CURRICULUM VITAE
JEFFREY D. NABER, PH.D.

Michigan Technological University
University Professor
Professor of Mechanical Engineering - Engineering Mechanics
Richard and Elizabeth Henes Professor in Energy Systems
Director APS LABS (Advanced Power Systems Research Center)
Graduate Advisor Hybrid Electric Vehicle Curriculum

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Education

1992	Ph.D. in Mechanical Engineering, University of Wisconsin-Madison (UW-Mad), Engine Research Center (ERC), Advisor: Professor P.V. Farrell
1987	M.S. in Mechanical Engineering, UW-Madison, ERC
1986	B.S. in Mechanical Engineering, UW-Madison

Experience

2022-Present	Presidential Professor
2019-Present	Richard and Elizabeth Henes Professor of Energy Systems
2010-2019	Ronald & Elaine Starr Professor of Energy Systems
2008-Present	Director, Advanced Power Systems Research Center (*APS LABS*) Michigan Technological University, www.me.mtu.edu/research/power, FY 2021 Research Awards of $9.5M. Led the establishment of the center with Director, Professor Carl Anderson and other faculty across campus. The APS LAB center is a Tier 1 research center operated under the VPR office. The Center's focus is collaborative research in the areas of clean, efficient, and sustainable mobility and power systems. The center's faculty and staff expertise are in energy conversion processes, power generation, and energy storage in chemical, mechanical, and thermal systems. Working with the university in strategic indicatives, we have added additional faculty and laboratories including the 3500 sq.ft. Alternative Energy Research Building (AERB) and the 55,000 sq.ft. Advanced Power Systems Research (APSR) Lab to the center resources. The APSRC Building is operated as a university shared facility with extensive laboratory and vehicle facilities.
2010-Present	Graduate Program Director/Advisor for Hybrid Electric Vehicle Curriculum and Graduate Certificate
2006-2007	Associate Director, APSRC Michigan Technological University
2004-2008	Associate Professor, Dept. of Mechanical Engineering - Engineering Mechanics Michigan Technological University

1995-2004 Engineering Manager

Research and Development for Powertrain Systems & External Contract Services
Motorola Automotive Group, Dearborn, MI
Managed a diverse engineering group of engineers and staff working on a mix of development and production projects for automotive and engine OEM's. In addition I provided systems expertise and interfaced between the Automotive Electronics Group and OEM powertrain groups on systems requirements for a number of production programs in large business unit. As a group we developed technologies for spark-ignition and diesel engine management systems. This included:

- Emissions control
- Spark ignition fuel control for optimized catalyst conversion
- Diesel engine EGR design and control for NOx reduction
- Knock detection and spark control
- Electronic throttle control
- Variable valve timing control
- On-Board-Diagnostics including: misfire, evaporative leak detection, and catalyst monitor
- Vehicle test systems

I led the technical team in a major IP technology transfer negotiated between Motorola and OEM focused on diesel engine management.

I managed an engineering consulting business of $4M/year based upon the resources of the Detroit Applications and Systems Engineering Center (DASEC) and reporting to the Director. DASEC was composed of a staff of engineers and technicians with three full engine dynamometers and two chassis dynamometers. Customers included OEMs and Tier I's.

1992-1995 Post-Doctoral Researcher, Advisor Dennis Siebers.
Sandia National Laboratories, Combustion Research Facility
Livermore, CA
www.ca.sandia.gov/crf/research/combustionEngines/DCSV.php

In collaboration with Dr. Siebers, I developed the Low-Temperature Combustion/Diesel Combustion Simulation Laboratory which is in operation today over 20 years later.

Contributions included:

- Laboratory and instrumentation development
  - Design and application of optical instrumentation systems,
  - Characterization of operation including combustion mixture preparation, temperature, and velocity,
  - Remote sensing and control,
- Gas Research Institute and DOE sponsored research of natural gas combustion
- Investigation of hydrogen combustion under DI conditions IC engines
- DOE sponsored investigations of diesel spray and combustion:
  - High-pressure liquid fuel injection system characterization,
  - Optical and classical diagnostics applied to high-pressure sprays with combustion under extended ambient conditions

1987 Graduate Intern
General Motors Research Laboratories

Fluid Mechanics Department, Warren, MI
I worked under the direction of Dr. Rolf Reitz on CFD modeling of DI diesel sprays. We developed the first integrated fuel impingement model and characterized the sprays under conditions in a pressure vessel and small-bore diesel engine. The results of this research were published and received the 1988 SAE Horning Award.

