RESUME

Dr. Henry K. Ng

Education

Ph. D. in Mechanical Engineering (1985), University of Wisconsin, Madison

Minor in Analytical Chemistry and Spectroscopy

M. Engr. in Mechanical Engineering (1978), Cornell University

M. S. in Food Science (1976), Cornell University

Minor in Organic Chemistry

B. S. in Chemistry/Food Science (1973), University of California, Berkeley

Qualifications Statement

Dr. Ng has more than 20 years of comprehensive experience in mechanical engineering research in government, industry and academia with emphasis on improving the efficiency and exhaust emissions of combustion systems. He is currently the PI for two alternative fuels projects to investigate the engine/vehicle combustion and emissions characteristics of hydrogen and bio-diesel. He has served as the project manager overseeing the design and construction of a multi-million dollar 4-Wheel Drive Chassis Dynamometer Facility for Hybrid Electric Vehicle (HEV) and advanced technology vehicles research. He was also actively involved in the research of both engine and tailpipe emissions of HEVs particularly during transient operations. He would like to continue research work in the engine combustion and emissions areas and to teach and supervise engineers utilizing his multidisciplinary background.

Professional Experience

Argonne National Laboratory - Research Mechanical Engineer (1991-present)

Dr. Ng is the principal investigator of the project on the particulate matter and NO_x emission benefits of bio-diesel in internal combustion engines. He is also the co-principal investigator of hydrogen fuel research in a single-cylinder engine to improve the engine pre-ignition problem using in-cylinder diagnostics.Dr. Ng had served as the co-principal investigator for the projects on oxygen-enrichment benefits for alternative transportation fuels in spark ignition engines, and a novel exhaust NO_x abatement device with monatomic nitrogen technique. He had a CRADA with Mercury Marine to solve the 2-stroke engine thermal over-loading problems using the state-of-the-art materials. He was also the co-principal investigator of a project on technical and economic assessments of future advanced technology vehicles based on a worldwide Delphi survey.

Cummins Engine Company - Technical Specialist/Group Leader (1989-1991),

Senior Engineer (1985-1989)

Dr. Ng was the project leader of a NASA/DOE funded study on diesel engine in-cylinder heat transfer. He designed in-cylinder instrumentation for heat flux and flame temperature measurements. He lead a group of five engineers to analyze the in-cylinder heat transfer differences between conventional metal and ceramic-coated piston engines using both experimental data and phenomenological modeling. He had designed a single cylinder diesel engine for optical access, set up a test cell for engine in-cylinder diagnostics at Sandia National Lab (Livermore) and had done Laser Doppler velocimetry work. His

previous work had included engine design and performance optimization, and high pressure diesel spray modeling. He had also participated in the development of particulates traps for diesel exhaust treatment and investigated novel NO_x reduction systems including catalysts.

University of Wisconsin, Research Assistant/Teaching Assistant (1978-1984)

Henry Ng worked on two NASA projects, the first one was on the effects of ethanol and it's emulsion with diesel fuel on combustion and the second one was on the effects of diesel fuel molecular structure on combustion, NO_x and particulates. The work on fuel molecular structure, pioneered by Ng, has remained a major research topic worldwide. He designed and built a mini-dilution tunnel with controls for exhaust particulates measurement and later invented a fiber-optics based 2-color pyrometer for in-cylinder (extremely high temperature and pressure conditions) flame temperature and optical thickness measurements.

Cornell University, Research Assistant/Teaching Assistant (1974-1978)

Mr. Ng developed a holographic interferometry technique to map the 3-D temperature profile of fluid surrounding a heated wire in a cylinder. He also studied combustion chemistry of a 2-stage Burke-Schumann type burner using gas chromatography. His earlier research work had included the thermal processing of food products applying air, air/vacuum and freeze-drying techniques. Henry Ng also managed a restaurant part-time in Ithaca.

Peer Review Publications

H.K.Ng (co-author),"Development of a Gaseous Hydrogen Fuel Delivery and Measurement System for a Chassis Dynamometer Test Cell", NHA Hydrogen Conference 2005, Washington, DC, March 29-April 1, 2005. (draft written)

H.K.Ng (co-author),"Performance on a Ford F-150 Using Various Blends of Compressed Natural Gas and Hydrogen", AIChE 2004 Annual Meeting Proceedings, Austin, November 2004.

