Oak Ridge National Laboratory ▪ 865-341-1517 ▪ nafzigerej@ornl.gov

**Eric J Nafziger**

Education

*1998–2003* **The University of Tennessee, Knoxville**

***Mechanical Engineering, B.S.***

*1999–2000* **The University of Tennessee, Knoxville**

***Maintenance and Reliability Center Engineering***

Received 80 hours professional development and education · Specific instruction on vibration monitoring, electrical signature analysis, signal processing, tribology, failure modes, and reliability-centered maintenance from leading MRC experts in academia, national laboratories, and industry

**Scholarships**: Fred M. Roddy Scholarship, Bicentennial Scholarship, Colonel S. H. Lockett Engineering Scholarship, Callie W. Ross Scholarship

Research and Personal Experience

*2019-Present* **Fuels and Engines Research Group**

***Technical Professional***

Discovered novel steerable hub-mounted dynamometer system and garnered internal support toward acquisition; organized Rototest and Toyo visit to NTRC to formally begin partnership; relationship manager for Rototest, Toyo, and ToyoTech; secured $1.5M in support; helped lead efforts to obtain $4M in DOE funds to purchase Rototest system and create REAL-SIM lab at NTRC · Lead facility design engineer and TPO for NTRC on infrastructure improvements

*2004–2019* **Fuels Engines and Emissions Research Center, Oak Ridge National Laboratory**

***Research and Development***

Lead design engineer for ExxonMobil SPP, including installation of Enterprise single-cylinder marine research engine; lead engineer for all support systems; primary technical liaison with Mahle PowerTrain, Chevron/Oronite, Alfa-Laval; led design team for unique heavy fuel oil infrastructure · Responsible for operating technically complex experiments, and solving non-routine and complex technical problems; involves both independent problem solving, and synergistic collaborations with interdisciplinary senior research staff and established industry partners; frequently participate in inter-organizational projects covering diverse disciplines of engineering and material sciences; Participate in discussions with industry partners to secure WFO funding · Responsible for setting up and conducting experiments for a LDRD involving capillary condensation of water in exhaust through nanoporous membranes; presented results; led to additional opportunities · Performed technical literature reviews for DOE sponsors · Responsible for writing Quarterly Reports · Worked synergistically with other research staff toward a potential entrepreneurial venture stemming from success with LDRD · Led the engine experiments on a GenSet for aggressive thermal cycling of DPFs · Participated in writing proposals and program development activities · Acted in mentoring capacity for Ph.D. interns · Designed a stand-alone high pressure fuel spray system to perform neutron imaging on active high pressure fuel sprays at HFIR; worked with safety personnel at HFIR to develop a proper procedure for allowing a high pressure fuel spray to be imaged in the beam line; coordinated with automotive engineering firm on leading the technical design; responsible for integrating fuel spray system with the neutron beam and a stroboscopic detector for small time-scale resolved snapshots of intra-nozzle and near-nozzle high pressure spray dynamics · Oversaw the integration and testing of a scroll expander for a major engine supplier in the heavy-duty market · Conducted complex experiments on a single-cylinder research engine for WFO project; required highly developed organization and attention to detail · Developed novel approach for engine installations and re-designed supporting architecture for temperature control of fluid systems; allowed for drastic reduction in engine installation times, tighter control, and increased safety and productivity · Worked with industry engineers to implement ionization sensors into a heavy-duty platform; completed testing and analysis of spray plume effects on functionality · Intimately involved with development of a waste heat recovery system; demonstrated increased efficiency for reaching DOE/JOULE milestones · Conducted multiple engine mapping experiments on compression ignition and gasoline engines; responsible for fuel blending · Lab Space Manager for FEERC engine labs for 11 years; responsible for leading multiple tours, audits, inspections; maintained compliance with ES&H, EPA, TDEC, OSHA, etc · Responsible for Knox County Air Quality emissions reporting for the engine laboratory and associated spaces · TPO and lead on > $6M of equipment purchases and SOW efforts

*2003–2004* **Fuels Engines and Emissions Research Center, Oak Ridge Associated Universities**

***Post Bachelors Participant***

Performed engine baseline maps and conducted experiments involving emissions and pressure data; operated Dyne Systems controls, Cell Assistant software, and CAN-bus communication tools to allow control over engine sensors and operation · Supported PIs during experimental campaigns and reporting, including data reduction, developing testing protocols, and reporting · Served as liaison between engineering staff and craft workers in the fabrication and modification of automotive components · Built up emissions benches and a particulate sampling system for gas sample analysis

*2002–2003* **Fuels Engines and Emissions Research Center, Oak Ridge Associated Universities**

***ORISE Appointment***

Comprehensively involved in performing the setup of both light-duty and heavy-duty diesel engines, as well as spark ignited engines; included engine and driveshaft alignment, component layout and installation, creative problem solving for custom hardware configurations, drafting plans, working with vendors, coordinating activities, instrumenting engines, etc · Involved with conceptualizing and designing experimental hardware and integration of engine sensors and controls · Troubleshooting and diagnostics of complicated engine setups, mechanical and HVAC systems, and pneumatic and fluid systems