1986-1992 Research Assistant, ARO Fellow
University of Wisconsin-Madison
Engine Research Center
Madison, WI

Working under the advisement of my thesis advisor, Dr. Patrick Farrell, I developed and constructed an experimental facility and instrumentation to study droplet impingement which was used for my thesis work and later for additional graduate students in their thesis work.

1978-1982 Enlisted NCO, U.S. Army Intelligence
United States, Europe, Japan, and Korea assignments

My service included electronic surveillance with a top-secret security clearance and was honorably discharged at the grade of Sergeant.

Post-Doctoral and Graduate Advisors

Post-Doctoral	Dennis Siebers, CRF, Sandia National Laboratories
Ph.D. and M.S.	Patrick Farrell, ME, University of Wisconsin-Madison

Research & Teaching Interests

Research programs in the areas of alternative energy, combustion, internal-combustion engines, power generation, and mobility in the application of connected and automated vehicles. Manage the APS LABS Michigan Tech Tier I Research Center including the APSRC and AERB buildings. Sponsors of research program include: DOE, DOD, DOL, NSF, and several industrial partners.

My teaching interests are in the energy thermos-fluids technical area with a focus on internal combustion engines, multidisciplinary education in hybrid vehicles, powertrains, and systems engineering.

Honors

- ASME, 2023 ASME Internal Combustion Engine Award in recognition of achievement or distinguished contribution over a substantial period, which may result from research, innovation, or education in advancing the art of engineering in the field of ICEs.
- Michigan Technological University, Leading Research Expenditures, COE (2023)
- Michigan Technological University, University Professor: Awarded by University President and Provost in recognition of faculty members who have made outstanding scholarly contributions to the University and their discipline over a substantial period of time (2022)
- Michigan Technological University, Research Award in recognition for outstanding achievement in research based on the impact made toward the advancement of knowledge and/or the state of scholarship (2022).
- Michigan Technological University, leading Research Expenditures, (2022)
- Michigan Technological University, Richard & Elizabeth Henes Professor in Energy Systems, (2019)
- SAE Bendix Award, Best Paper, Dudekula, A. B., & Naber, J. (2021). Studies on Simulation and Real Time Implementation of LQG Controller for Autonomous Navigation (No. 2021-01-0108).
- ASME, Most Valuable Technical Paper, (2021) Internal Combustion Engines Fall Conference, Miller, T., Duncan, J., Hensley, W., Beard, J., Worm, J., & Naber, J. "Design, actuation, experimental setup and testing of a 4-cylinder gasoline spark ignited variable compression ratio engine. ASME
- John Deere, "On it" award for Short Courses (2016)
- Michigan Technological University, Provost, Exceptional "Average of 7 dimensions" student evaluations (2016)
- Michigan Technological University, Provost, Top 10% student evaluations for 7 elements (2015)
- Michigan Technological University, Best Graduate Student Mentor, Michigan Technological University (2012)
- Michigan Technological University, Ronald & Elaine Starr Professor of Energy Systems (2010)
- SAE Fellow (2010)
- Engineering Society of Detroit, Distinguished Service Award, (2010)
- SAE Forest R. McFarland Award (2010)
- Michigan Technological University Outstanding Graduate Mentor Award, (2010)
- SAE Ralph R. Teetor Educational Award (2008)
- SAE 2007 World Congress Substantial Contribution as a Session Organizer (2007)
- Motorola, Science Advisory Board (2003)
- Motorola, Gold Level Inventor (2000)
- Combustion Institute, Best Paper (1996)
- SAE, Horning Memorial Award (1988)

University Service

- MTU, Michigan Tech Research Award, Evaluation Committee, 2024.
- MTU, Distinguished and University Professor Evaluation Committee, 2024
- MTU, Distinguished and University Professor Evaluation Committee, 2023
- MTU, Research Award

- ME-EM Department Area Director, Energy Thermal Fluids (2023)
- University, Director, Advanced Power Systems Research Center, APS LABS (2008-present)
- College of Engineering, Hybrid Electric Certificate Graduate Advisor (2013-present)
- ME-EM Pi Tau Sigma Faculty Advisor (2005-present)
- ME-EM, Chair Evaluation Committee (2011, 2017)
- COE Tenure and Promotion Committee (2015-2017)
- ME-EM Department Area Director, Energy Thermal Fluids (2010)
- ME-EM Faculty Development and Tenure Committee (2007-2008, 2014-2015)
- College of Engineering, Vehicle Electrification Curriculum Development (2009-2011)
- University Faculty Recruitment Committees (2009-2012)
- ME-EM Faculty Mentor (2009 – present)
- University, Early Career Management Committee (2016-2017)

