited presentation delivered at the 5th International CTI Conference, Troy, Michigan.
12. Jacobs, T. (2014, July). Efficiency considerations of biodiesel-fuelled advanced combustion engines. Invited presentation delivered at the 1st International Symposium on Energy Challenges and Mechanics, Aberdeen, Scotland, UK.
13. Jacobs, T. (2013, November). System Interactions: Their role in causing and mitigating differences in emissions of biodiesel combustion in advanced diesel engines. Invited presentation delivered at Brunel University's 2013 Workshop on Sprays and Biodiesel, Brunel, London, UK.
14. Jacobs, T. (2012, September). Fuels and advanced combustion: Their role in the future of automotive powertrain. University of Wisconsin Lindbergh Lecture Series, Madison, Wisconsin.
15. Jacobs, T. (2012, August). Fuels and advanced combustion research at Texas A&M. Invited presentation at John Deere Product Engineering Center, Cedar Falls, Iowa.
16. Jacobs, T. (2012, July). Fuels and advanced combustion: Their role in the future of automotive powertrain. Invited presentation at Oak Ridge National Laboratory, Oak Ridge, Tennessee.
17. Jacobs, T. (2011, November). Thermodynamics for the next generation engineer. Invited delegate to the National Academy of Engineer's Frontiers of Engineering Education, Irvine, California.
18. Tompkins, B., Bittle, J., Song, H., Jacobs, T. (2011, November). Biodiesel's enabling characteristics in attaining low temperature diesel combustion. Invited presentation delivered at the National Biodiesel Board's Technical Workshop, Kansas City, Missouri. November 1, 2011.
19. Jacobs, T. (2011, February). Novel opportunities for reduced biodiesel NO_x and PM without aftertreatment through the use of in-cylinder low-temperature combustion regimes. Invited presentation delivered at the National Biodiesel Board's Conference and Exposition, Phoenix, Arizona.
20. Tompkins, B., Jacobs, T. (2010, November). Low temperature combustion with biodiesel. Invited presentation delivered at the National Biodiesel Board's Technical Workshop, Kansas City, Missouri. November 4, 2010.
21. Bittle, J., Knight, B., Jacobs, T. (2010, November). System response issues of biodiesel-fuelled diesel engine. Invited presentation delivered at the National Biodiesel Board's Technical Workshop, Kansas City, Missouri. November 4, 2010.
22. Bittle, J., Esquivel, J., Knight, B., Tompkins, B., Jacobs, T. (2009, October). System-response issues imposed by biodiesel in an advanced medium-duty diesel engine. Invited presentation delivered at the National Biodiesel Board's Technical Workshop, San Antonio, Texas. October 29, 2009.
23. Jacobs, T. (2009, October). Internal combustion engines: Reliable for over 100 years – but will they be around in 40 years? Presentation delivered at Texas A&M University – Qatar, Doha, Qatar, October 4, 2009.

24. Jacobs, T. (2009, October). Homogeneous charge compression ignition combustion: An ultra efficient and clean method to produce power. Presentation delivered at Texas A&M University-Qatar, Doha, Qatar, October 1, 2009.
25. Jacobs, T. (2009, March). Combustion and system-response analysis of biodiesel fuel in an internal combustion engine. Invited lecture at Tecnologico de Monterrey Campus Estado de Mexico, Mexico, March 19, 2009.
26. Jacobs, T. (2008, October). The effect of biodiesel on medium-duty diesel engine performance and system parameters. Invited presentation at the National Biodiesel Board's Technical Workshop, New Orleans, Louisiana, October 22, 2008.