*2001–2002* **The University of Tennessee, Knoxville**

***Future Truck 2002 Participant***

Member of the engine/power train group involved with converting a production 2002 Ford Explorer into a charge sustaining, post-transmission parallel hybrid-electric vehicle that had improved fuel efficiency and reduced regulated exhaust emissions while maintaining stock vehicle acceleration and performance · Performed baseline testing, vehicle modeling, and design failure modes and effects analysis (DFMEA) · Interacted with multiple design groups to accomplish task within time and budget constraints

*2001 Summer* **Fuels Engines and Emissions Research Center, Oak Ridge Associated Universities**

***ORISE Appointment***

Conducted experiments using Dyne Systems controllers, emissions benches, and LabView software · Ran test cycles on both natural gas and gasoline engines · Acquired, analyzed, and reported engine data, including emissions measurements and efficiencies · Became acquainted with taking in-cylinder pressure data, and with the general operation of a Gas Chromatograph-Mass Spectrometer, Cambustion fast analyzers, Fourier Transform Infrared Spectroscopy (FTIR) instrument, Diesel Particulate Scatterometer, and DC dynamometers · Operated a light-duty diesel vehicle through an FTP cycle on a chassis dynamometer

*2000 Summer* **Fuels Engines and Emissions Research Center, Oak Ridge Associated Universities**

***ORISE Appointment***

Became familiar with calibrating and obtaining emissions data using Rosemount analyzers, Horiba analyzers, California Analytical analyzers, Tapered Element Oscillating Micro-orifice (TEOM), Scanning Mobility Particle Sizer (SMPS), Micro-Orifice Uniform Deposit Impactor (MOUDI), and filter samples · Designed and constructed an exhaust gas sampling manifold to accommodate both individual and amalgamated cylinder analysis using fast instruments

*1999 Summer* **Fuels Engines and Emissions Research Center, Oak Ridge Associated Universities**

***ORISE Appointment***

Assisted in engine setups, driveshaft alignment, instrumenting engine platforms, and plumbing ·Designed engine components and supporting hardware · Diagnosis and problem solving of engine setups and dynamometers

Selected Publications and Presentations

Lance, Michael J.; Wereszczak, Andrew A.; Ferber, Mattison K.; Fox, Ethan E.; Toops, Todd J.; Bunting, Bruce G.; **Nafziger, Eric J.**; Williams, Aaron; Burton, Jonathan; McCormick, Robert, ***Impact of Biodiesel on the Mechanical Properties of Diesel Particulate Filter Ceramics,*** Presentation at the 37th International Conference & Exposition on Advanced Ceramics & Composites (Daytona Beach, FL USA; January 2013).

Szybist, James P.; Bunting, Bruce G.; Sluder, Scott; Cho, Kukwon; Weall, Adam J.; Curran, Scott; Prikhodko, Vitaly Y.; Lewis Sr, Samuel Arthur; Barone, Teresa L.; Bunce, Michael; Storey, John Morse; **Nafziger, Eric J.**; Parks, II, James E.; Wagner, Robert M., ***Non-Petroleum Fuel Effects in Advanced Combustion Regimes***, DOE OVT Fuel Technologies annual report, 2010.

Szybist, J.P.; **Nafziger, E.**; Weall, A., ***Load Expansion of Stoichiometric HCCI Using Spark Assist and Hydraulic Valve Actuation***, SAE Technical Paper 2010-01-2172, 2010.

Szybist, J.P.; **Nafziger, E.**; Weall, A., ***Load Expansion of Stoichiometric HCCI Using Spark Assist and Hydraulic Valve Actuation***, Oral Presentation at the 2010 Directions in Engine-Efficiency and Emissions Research Conference (Detroit, MI USA; September 2010).

Szybist, J.P.; **Nafziger, E.**; Weall, A., ***Load Expansion of Stoichiometric HCCI Using Spark Assist and Hydraulic Valve Actuation***, Presentation at the Fall 2010 AEC/HCCI Working Group Meeting at USCAR (Detroit, MI USA, August 2010).

Wagner, Robert M.; Curran, Scott; Prikhodko, Vitaly Y.; **Nafziger, Eric J.**; Parks, II, James E.; Sluder, Scott; Storey, John Morse; Barone, Teresa L., ***Dual-Fuel Combustion Concept for Improved Efficiency and Emissions in a Multi-Cylinder Engine***, Oral Presentation at The 11th International Conference on Present and Future Engines for Automobiles (Shanghai, China; June 2010).

Briggs, T. E.; Wagner, R. M.; Edwards, K. D.; Curran, S. J. ; **Nafziger, E. J.**, ***A Waste Heat Recovery System for Light Duty Diesel Engines***, SAE Paper 2010-01-2205, Society of Automotive Engineers, 2010.

Wagner, R. M.; Briggs, T. E.; Edwards, K .D.; Curran, S. J.; **Nafziger, E. J.**; Cho, K., ***Achieving and Demonstrating Vehicle Technologies Engine Fuel Efficiency Milestones***, 2010 DOE Hydrogen and Vehicle Technologies Merit Review (Washington, DC; June 2010).

Recognitions and Awards

*2011* **Significant Event Award ·** Significant contribution to ORNL for the Demonstration of 45% Brake Thermal Efficiency on a Light-Duty Diesel Engine

*2010* **Exceptional Effort Award ·** Exceptional role in implementing a work plan and coordinating timing of fuel movement in the implementation of new, safer fuel storage on-site at the NTRC and consolidation of all stored fuel into these new facilities

Professional Organizations

**Society of Automotive Engineers**Organizer, Author, member