Professional Service

- Michigan Alliance for Greater Mobility Advancement (MAGMA), (2010-present)
    - Research Advisory Group, Educational Advisory Group, and Board Member
- Editor, Special Issue, Applied Sciences, Engine Emission Control: Strategies for High-Efficiency Clean Combustion, 2021-2022
- Associate Editor, ASME Journal of Engineering for Gas Turbines and Power since 2015
- SAE Session Organizer for multiple meetings since 2002
- SAE Session Chair for multiple meetings since 2002
- Program and Proposal reviews for NSF and DOE

Professional and Honorary Societies

- Society of Automotive Engineers (SAE Fellow)
- American Society of Mechanical Engineers
- Pi Tau Sigma
- Motorola Science Advisory Board, Associate Member

Consulting

- Stanadyne
- Continental Automotive
- Independent Engine Designer – Diesel Fuel Injection and Combustion
- Leadfoot Engineering
- Leidos Engineering
- John Deere
- Mercury Marine
- Motorola
- Nostrum Energy

Graduate Student Advising/Mentoring

Major Advisor – Ph. D. Students

1) Irdmousa, Behrouz Khoshbakht, Data-Driven Modeling and Predictive Control of Combustion at Reactivity Controlled Compression Ignition Engines, PhD Thesis, Michigan Technological University, 2023.
2) Batool, Sadaf, Dynamic Modeling and Predictive Control of a Multi-Mode Combustion Engine, PhD Thesis, Michigan Technological University, 2023. (Co-Advisor M.Shahbahki),
3) Zoldak, Philip, Partially Stratified Combustion of Natural Gas for Spark Ignition Engines, PhD Thesis, Michigan Technological University, 2022. (Distance Learning Student)
4) Joshi, Satyum, "Concept Evaluation and Development of a Novel Approach for Integration of Turbogeneration, electrification and Supercharging on Heavy Duty Engines, PhD Thesis, Michigan Technological University, 2022. (Distance Learning Student)
5) Vinhaes, Vinicius Bonfochi, Combustion Development of a High Load High-Efficiency, Micro-Pilot Diesel Natural Gas Engine, Ph.D. Thesis, Michigan Technological University, 2022. (Co-Advisor M.Shahbahki),
6) Khameneian, Amir A., "Dynamic Engine-Out Emissions Analysis for a Gasoline Turbocharged Direct Injection Engine During the Cold Crank-Start Conditions in Elevated HEV Cranking Speed," PhD Thesis, Michigan Technological University, 2021 (M.Shahbahki Co-advisor)
7) Pourhasanzadehsharifi, Maryam. "Study of Spark Discharge and Cycle-to-Cycle Combustion Variations Using Optical Diagnostics," PhD Thesis, Michigan Technological University, 2020.
8) Miganakallu Narasimhamurthy, Niranjan. "Water Injection and its Impact on Knock Mitigation in Spark Ignited Engines," PhD Thesis, Michigan Technological University, 2020.
9) Dudekula, Ahammad Basha, "Sensor Fusion and Non-linear MPC controller development studies for Intelligent Autonomous vehicular systems," PhD Thesis, Michigan Technological University, 2020.
10) Wang, Xin, A Study of Model-based Control Strategy for a Gasoline Turbocharged Direct Injection Spark Ignited Engine, PhD Thesis, Michigan Technological University, 2020. (B.Chen Co-Advisor)
11) Yang, Zhuyong, Optimization and Comparison of Over-expanded and Other High Efficiency Four-stroke Spark-ignited Boosted Engines, PhD Thesis, Michigan Technological University, 2019.
12) Schroeter, Robert A. " Characterization of the Post Injection Behavior of Gasoline Direct Injection Fuel Injectors," PhD Thesis, Michigan Technological University, 2019.
13) Meng, Tang, "Spray and Combustion Studies of High Reactivity Gasoline in Comparison to Diesel under Advanced Compression Ignition Engine Conditions," PhD Thesis, Michigan Technological University, 2018.
14) Wang, Yanyu "The Interaction of Ignition and in-cylinder Flow on Flame Kernel Development and Its Impacts on Combustion in an Optically Accessible Direct Injection Engine," PhD Thesis, Michigan Technological University, 2018.
15) Dahodwala, M. Z., "Experimental and Computational Investigation of Dual Fuel Diesel-Natural Gas RCCI Combustion in a Heavy-Duty Diesel Engine," PhD Thesis, Michigan Technological University, 2018.
16) Worm, Jeremy, "The Impact of Water Injection on Spark Ignition Engine Performance under High Load Operation," PhD Thesis, Michigan Technological University, 2017.
17) Ansari, Ehsan "Combustion, Emissions and Performance Optimization in a DI/PFI-RCCI Diesel/Natural Gas Turbocharged Engine," PhD Thesis, Michigan Technological University, 2017. (M.Shahbahki Co-Advisor)