TEACHING

Courses Taught

Texas A&M University, College Station, Texas			
Semester	Course Number	Course Title	Number of Students
Fall 2006	MEEN 227	Principles of Thermodynamics	39
Spring 2007	MEEN 227	Principles of Thermodynamics	77
Fall 2007	MEEN 615	Advanced Engineering Thermodynamics	39
Spring 2008	MEEN 315	Principles of Thermodynamics	61
Fall 2008	MEEN 315	Principles of Thermodynamics	95
Fall 2008	MEEN 615	Advanced Engineering Thermodynamics	39
Spring 2009	MEEN 410	Internal Combustion Engines	37
Fall 2009	MEEN 315	Principles of Thermodynamics	92
Fall 2009	MEEN 615	Advanced Engineering Thermodynamics	34
Spring 2010	MEEN 410	Internal Combustion Engines	39
Fall 2010	MEEN 315	Principles of Thermodynamics	92
Fall 2010	MEEN 404	Experimental Laboratory - Studio	22
Spring 2011	MEEN 421	Thermal-Fluids Analysis and Design	49
Fall 2011	MEEN 315	Principles of Thermodynamics	93
Fall 2011	MEEN 401	Senior Design Studio	23
Spring 2012	MEEN 410	Internal Combustion Engines	43
Fall 2012	MEEN 315	Principles of Thermodynamics	90
Fall 2012	MEEN 404	Experimental Laboratory – Studio	20
Spring 2013	MEEN 315	Principles of Thermodynamics	96
Fall 2013	MEEN 315	Principles of Thermodynamics	89
Spring 2014	MEEN 315	Principles of Thermodynamics	99
Spring 2014	MEEN 381	Undergraduate Seminar	127
Fall 2014	MEEN 615	Advanced Engineering Thermodynamics	29
Fall 2014	MEEN 381	Undergraduate Seminar	116
Spring 2015	MEEN 410	Internal Combustion Engines	34
Spring 2015	MEEN 689	Advanced Internal Combustion Engines	10

Spring 2015	MEEN 381	Undergraduate Seminar	146
Fall 2015	MEEN 381	Undergraduate Seminar	138
Spring 2016	MEEN 381	Undergraduate Seminar	148
Spring 2016	MEEN 615	Advanced Engineering Thermodynamics	32
Fall 2016	MEEN 381	Undergraduate Seminar	163
Fall 2016	MEEN 421	Thermal-Fluids Analysis and Design	44
Spring 2017	MEEN 410	Internal Combustion Engines	43
Spring 2017	MEEN 611	Advanced Internal Combustion Engines	17
Spring 2018	MEEN 410	Internal Combustion Engines	54
Spring 2018	MEEN 611	Advanced Internal Combustion Engines	37
Fall 2019	ENGR 401	Interdisciplinary Design	7
Spring 2020	ENGR 401	Interdisciplinary Design	1
Spring 2020	ENGR 402	Interdisciplinary Design II	7
Spring 2020	MEEN 410	Internal Combustion Engines	36
Spring 2020	MEEN 463 ¹	Cogeneration Systems	5
Spring 2020	MEEN 611	Advanced Internal Combustion Engines	16
Spring 2020	MEEN 663 ¹	Cogeneration Systems	26
Fall 2020	ENGR 401	Interdisciplinary Design	5
Spring 2021	ENGR 402	Interdisciplinary Design II	5
Spring 2021	MEEN 410 ²	Internal Combustion Engines	56
Spring 2021	MEEN 611 ²	Advanced Internal Combustion Engines	23
Spring 2022	MEEN 410	Internal Combustion Engines	46
Spring 2022	MEEN 611	Advanced Internal Combustion Engines	24
Spring 2023	MEEN 410	Internal Combustion Engines	54
Spring 2023	MEEN 611	Advanced Internal Combustion Engines	22

¹Co-taught with Dr. Jerry Caton, Mr. Kevin Wallace, and Mr. Tim Kroeger.

²Course mostly taught by Mr. Tim Kroeger, a Graduate Teaching Fellow

University of Michigan, Ann Arbor, Michigan

Semester	Course Number	Course Title	Number of Students
Fall 2005 ¹	ME 438	Internal Combustion Engines	71
Winter 2005 ²	ME 235	Introduction to Thermodynamics	107
Fall 2004 ³	ME 438	Internal Combustion Engines	39

¹Co-taught (half of the semester) as a post-doctoral fellow with D. Assanis. ²Taught as a post-doctoral fellow. ³Co-taught (half of the semester) as a graduate student with D. Assanis.

Graduate Students

Texas A&M University, College Station, Texas

Doctor of Philosophy

1. Dr. Hoseok (Will) Song, Ph.D, May 2012. Thesis title: Investigation on nitric oxide and soot of biodiesel fuel using a medium duty diesel engine. Now at the University of Houston.

