

BRIAN C. KAUL, PHD

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EDUCATION

Missouri University of Science & Technology, Rolla, MO

Ph.D. in Mechanical Engineering

2008

Dissertation: Addressing nonlinear combustion instabilities in highly dilute SI engine operation
(Missouri S&T was formerly named University of Missouri – Rolla)

University of Missouri – Rolla, Rolla, MO

M.S. in Mechanical Engineering

2003

Thesis: Three-dimensional velocity measurements of three-dimensional turbulent separated flow

University of Missouri – Rolla, Rolla, MO

B.S. in Mechanical Engineering

2001

Minor: History

Graduated summa cum laude

WORK EXPERIENCE

Oak Ridge National Laboratory, Knoxville, TN

Research Staff – Fuels, Engines, and Emissions Research Center

2012-present

- Principal investigator for research related to high-dilution GDI combustion stability
- Principal investigator on industry-sponsored work-for-others project

Oak Ridge National Laboratory, Knoxville, TN

Postdoctoral Research Associate – Fuels, Engines, and Emissions Research Center

2008-2012

- Conducted second-law thermodynamic analysis of experimental and modeling data for heavy-duty diesel engine
- Designed and installed instrumentation and data acquisition systems for multiple experimental engine setups
- Conducted experiments for thermodynamic, material durability, and turbocharger performance studies on heavy-duty diesel engine
- Helped oversee installation and commissioning of prototype large-bore natural gas single-cylinder research engine
- Designed, installed, and programmed NI cRIO/LabView-based engine control system for single-cylinder natural gas engine
- Designed engine experiments to examine combustion instabilities in lean natural gas engine operation
- Prepared reports and presented results from various studies (largely corporate sponsor proprietary data/unpublished)
- Participated in proposal process for several new projects

AWARDS

GAANN Fellowship, University of Missouri – Rolla

2006 – 2007

Chancellor's Fellowship, University of Missouri – Rolla

2001 – 2006

TEACHING EXPERIENCE

University of Missouri – Rolla, Rolla, MO

Instructor: "ME 221 – Applied Thermodynamics"

2007-2008

Developed syllabus, lectured, administered assignments and grading

PUBLICATIONS AND PAPERS

Kaul BC, Lawler BJ, Zahdeh A. "Engine diagnostics using acoustic emissions sensors," SAE International Journal of Engines. 2016; 9(2), doi:10.4271/2016-01-0639.

Jatana GS, Kaul BC, Wagner RM. "Impact of delayed spark restrike on the dynamics of cyclic variability in dilute SI combustion," SAE Technical Paper 2016-01-0691. 2016, doi:10.4271/2016-01-0691.

Daw CS, Finney CEA, Kaul BC, Edwards KD, Wagner RM. "Characterizing dilute combustion instabilities in a multi-cylinder spark-ignited engine using symbolic analysis," Philosophical Transactions of the Royal Society A. 2015; 373(2034), doi:1098/rsta.2014.0088.

Finney CEA, Kaul BC, Daw CS, Wagner RM, Edwards KD, Green JB. "Invited review: A review of deterministic effects in cyclic variability of internal combustion engines," International Journal of Engine Research. 2015, doi:10.1177/1468087415572033.

Kaul BC, Lawler BJ, Finney CEA, Edwards ML, Wagner RM. "Effects of data quality reduction on feedback metrics for advanced combustion control," SAE Technical Paper 2014-01-2707. 2014, doi:10.4271/2014-01-2707.

Kaul BC, Finney CEA, Wagner RM, Edwards ML. "Effects of external EGR loop on cycle-to-cycle dynamics of dilute SI combustion," SAE International Journal of Engines. 2014; 7(2), doi:10.4271/2014-01-1236.

Storey JM, Theiss TJ, Kass MD, Finney CEA, Lewis SA, Kaul BC, Besmann TM, Thomas JF, Rogers H, Sepaniak M. "Fuel flexibility: landfill gas contaminant mitigation for power generation," ORNL Report. Oak Ridge, Tennessee, USA: Oak Ridge National Laboratory; 2014. Report No.: ORNL/TM-2014/44.