18) Chen, Wei, "Impact of Spark Ignition Duration, Energy and Phasing on Combustion and Performance in a GTDI Engine near the Dilute Limit," 2015. (B. Chen Co-Advisor)
19) Jia, Libin, "Estimation of Transfer Path with Excitation from Cylinder Pressure for Combustion and Noise Metrics Determination on Diesel Engines," 2014. (J. Blough Co-Advisor)
20) Xiaobo Song, "A SCR Model based on Reactor and Engine Experimental Studies for a Cu-zeolite Catalyst," 2013. (J.Johnson Co-Advisor)
21) Vaibhav Kale, "Improving Startability and reducing emissions in flex-fuel spark ignition direct injection variable cam timing engine," 2013.
22) Iltesham Zameer Syed, "Numerical Investigation of Effects of Addition of Ethanol to Gasoline on Laminar Flame Speed, Autoignition, and Wall Quenching," PhD. Thesis, Michigan Technological University, 2012. (A Mukherjee Co-Advisor)
23) Jaclyn Elyse Nesbitt, Diesel Spray Mixing Limited Vaporization with Non-Ideal and Multi-Component Fuel Thermophysical Property Effects," PhD. Thesis, Michigan Technological University, 2011.
24) Yeliana, "Parametric Combustion Modeling for Ethanol-Gasoline Fuelled Spark Ignition Engines," PhD. Thesis, Michigan Technological University, 2010.
25) Polonowski, Christopher, "Accelerometer Based Measurements of Combustion in an Automotive Turbocharged Diesel Engine," Ph.D. Thesis, Michigan Technological University, 2009.

Major Advisor – M.S. Students (as sole and co-advisor)

1) Tuma, Nicolas, An Experimental Study on the Impact of Water Injection on the Performance and Emissions of a Natural Gas – Diesel Pilot Engine, MS Thesis, Michigan Technological University, 2022.
2) Goyal, Vasu, Development and Validation of Dynamic Programming Algorithm for Eco Approach and Departure, MS Thesis, Michigan Technological University, 2021.
3) Vatsam, Shubham, "Vehicle Dynamics Modeling for Autonomous Drifting and Clothoid Based Waypoint Interpolation," MS Report, Michigan Technological University, 2020.
4) Sethia, Shreyans, "Radio Frequency Studies of Soot Loading and Ammonia Storage on a Diesel Particulate Filter with a SCR Catalyst Coating," MS Thesis, Michigan Technological University, 2020.
5) Sitaraman, Radhika, "Identification of Heat Release Shapes and Combustion Control of an LTC Engine," MS Thesis, Michigan Technological University, 2020.
6) Miller, Tyler, "Design, Build, and Analysis of a Compressed Natural Gas Direct Injection Compression Ignition Single Cylinder Research Engine," Michigan Technological University, 2020.
7) Minehart, Cooper Heyne, "Data Driven Sensor Fusion for Cycle-Cycle IMEP Estimation, MS Thesis, Michigan Technological University, 2020
8) Narodzonek, Brandon, "Development of an Eco Approach and Departure Application to Improve Energy Consumption of a Plug-in Hybrid Vehicle in Charge Depleting Mode," MS Thesis, Michigan Technological University, 2020
9) Nischal, Muralidhar, "Application of Sensor Fusion for Si Engine Diagnostics and Combustion Feedback," MS Thesis, Michigan Technological University, 2019
10) Jadav, Abhishek, "Experimental and Modeling Study of Particulate Matter Oxidation Under Loading Conditions for a SCR Catalyst on a Diesel Particulate Filter," MS Thesis, Michigan Technological University, 2018