2. Dr. Joshua A. Bittle, Ph.D, May 2014. Thesis title: Insights into conventional and low temperature diesel combustion using combustion trajectory prediction model. Now associate professor with tenure at the University of Alabama.
3. Dr. Jiafeng Sun, Ph.D, August 2014. Thesis title: Simultaneous efficiency, NO_x, and smoke improvements through diesel / gasoline dual-fuel operation in a diesel engine.
4. Dr. Brandon Tompkins, Ph.D, August 2015. Thesis title: The characterization of two-stage ignition effects on late injection low temperature combustion using biodiesel and biodiesel blends.
5. Dr. Tingting Li, Ph.D (co-chair with Dr. J. Caton), August 2017. Thesis title: A high efficiency and clean combustion strategy for compression ignition engines: Integration of low heat rejection concepts with low temperature combustion.
6. Dr. Alireza Mashayekh, Ph.D, August 2017. Thesis title: Study of conjugate heat transfer of a spark-ignited natural gas engine cylinder.
7. Dr. Jue Li, Ph.D, December 2017. Thesis title: Assessing potential differences of diesel fuel effects on combustion and engine behavior between differently-sized engines.
8. Dr. Abdullah Bajwa, Ph.D, December 2020. Thesis title: Improved gas exchange characterization of two-stroke engines to develop robust emissions control systems.
9. Mr. Timothy Kroeger, Expected August 2023.
10. Mr. Kevin Wallace, Expected August 2023.
11. Mr. Kyle Beurlot, Expected May 2024.
12. Mr. Forrest Pommier, Expected December 2025.

Master of Science

1. Mr. Sushil Oak (co-chair with Dr. J. Caton), MS, August 2008. Thesis title: Second law analysis of premixed compression ignition combustion in a diesel engine using a thermodynamic engine cycle simulation.
2. Mr. Rahul Pillai, MS, August 2008. Thesis title: Efficiency analysis of varying EGR under PCI mode of combustion in a light duty diesel engine.
3. Mr. Sidharth Sambashivan, MS (non-thesis), August 2008. Non-thesis project title: Advanced engine research laboratory, test cell manual.
4. Mr. Brandon Tompkins, MS, December 2008. Thesis title: An emissions comparison between ultra low sulfur reference diesel and a 100% blended feed stock biodiesel in a direct injection, variable geometry turbocharged engine with exhaust gas recirculation.
5. Mr. Jason Esquivel, MS, December 2008. Thesis title: Performance characterization of a medium-duty diesel engine with bio-diesel and petroleum diesel fuels.
6. Ms. Gurloleen Rathore (co-chair with Dr. K. Rajagopal), MS, August 2010. Thesis title: Formation kinetics of nitric oxide of biodiesel relative to petroleum diesel under comparable oxygen equivalence ratio in a homogeneous reactor.
7. Mr. Bryan Knight, MS, August 2010. Thesis title: Investigation into the emissions and efficiency of low temperature diesel combustion.

