

## Dr. Jacobs's 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* (12<sup>th</sup> 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* (2<sup>nd</sup> 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* (11<sup>th</sup> 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 CO<sub>2</sub> 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 31<sup>st</sup> International Symposium on Combustion, Heidelberg, Germany, 2006.
42. Bohac, S., Han, M., Jacobs, T., Lopez, A., Assanis, D., Szymkowicz, 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<sub>x</sub> 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 29<sup>th</sup> 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 CO<sub>2</sub> 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<sub>x</sub> 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 28<sup>th</sup> 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 28<sup>th</sup> 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 11<sup>th</sup> 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 125<sup>th</sup> 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 26<sup>th</sup> 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 25<sup>th</sup> 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 123<sup>rd</sup> 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 24<sup>th</sup> 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 122<sup>nd</sup> 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 121<sup>st</sup> 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 121<sup>st</sup> 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<sub>x</sub> 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 2<sup>nd</sup> 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<sub>x</sub> emissions from integral compressor engines. Paper presented at the 12<sup>th</sup> 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 12<sup>th</sup> 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 37<sup>th</sup> 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 37<sup>th</sup> 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 14<sup>th</sup> 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 124<sup>th</sup> 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 10<sup>th</sup> 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 10<sup>th</sup> 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 10<sup>th</sup> 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 9<sup>th</sup> 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., Etcheverry, 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 8<sup>th</sup> 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 3<sup>rd</sup> 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<sub>x</sub> 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 6<sup>th</sup> 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<sub>x</sub> to exhaust gas recirculation in a premixed compression ignition engine. Paper presented at the 5<sup>th</sup> 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.