11) Bhattacharjya, Shuvodeep, “Effect of Sensor Errors on Autonomous Steering Control and Application of Sensor Fusion for Robust Navigation,” MS Report, Michigan Technological University, 2019.
12) Berndt, Conor T., “An Experimental Study of a Passive NOx Adsorber (PNA) for the Reduction of Cold Start Diesel Emissions,” MS Thesis, Michigan Technological University, 2019.
13) Pathak, Murchana, “Investigation on the Potential of a CO2 Capture System, Downstream of the Aftertreatment System for a Heavy-Duty Engine Application,” MS Thesis, Michigan Technological University, 2018
14) Borghate, Yash, "Cold start analysis and modeling of a direct-injection gasoline engine." MS Thesis, Michigan Technological University, 2018.
15) Menucci, Tyler, "Development of Bosch Rate of Injection Measurement Procedure and Results," MS Thesis, Michigan Technological University, 2018
16) Ankur Gupta, “Single Cylinder Engine Studies with Impinging Direct Injection Fuel Injector,” 2017.
17) Rao, Sandesh Subhaschandra, “An Experimental Investigation on the Effect of Dual Coil Ignition Discharges on Dilute Combustion in a Spark Ignition Engine,” 2017.
18) Sagar Sharma, “The Emission and Particulate Matter Oxidation Performance of a SCR Catalyst on a Diesel Particulate Filter with a Downstream SCR,” 2017.
19) Sai Sharath Gorthy, “Simulation Study on Effect of Gas Charging and EGR in a Dual-Fuel Engine,” 2017.
20) Saksham Gupta, “An Experimental Investigation into the Effect of Particulate Matter on NOx Reduction in a SCR Catalyst on a DPF,” 2017.
21) Arya Yazdani, “Air Charge Estimation for an SI Engine Using In-Cylinder Pressor Sensor,” 2016
22) Paul Dice, “Evaluation of Sensors and Strategies for Closed Loop Combustion Control of a Gasoline Spark-Ignition Turbocharged Direct Injection Engine,” 2016
23) Vaibhav Kadam, “An Experimental Investigation of the Effect of Temperature and Space Velocity on the Performance of a CU-Zeolite Flow-Through SCR and a SCR on a PDF with and without PM Loading,” 2016.
24) Erik A. Gustafson, “An Experimental Investigation into NO2 Assisted Passive Oxidation with and without Urea Dosing and Active Regeneration of Particulate Matter for a SCR Catalyst on a DPF,” 2016.
25) Akshada S. Joshi, “Formulation of a Numerical Model for Predicting the PM Oxidation in the Cake Layer of a CPF,” 2016.
26) Arya Yazdan, “Air Charge Estimation for an SI Engine Using In-cylinder Pressure Sensor,” 2016.
27) Chendvankar, Prathamesh, “1D Simulation of Direct Water Injection in a Spark Ignited Engine,” 2015.
28) Christopher Davis, Development and Operation of a Mobile Test Facility for Education and Outreach,” 2015.
29) Timothy J. Okkema, “Design and Implementation of a Mobile Test Cell, (with J.Worm), 2015
30) Krishnan Raghavan, “An Experimental Investigation into the Effect of NO2 and Temperature on the Passive Oxidation and Active Regeneration of Particulate Matter in a Diesel Particulate Filter,” (with J.Johnson), 2015.
31) Parmar, Janak V., “Single Cylinder Engine Studies with Nostrum Impinging Fuel Injector with Variable Start of Injection and Determination of Fuel Vaporization with Skip Injection,” 2015.
32) Gujar, Ajinkya, “Impact of Engine Calibration on PM Oxidation in a Catalyzed Particulate Filter over a Transient Cycle: A Modeling Study, 2014.

33) Henry Schmidt, “The effect of Deposit Formations on SI PFI Engine Performance, Control and Idle Quality,” 2014

34) Foley, Ryan K., “Experimental Investigation into Particulate Matter Distribution in Catalyzed Particulate Filters using a 3D Terahertz Wave Scanner,” 2014.

35) Yogesh Kanabar, “Engine Tests and Imaging of Impinging Jet Injectors and Results of Direct Water Injection in a Spark-Ignited Engine at High Compression Ratio,” 2014.

36) Tyler B. Daavettila, “Modeling and Design work for ECOCAR3,” (with J.Worm), 2013.

37) Dustin Loveland, “Development of a Predictive Combustion Model of a Spark Ignited Engine with Gasoline Direct Injection, Variable Valve Timing, Duration and Lift Technologies,” 2013.

38) Jason E. Socha, “The Setup and Experimental Results of Direct Water Injection in a Spark Ignited Natural Gas Engine at Varing Compression Ratios,” 2013.