8. Mr. Josh Bittle, MS, December 2010. Thesis title: Two-stage ignition as an indicator of low temperature combustion in a late injection pre-mixed compression ignition control strategy.
9. Mr. James McLean, MS, August 2011. Thesis title: Injection timing effects on brake fuel conversion efficiency and engine system's responses.
10. Mr. Michael Kader, MS, May 2013. Thesis title: Study of oil degradation in extended idle operation of heavy duty vehicles.
11. Mr. Aditya Narayanan, MS, May 2014. Thesis title: Investigation of the difference in cool flame characteristics between petroleum diesel and soybean biodiesel operating in low temperature combustion mode.
12. Mr. Michael Penny, MS, August 2014. Thesis title: Efficiency improvements with low heat rejection concepts applied to low temperature combustion.
13. Mr. Aaron Griffin, MS, August 2015. Thesis title: Combustion characteristics of a single cylinder large bore natural gas spark-ignited engine.
14. Mr. Abdullah Bajwa, MS, December 2016. Thesis title: First and second law analyses of a large bore two stroke spark ignition engine fueled with natural gas.
15. Mr. Jeffrey Brown, MS, May 2017. Thesis title: Implementable changes to a large-bore single cylinder natural gas engine for improved emissions performance.
16. Mr. Ryan Bandura, MS, May 2017. Thesis title: Simple zero-dimensional quasi-predictive thermodynamic simulation for the prediction of NO_x for diesel combustion.
17. Mr. Trevor Murray, MS, August 2017. Thesis title: Control of fugitive methane emissions through combustion of compressor vent and engine crankcase emissions.
18. Mr. Timothy Kroeger, MS, December 2017. Thesis title: Reducing the emissions and efficiency penalties of low temperature combustion through low heat rejection operation.
19. Mr. Benjamin McKeathen, MS, May 2018. Thesis title: Diesel fuel cetane number effects on engine efficiency and emissions.
20. Ms. Kelsey Fieseler, MS, August 2018. Thesis title: Simulation development of a large bore two stroke integral compressor engine to study variable natural gas composition effects.
21. Mr. Taylor Linker, MS, December 2019. Thesis title: Predictive NO_x emissions modeling for a large bore, lean burn, integral compressor engine.
22. Mr. Forrest Pommier, MS, May 2020. Thesis title: A fundamental study of spark ignition for a large-bore single cylinder natural gas engine.
23. Mr. Kevin Wallace, MS, August 2020. Thesis title: Thermodynamic cycle simulation of a large-bore, single-cylinder, 2-stroke natural gas engine for predicting emissions of oxides of nitrogen.
24. Mr. Kyle Ward, MS, May 2021. Thesis title: Precombustion chamber performance and emissions studies on a large-bore single cylinder natural gas engine.
25. Mr. Kyle Beurlet, MS, August 2021. Thesis title: Study of direct injection fuel delivery in a spark-ignited natural gas engine.

26. Ms. Taylor Ritchie, MS, August 2022. Thesis title: The geometry of a prechamber's impact on temperature distribution and heat flow.
27. Mr. Jacob Nowlin, MS, Expected May 2023.

Undergraduate Students (Honors Thesis / Research)

Texas A&M University, College Station, Texas

Undergraduate Honors Thesis

1. Mr. Timothy Kroeger, 2013 - 2015, Thesis title: Achieving consistent maximum brake torque with varied injection timing in a DI diesel engine.
2. Ms. Kelsey Fieseler, Fall/Spring 2015 – 2016, Thesis title: Particulate matter and filter smoke number correlation under conditions varying from conventional to low temperature combustion.
3. Mr. Cole Frazier, Fall/Spring 2016 – 2017, Thesis title: Improving BSFC through multiple injections and varying cetane number for a light duty diesel engine.
4. Mr. Pedro Riojas, 2017 – 2018, Thesis title: Controlling software and optimization for compressor engine's operation under variable gas compositions.
5. Ms. Gabrielle Adams, 2017 – 2018, Thesis title: Dynamic modeling of common rail fuel injection for varying operating conditions.

Undergraduate Honors Research

1. Mr. Daniel D. Steck, Fall 2011, Report title: Experimental exergy analysis performed on a low premixed compression ignition engine operating in a low temperature combustion regime.
2. Ms. Nicholle Thelen, Spring 2012, Report title: Effect of Air-Fuel Ratio of Biodiesel-fuelled Diesel Engines on Brake Fuel Conversion Efficiency.
3. Mr. Zachary Burke, Spring 2013, Report title: Modeling Heat Rejection in Radiator Systems.

Undergraduate Research

1. Mr. Cole Frazier, 2015 – 2016. Report title: Integration of diesel engine exhaust aftertreatment system with advanced diesel combustion.
2. Ms. Gabrielle Adams, 2016 – 2017. Report title: Effect of O₂ enrichment on diesel engine efficiency and boosting capability.
3. Mr. Joshua Tremblay, 2016 – 2018, Research topic: Design and installation of an electronic spark ignition controller for a two-stroke natural gas engine.
4. Ms. Yvonne Chukwu, 2017 - 2019. Research topic: Propane fueled compression ignition combustion engines.
5. Mr. Robert Caraway, 2018 – 2019. Research topic: Cyclic variability of natural gas engines.
6. Ms. Ally Johnson, 2018 – 2019. Research topic: Low temperature combustion.
7. Ms. Katy Armitage, 2017 – 2020. Research topic: Study of low heat rejection with low temperature combustion.