Kass MD, Noakes MW, Kaul BC, Edwards KD, Theiss TJ, Love LJ, Dehoff RR, Thomas JF. "Elucidation of combustion associated with a small-volume (4 cc) engine and the utilization of thermally-insulating titanium as a head material to improve efficiency and availability," SAE Technical Paper 2014-01-1673. 2014, doi:10.4271/2014-01-1673.

Storey JM, Lewis SA, Szybist JA, Thomas JF, Barone TL, Eibl M, Nafziger E, Kaul BC. "Novel characterization of GDI engine exhaust for gasoline and mid-level gasoline-alcohol blends," SAE International Journal of Fuels and Lubricants. 2014; 7(2), doi:10.4271/2014-01-1606.

Kaul BC, Wagner RM, Green JB. "Analysis of cyclic variability of heat release for high-EGR GDI engine operation with observations on implications for effective control," SAE International Journal of Engines. 2013; 6(1), doi:10.4271/2013-01-0270.

Kaul BC, Vance JB, Drallmeier JA, Sarangapani J. "A method for predicting performance improvements with effective cycle-to-cycle control of highly dilute spark ignition engine combustion," Proceedings of the Institution of Mechanical Engineers Part D—Journal of Automobile Engineering. 2009; 223(3): p. 423-438, doi:10.1243/09544070JAUTO943.

Shih P, Kaul BC, Jagannathan S, Drallmeier JA. "Reinforcement-learning-based output-feedback control of nonstrict nonlinear discrete-time systems with application to engine emission control," IEEE Transactions on Systems, Man, and Cybernetics—Part B: Cybernetics. 2009; 39(5): p. 1162-1179. doi:10.1109/TSMCB.2009.2013272.

Vance JB, Kaul BC, Jagannathan S, Drallmeier JA. "Neuro emission controller for minimising cyclic dispersion in spark ignition engines with EGR levels," International Journal of General Systems. 2009; 38(1): p. 45-72. doi:10.1080/03081070802193028.

Shih P, Kaul BC, Jagannathan S, Drallmeier JA. "Reinforcement-learning-based dual-control methodology for complex nonlinear discrete-time systems with application to spark engine EGR operation," IEEE Transactions on Neural Networks. 2008; 19(8): p. 1369-1373. doi:10.1109/TNN.2008.2000452.

Vance JB, Kaul BC, Jagannathan S, Drallmeier JA. "Output feedback controller for operation of spark ignition engines at lean conditions using neural networks," IEEE Transactions on Control Systems Technology. 2008; 16(2): p.214-228. doi:10.1109/TCST.2007.903368.

Vance JB, Singh A, Kaul BC, Jagannathan S, Drallmeier JA. "Neural network controller development and implementation for spark ignition engines with high EGR levels," IEEE Transactions on Neural Networks. 2007; 18(4): p.1083-1100. doi:10.1109/TNN.2007.899199.

Shih P, Kaul BC, Jagannathan S, Drallmeier JA. "Near optimal output feedback controller of nonlinear discrete-time systems in nonstrict feedback form with application to engines," Proceedings of the International Joint Conference on Neural Networks. 2007; doi:10.1109/IJCNN.2007.4370989.

Shih P, Vance JB, Kaul BC, Jagannathan S, Drallmeier JA. "Reinforcement learning based output-feedback control of nonlinear nonstrict feedback discrete-time systems with application to engines," Proceedings of the 2007 American Controls Conference. 2007; doi:10.1109/ACC.2007.4283127.

Singh A, Vance JB, Kaul BC, Sarangapani J, Drallmeier JA. "Neural network control of spark ignition engines with high EGR levels," Proceedings of the IEEE World Conference on Computational Intelligence 2006.

Vance JB, He P, Kaul BC, Sarangapani J, Drallmeier JA. "Neural network-based output feedback controller for lean operation of spark ignition engines," Proceedings of the American Controls Conference. 2006; p.1898-1905. doi:10.1109/ACC.2006.1656497.

He P, Bui H, Jagannathan S, Kaul BC, Drallmeier JA. "Neuro emission controller for minimizing cyclic dispersion in spark ignition engines with high EGR levels," Proceedings of ANNIE. 2004.

MEMBERSHIPS

ASME

SAE

TBP Engineering Honor Society

ΠΤΣ Mechanical Engineering Honor Society

ΦΚΦ Honor Society