39) James M. Pigeon, “An Experimental Investigation into the Effects of Biodiesel Blends on Particulate Matter Oxidation in a Catalyzed Particulate Filter during Active Regeneration,” (with J.Johnson), 2013.

40) Kenneth L. Shiel, “A Study of the Effect of Biodiesel Fuel on Passive Oxidation in a Catalyzed Particulate Filter,” (with J.Johnson), 2012

41) Christopher J. Morgan, “Spray Characterization of Gasoline and E85 Direct Injection in an Optical Combustion Vessel under Starting Conditions,” 2010.

42) Christopher R. Hutton, “An Experimental Investigation into the Passive Oxidation of Particulate Matter in a Catalyzed Particulate Filter,” (with J.Johnson), 2010.

43) Samay Trivedi, Hybrid Electric Vehicle Architecture and Modeling of Powertrain Subsystems,” 2010.

44) Thomson Varghese, Micro Combined Heat and Power Laboratory Development, 2011

45) Yashodeep Lonari, Stochastic Knock Detection Model for Spark Ignited Engines, 2011.

46) Brandon Pennala, Idle Combustion Stability Investigation in a Single Cylinder Hydra Engine, 2011.

47) Gregory T. Austin, M.S. in ME-EM from Michigan Tech, “Effects of Biodiesel Blends on Particulate Matter Oxidation in a Catalyzed Particulate Filter During Active Regeneration,” 2010, (with J. H. Johnson).

48) Geomy George M.S., ME-EM at Michigan Tech, “A Study on the Ion Signal and Applications in Evaluating in Cylinder Parameters”, 2010.

49) Saurabh Ladia, M.S. in ME-EM from Michigan Tech, "Application of Stochastic Log-Normal Combustion Knock Analysis to Data from a Ford V8 SI Engine," 2010.

50) Mathew Mitchell, Combustion Characterization for Low Temperature Combustion Engine, 2010.

51) Brandon Toby Rouse, M.S. in ME-EM from Michigan Tech, “Part Load Combustion Characterization of Ethanol-Gasoline Fuel Blends in a Single Cylinder Spark Ignition Direct Injection Variable Cam Timing Variable Compression Ratio Engine,” 2009.

52) Samuel E. Johnson, M.S. in ME-EM from Michigan Tech, “Premixed Lean Gas Combustion and HPCR Rate of Injection Used with a Constant Volume Combustion Vessel,” 2009.

53) Jay Shah, “Estimating Residual Gas Fractions for SI Engines with Dual Independent Variable Valve Timing Systems,” 2009.

54) Abhijit, M.S. in ME-EM from Michigan Tech, “Ionization Waveform Characteristics as a Feedback Signal for Spark Ignited Engines,” 2008.

55) Rohith Arasappa, M.S. in ME-EM from Michigan Tech, “Modeling the Filteration, Oxidation and Pressure Drop Characteristics of a Catalyzed Particulate Filter During Active Regeneration,” 2008, (with J. H. Johnson).

56) Krishna Pradeep Chilumukuru, M.S. in ME-EM from Michigan Tech, "An Experimental Study of Particulate Thermal Oxidation in a Catalyzed Filter during Active Regeneration," 2008, (with J. H. Johnson).
57) Benjamin W. Moscherosch, M.S. in ME-EM from Michigan Tech, "Combustion and Emissions Characterization of Soy Methyl Ester Biodiesel Blends in an Automotive Turbocharged Diesel Engine," 2008.
58) Abhijeet Nande, M.S. in ME-EM from Michigan Tech, "Combustion and Emissions Studies in Spark Ignition Engines Fuelled with Hydrogen," 2008.
59) Jaclyn E. Nesbitt, M.S. in ME-EM from Michigan Tech, "Combustion Vessel Laboratory Development Focusing on Optical Diagnostic Subsystem Integration Through the Dynamic Characterization of Fuel Sprays," 2008.
60) Amandeep Singh, M.S. in ME-EM from Michigan Tech, "Estimating Residual Gas Fraction for SI Engines with Dual Independent Cam Systems," 2008.
61) Rayomand H. Dabhoiwala, M.S. in ME-EM from Michigan Tech, "An Experimental and Modeling Study of Two Diesel Oxidation Catalyst-Catalyzed Particulate Filter Systems and the Effects of a Cracked Filter on its Performance," 2007 (with J. H. Johnson).
62) Saurabh Mathur, M.S. in ME-EM from Michigan Tech, "Experimental Studies of an Advanced Ceramic Diesel Particulate Filter," 2007 (with J. H. Johnson).
63) Vivek K. Mathur, M.S. in ME-EM from Michigan Tech, "Experimental Investigation of Soy Based Biodiesel Fuel in Comparsion to Ultra Low Sulfur Diesel Fuel in a HSDI Diesel Engine," 2007.
64) Nirav Acharya, M.S. in ME-EM from Michigan Tech, "Start of Combustion Detection Using In-Cylinder Ionization Feedback in a HPCR Direct Injection Diesel Engine," 2006.
65) Kirtan Ram Bhandary, M.S. in ME-EM from Michigan Tech, "Characterization of Knock/Pre-Ignition and Combustion Study of a Hydrogen Engine," 2006.
66) Satheesh Rajh Rajagopalan, M.S. in ME-EM from Michigan Tech, "Experimental Measure and Analysis for Determination of Combustion Knock Intensity in a Spark Ignition Engine," 2006.
67) Paramjot Singh, "An Experimental Study of Active Regeneration of an Advanced Catalyzed Particulate Filter by Diesel Fuel Injection Upstream of an Oxidation Catalyst," 2006 (with J. H. Johnson).