8. Ms. Bailey Brawley, 2017 – 2020. Research topic: Small engine fuel efficiency and emission improvements.
9. Ms. Madison Flesner, 2018 – 2020. Research topic: Historical vehicle fuel efficiency behavior.
10. Mr. Rohit Bachani, 2020. Research topic: Thermodynamic modeling of 4-stroke diesel engines.
11. Ms. Taylor Ritchie, 2018 – 2021. Research topic: Study of variable fuel composition on natural gas engine combustion.
12. Mr. Jacob Nowlin, 2019 – 2021. Research topic: Flow visualization of two-stroke cross-scavenged engine.
13. Mr. Ross Burgett, 2020 – 2021. Research topic: Experimental development of research test cell.
14. Mr. John-David Leggett, 2020 – 2021. Research topic: Computational simulation of a cross-scavenged flow model apparatus.
15. Ms. Bailey Mitchell, 2020 – 2021. Research topic: Development of test procedures and protocols for advanced engine testing.
16. Ms. Cynthia Jarvis, 2019 – 2022. Research topic: Hardware modifications for improved combustion.
17. Ms. Zoe Humphreys, 2022 – 2023. Research topic: Hydrogen fuel study.
18. Mr. Asa Schwierking, 2022 – 2023. Research topic:
19. Ms. Sarah Bouckley, 2023. Research topic: Gas-to-liquid diesel fuel study.

Guest Lecture for Texas A&M University Courses

1. Jacobs, T. (2008 - 2022). Internal Combustion Engines. Invited lecture for ENGR 101: Resources, Utilization, and Importance to Society, Texas A&M University, College Station, Texas. Once per year.
2. Jacobs, T. (2016). Internal Combustion Engines. Invited lecture for ECEN 868: Hybrid Vehicles, Texas A&M University, College Station, Texas.
3. Jacobs, T. (2013, February). Internal Combustion Engines: Approaches toward Clean and Efficient Energy Conversion. Invited lecture for MEEN 681: Graduate Student Seminar, Texas A&M University, College Station, Texas, February 13, 2013.
4. Jacobs, T. (2007, September). Low Temperature Combustion: Its Use in Diesel Engines for Simultaneous Nitric Oxide and Soot Reductions. Invited lecture for MEEN 681: Graduate Student Seminar, Texas A&M University, College Station, Texas. September 5, 2007.
5. Jacobs, T. (2007, April). HCCI Combustion. Invited lecture for MEEN 410: Internal Combustion Engines, Texas A&M University, College Station, Texas. April 16, 2007.

Guest Lecture / Short Courses for Other Universities

Guest Lecture

1. Jacobs, T. (2009, March). Heat Transfer In Pipes. Invited lecture for graduate-level heat transfer course, Tecnologico de Monterrey Campus Estado de Mexico, Mexico, March 19, 2009.

Short Course

1. Jacobs, T. (2009, October). Internal Combustion Engines. Invited short course for thermal-sciences graduate students, University of Guanajuato, Mexico, October 12 – 14, 2009.

OTHER**Awards**

1. Distinguished Service Award, American Society of Mechanical Engineers (2022).
2. Fellow of the American Society of Mechanical Engineers (2018)
3. Texas A&M Aggies Celebrate Teaching Award (2018).
4. ASME Special Recognition Service Award for Services to the Internal Combustion Engine Division (2015 and 2016).
5. Eppright University Professorship of Undergraduate Teaching Excellence (2015).
6. Steve Brauer, Jr. '02 Faculty Fellow (2015 and 2018).
7. Society of Automotive Engineers' Lloyd L. Withrow Distinguished Speaker Award (2013).
8. Society of Automotive Engineers' Excellence in Oral Presentation Award (2003, 2005, and 2012).
9. 2012 Association of Former Students University-Level Distinguished Achievement Award in Teaching (Texas A&M University, 2012).
10. 2011 SAE Ralph R. Teetor Educational Award (Society of Automotive Engineers, 2011).
11. Pi Tau Sigma's John Weese Award for Excellence in Teaching (Texas A&M University, 2009 and 2010)
12. 2010 Texas Engineering Experiment Station Select Young Faculty Award (Texas A&M University, 2010).
13. 2010 Association of Former Students College-Level Distinguished Achievement Award in Teaching (Texas A&M University, 2010).
14. 2009 – 2010 Montague-Center for Teaching Excellence Scholar for the Dwight Look College of Engineering (Texas A&M University, 2009).
15. Peggy L. and Charles L. Brittan Teaching Award for Outstanding Undergraduate Teaching (Texas A&M University, 2009)
16. Outstanding Mentor Award (University of Michigan, 2006)
17. Outstanding Graduate Student Instructor Award (University of Michigan, 2005)
18. Summa cum Laude (University of Michigan, 1999)
19. Class of '31E Undergraduate Scholarship (University of Michigan, 1996-1999)

Professional Membership

1. American Society of Engineering Education (since 2012).
2. Pi Tau Sigma (faculty inductee, since 2008)
3. Combustion Institute (since 2006)
4. Society of Automotive Engineers (since 1999)
5. Tau Beta Pi (since 1997)

6. American Society of Mechanical Engineers - Internal Combustion Engines division (since 1996)

Editorial Boards

1. International Journal of Powertrains (Associate Editor, 2010 – present)
2. ASME Journal of Engineering for Gas Turbines and Power (Associate Editor, 2015 – 2021)
3. ASME Journal of Energy Resources Technology (Guest Editor, 2012 – 2014)

ABET Accreditation

1. Program Evaluator through American Society of Mechanical Engineers (2020 – present)

Committee / Speaking Service

Non-University

1. United States Section of The Combustion Institute Advisory Board (2017 – present).
Chair (2021 – present).
2. Central States Section of The Combustion Institute Advisory Board (2010 – present).
Chair of Outreach Activities (2010 – 2017). Chair-Elect (2017 – 2019). Chair (2019 – 2021). Past Chair (2021 – present).
3. ASME Energy Conversion and Storage Segment, Segment Leadership Team, Member (2015 – 2021).
4. ASME Internal Combustion Engine Division Executive Committee (2010 – 2016). Chair (2014-15), Acting Chair (2015-2016).
5. ASME Internal Combustion Engine Division Advanced Combustion Track Committee Chair (2007 – 2010).
6. SAE Powertrains, Fluids, and Lubricants Fall 2009 Emissions Performance of CI and SI Engines Session Co-Chair (2009).
7. ASME Internal Combustion Engine Division Fall 2007 Technical Conference Low Temperature / HCCI Combustion Session Chair (2006 – 2007).

University

1. Department Head, Department of Multidisciplinary Engineering (2021 – present).
2. Faculty Advisor, Catholic Student Association (2020 – present).
3. Founding Interim Department Head, Department of Multidisciplinary Engineering (2020 – 2021).
4. Faculty Advisor, Pi Tau Sigma (2014 – 2021).
5. Texas A&M University Department of Mechanical Engineering Thermodynamics Qualifying Exam Committee (2008 – 2021).
6. Co-Director, Institute for Engineering Education and Innovation (2019 – 2020).
7. Director, Interdisciplinary Engineering for Undergraduate and Graduate Programs (2017 – 2020).
8. Texas A&M University WC Advisory Committee, College of Engineering representative, appointed (2014 – 2020).