Ph.D. Graduate Students Currently Being Advised

1) Andrew Robare (Co-Advisor B.Chen)
2) Aman Poovalappil (Co-Advisor D.Robinette)
3) Zach Stanchina
4) Tyler Miller
5) Raj Santhosh (Co-Advisor D.Robinette)
6) David Leach (D.L)
7) Yashodeep Lonari (D.L.)

M.S. Graduate Students Currently Being Advised

1) Anirudh Udipi

Education Programs and Teaching

Programs Developed

- Co-developed ***undergraduate and graduate certificate*** programs in vehicle electrification. Led efforts to develop the first course co-taught with faculty from Mechanical, Electrical, Material Science, and Chemical engineering, and industry leaders in HEV engineering as a distance learning course. The program was funded by DOE to develop undergraduate and graduate certificates. The four foundational courses in the program derived from the initial course including Intro and Advanced courses in Propulsion Systems for Electric Drive Vehicles and associated laboratories as courses listed in electrical and mechanical engineering. A Mobile Laboratory was developed and is used for these and other university and industry short courses.
- Developed and managed the Michigan Tech component for the State Energy Sector Partnership Grant with funding from the federal Department of Labor for Graduate Professional Development Program in Advanced Energy Storage for distance learning comprising of a set of three courses geared towards degreed incumbent and dislocated engineers and scientists that require training and professional education in advanced energy storage and integration to energy distribution systems including the electrical grid.
- Co-developed with the Mechanical Engineering – Engineering Mechanics and Electrical and Computer Engineering Departments a ***graduate certificate in Automotive Systems and Control*** in partnership with industry guidance.

  MEEM/EE 5811 Automotive Systems: Automotive systems for light-duty vehicles will be examined from the perspectives of requirements, design, technical, and economic analysis for mobility needs. This capstone course is intended to link the content for the automotive systems graduate certificate in controls, powertrain, vehicle dynamics, embedded systems, automotive cyber security, and others to critically examine past, current, and future mobility trends. This is to include connected and autonomous vehicle functions and impacts on the vehicle subsystems, human-machine interfaces, and human-machine interactions.
- Worked with the Michigan Alliance for Greater Mobility Advancement (MAGMA), a partnership between the state, industry, and training partners since 2010 in committees and as a board member. Develop roadmaps, guidelines, proposals, and RFQs for educational and training needs for the automotive industry in the state of Michigan. Obtained more than $4M in federal and matching state funds for incumbent and displaced workers. Developed and conducted survives and training requirements
- Led the development of an Advanced Propulsion Course with several faculty in support of displaced workers from the 2009 recession in partnership with GM and the Engineering Society of Detroit. Working with the COE and University president and GM and ESD support, we were able to provide retraining for 60 displaced engineers with full tuition in the first cohort.
- Co-PI on NSF programs for Research Experiences for Teachers (RET) and Undergraduate Students.

Courses Developed and Taught

- MEEM 3210, Fluid Mechanics, multiple sections.
- MEEM 3999, ME Undergrad Research Project, 3 students.
- MEEM 4220, Internal Combustion Engines I, 6 sections including distance learning.
- MEEM 4900/4910, Senior Design Advisor, 10 groups.

- MEEM 4990, Special Topics for undergraduates in ME, 10 students
- MEEM 4999, ME Senior Research Thesis, 6 students
- MEEM 5201, Fundamentals of SI Engines, 3 sections, Co-taught with APSRC Staff in Mobile Lab
- MEEM 5202, Fundamentals of Diesel Engines, 3 sections, Developed and Co-taught with APSRC Staff in Mobile Lab
- MEEM 5203, SI Engine Control Systems, 3 sections, Developed and Co-taught with APSRC Staff in Mobile Lab
- MEEM 5204, Diesel Engine Control Systems, 3 sections, Developed and Co-taught with APSRC Staff in Mobile Lab
- MEEM 5250, Internal Combustion Engines II, 20 sections including distance learning.
    - Fully developed as it had not been offered at MTU for several years
- MEEM 5255, Advanced Powertrain Instrumentation and Experimental Methods, 1 Section
    - Applied laboratory course for graduate students to support research in ICE dynamometer laboratories and vehicle testing
- MEEM/ECE 5295, Adv Propulsion Systems for HEV, 7 sections including distance learning.
    - Led development with faculty from ME-EM, ECE, Materials Sci & Eng., and Chem. Eng. Developed initially as the HEV course which expanded to a four-course set and graduate and undergraduate certificates.
- MEEM/ECE 5811, Automotive Systems, 10 sections including distance learning.
    - Co-developed with Jeremy Worm. Cornerstone course for Automotive Systems and Control Graduate Certificate. The Certificate was developed with MEEM and ECE departments in response to requests and direction from Ford Motor Co.
- MEEM 5990, MS Special Topics – independent study, 33 students.
- MEEM 6990, PhD Special Topics – independent study, 3 students.
- MEEM 5990, 1D Engine Simulation and Modeling – co-developed with instructor Dr. J. Johnson.

Short Courses, Seminars, Panels

1) Panelist: Naber, J.D. (Michigan Tech), Briggs (SwRI), T., Xui, X (Cummins Inc.), Organizers Bharath, A.N., Chen, We., Costaill, A., Krivitizky, Expert Panel Discussion: Component and System Challenges and Opportunities for Low and Zero-Carbon Hydrogen Propulsion Systems, WCX SAE World Congress, April 2022
2) Ovist,G., Worm, JJ, Hassel, T., Chen, Bo, Hackney, S., and Naber, J.D., Vehicle Electrification for Tier 1 Supplier, 2022.
3) Panelist: Naber, J.D. (Michigan Tech), Shehdel, G., (Tesla), Northrop,W. (Univ. of Minnesota), Koedam,H., (Dana Inc.), Chambers, Zac, (Rose-Hulman), Moderators: Onyancha, R., (Rose-Hulman), Elahinia, M., (Univ. of Toledo), Engineering Workforce: Educating for the EV and AV Industry, ASME Engineering Education Webinar Series, May 2021
4) Naber, J.D, Morgan, C., & Worm, JJ, Diesel Engine Controls with Laboratories, Michigan Tech, 2017.
5) Worm, J.J., Morgan, C., & Naber, J.D., Diesel Engine Fundamentals with Laboratories, Michigan Tech, 2017.

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8) Worm, J., Morgan, C., and Naber, J.D., Diesel Engine Calibration, John Deere, 2016

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10) Naber, J.D., Worm, J., and Davis, C., Spark-Ignition Engines – Their Operation and Control, Michigan Tech, 2015

11) Worm, J., Davis, C., and Naber, J.D., Fundamentals of Diesel Engines, Michigan Tech, 2015

12) Naber, J.D. and Miles, P.C., Engage with Experts - Panel, Fuel/Engine Interactions, SAE Congress 2015.

13) Miles, P.C. and Naber, J.D., Chat with Experts, Advances in Diesel Engine Combustion, SAE Congress 2014.

14) Naber, J.D., Worm, J.J., and Shahbakhti, M. Spark Ignition Management Systems and Torque Based Control, Short Course, Denso, Feb 5-8, 2013

15) Naber, J.D., Weaver, W., and Hackney, S., Hybrid Electric Vehicles, Short Course, Engineering Society of Detroit, Nov 12, 2012.

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2) Naber, J.D., and APS LAB Center, Mobility Solutions and Partners in Development at APS LAB Research Center, Presentation an Tour to J.Johnson, Chief Mobility Officer, OFME, State of MI, Q.L, Messer CEO-COO, MEDC, (March 2024).
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Research
Center Director APS LABS (Advanced Power Systems Research Center)

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