9. Texas A&M Department of Mechanical Engineering AY18 Faculty Search Committee (chair) and Energy and Combustion Sub-Committee (chair) (2017 – 2018).
10. Texas A&M University Department of Mechanical Engineering Educational Development Committee, elected (2010 – 2019, Chair 2013 - 2016).
11. Texas A&M University Department of Mechanical Engineering Thermodynamics Course Coordinator (2011 – 2016).
12. Texas A&M University Department of Mechanical Engineering Undergraduate Program Director, appointed (2013 – 2016).
13. Texas A&M University Department of Mechanical Engineering 25x25 Implementation Committee, appointed (2014 – 2016).
14. Texas A&M University Faculty and Staff Advisory Committee to the Vice President of Student Affairs, College of Engineering representative, appointed (2014 – 2016).
15. Texas A&M University SPARK Conference, invited speaker, “Should I become a Texas A&M engineer?” (2016).
16. Texas A&M University Pedagogy Project: Supporting Transformational Learning, invited panelist (2016).
17. Texas A&M University’s Engineering Programs and Academic Services E12 and WEE Summer Camps for underrepresented and female students, Energy Faculty Advisor (2011 – 2014).
18. Texas A&M University Dwight Look College of Engineering 25x25 Hiring Committee, appointed (2013 – 2014).
19. Society of Automotive Engineers Texas A&M University Student Chapter, Faculty Advisor (2007 - 2014).
20. Texas A&M University Department of Mechanical Engineering 25x25 Growth Committee, Chair, appointed (2013 – 2014).
21. Texas A&M University Department of Mechanical Engineering Graduate Studies Advisory Committee, elected (2012 – 2013).
22. Texas A&M University, Mechanical Engineering Department Head Search Committee, appointed (2011 – 2012).
23. Texas A&M University’s Center for Teaching Excellence Faculty and Student Advisory Board, Faculty Member (2009 - 2011).
24. Texas A&M University’s Future A&M Engineers Prospective Student Day, Guest Speaker (2009).
25. Texas A&M University Department of Mechanical Engineering Safety Committee (2006 – 2007).

Reviewer Assignments (Grants)

1. ARPA-E (since 2015).
2. National Science Centre – Poland (since 2012).
3. American Chemical Society Petroleum Research Fund (since 2012).
4. Northeast Sun Grant Initiative (since 2011).
5. Army Research Office (since 2010).
6. National Science Foundation (since 2007).

Reviewer Assignments (Journals)

1. Energy Conversion and Management (since 2016).
2. American Society of Engineering Education (since 2014).
3. Environmental Engineering and Management Journal (since 2012).
4. International Journal of Rotating Machinery (since 2011).
5. Journal of Combustion (since 2011).
6. Energies (since 2011).
7. Fuel Processing Technology (since 2010).
8. Energy & Fuels (since 2010).
9. ASME Journal of Energy Resources Technology (since 2010).
10. Fuel (since 2010).
11. AIAA Journal of Thermophysics and Heat Transfer (since 2009).
12. ASME Journal of Dynamic Systems, Measurement and Control (since 2009).
13. International Journal of Thermal Sciences (since 2009).
14. Atmospheric Engineering (since 2008).
15. Applications and Applied Mathematics: An International Journal (since 2008).
16. Combustion and Flame (since 2007).
17. Journal of Energy, Heat, and Mass Transfer (since 2007).
18. Combustion Science and Technology (since 2007).
19. Institute of Mechanical Engineers Part D: Automobile Engineering (since 2007).
20. International Journal of Heavy-Vehicle Systems (since 2007).
21. ASME Journal of Heat Transfer (since 2007).
22. ASME Journal of Fluids Engineering (since 2007).
23. SAE Papers (since 2005).
24. ASME Journal of Engineering of Gas Turbines and Power (since 2001).

Consulting

1. TSCyanergy (2023 – continuing). Diesel engine emissions calculations and analysis.
2. Arnold & Saunders (2021 – 2022). Material defect detection software patent infringement litigation.
3. Pipeline Research Council, International (2021 – 2022). Fuel reforming for hydrogen use in natural gas compressor station engines literature review.
4. DLA Piper (2021 – 2022). Diesel combustion, emissions, and engine control litigation.
5. United States Department of Justice (2020). Biodiesel, renewable fuel, biofuel gas fuel production.
6. Shook Hardy & Bacon (2019 – 2020). Piping patent infringement litigation.
7. Pipeline Research Council, International (2019). Prechamber Combustion Compendium.
8. Squire Patton Boggs (2017 - 2019). Diesel combustion, emissions, and engine control litigation. Sworn affidavit, deposition under oath, cross-examination.
9. Howard and Howard (2017). Patent infringement case. *Inter partes* review report.
10. Shell Global Solutions, Inc. (2014). Short course on internal combustion engines.
11. PTT: Petroleum Authority of Thailand (2012). Development of an engine test cycle for combustion analysis of varying grades of diesel fuel.

12. Enerpulse, Inc. (2011). Burn rate analysis of Pulstar spark-ignition combustion system.