H.K.Ng (co-author),"Direct Measurement of Powertrain Component Efficiencies for a Light- Duty Vehicle with a CVT Operating Over a Driving Cycle", SAE paper 2003-01-3202, SP-1806, October 2003.

H.K.Ng (co-author),"Effects of Piston Wetting on Size and Mass of Particulate Matter Emissions in a DISI Engine", Journal of Engines, V111, Section 3, pp.1977-1984, September 2003.

H.K.Ng (co-author),"Effects of Piston Wetting on Size and Mass of Particulate Matter Emissions in a DISI Engine", SAE 2002-01-1140, March 2002.

H.K. Ng (co-author),"Particulate Characterization of a DISI Research Engine Using a Nephelometer and In-cylinder Visualization", SAE Journal of Fuels and Lubricants, Vol. 110, Section 4, pp. 1294-1309, September 2002.

H.K.Ng, J. A. Anderson, M.J. Duoba, and R.P. Larsen, " Engine Start Characteristics of Two Hybrid Electric Vehicles (HEVs) - Honda Insight and Toyota Prius ", SAE Journal of Engines, V110, Section 3, pp.1931-1943, September 2002.

H.K.Ng, J.A. Anderson, M.J. Duoba and R.P. Larsen, "Engine Start Characteristics of Two Hybrid Electric Vehicles (HEVs) - Honda Insight and Toyota Prius", SAE 2001-01- 30xx, August 2001.

H.K.Ng Ng (co-author), "Honda Insight Validation Using PSAT", SAE 2001-01- 30xx, August 2001.

H.K. Ng (co-author),"Particulate Characterization of a DISI Research Engine Using a Nephelometer and In-cylinder Visualization", SAE 2001-01-1976, May 2001.

M.J. Duoba, H.K.Ng and R.P. Larsen, "Characterization and Comparison of Two Hybrid Electric Vehicles (HEVs) - Honda Insight and Toyota Prius", SAE 2001-01-1335, March 2001.

M.J. Duoba, H.K.Ng and R.P. Larsen, "In-Situ Mapping and Analysis of the Toyota Prius HEV Engine", SAE 2000-01-3096, August 2000.

H.K. Ng (co-author),"Effect of Fuel Parameters on FTP Emissions of a 1998 Toyota with a Direct Injection Spark Ignition Engine", SAE 2000-01-1907, June 2000.

H.K. Ng (co-author), "Effects of Fuel Parameters on Speciated Hydrocarbon Emissions from a Direct Injection Spark Ignition Engine", SAE 2000-01-1908, June 2000.

H.K. Ng (co-author),"Effect of Fuel Parameters on Emissions from a Direct Injection Spark Ignition Engine During Constant Speed, Variable Load Tests", SAE 2000-01-1909, June 2000.

H.K. Ng, A.D. Vyas and D.J. Santini, "The Prospect for Hybrid Electric Vehicles, 2005- 2020: Results of a Delphi Study", SAE 1990-01-2942, August 1999.

H.K. Ng (co-author), "Multiyear Program Plan -Advanced Petroleum-Based Fuels RD&T for Compression-Ignition, Direct-Injection Engines and Emission Control Systems", DOE/OTT/OHVT/EERE publication, September 1999.

H.K. Ng (co-author),"Emissions and Fuel Economy of a 1998 Toyota with a Direct Injection Spark Ignition Engine", SAE 199-01-1527, May 1999.

H.K. Ng (co-author), "Effects of Load on Emissions and NOx Trap/Catalyst Efficiency for a Direct Injection Spark Ignition Engine", SAE 1999-01-1528, May 1999.

A.D. Vyas, H.K. Ng, D.J. Santini, and J.L. Anderson, "Batteries for Electric Drive Vehicles: Evaluation of Future Characteristics and Costs through a Delpi Study", SAE971628, 1997.

H.K. Ng, J.L. Anderson, D.J. Santini, and A.D. Vyas, "The Prospects for Electric and Hybrid Electric Vehicles: Second-Stage Results of a Two-Stage Delphi Study", -Technical Solutions to Alternative Transportation Problems, SAE International Report SP-1189, pp.111-130, Warrendale, Penn., 1996.

R.B. Poola, H.K.Ng, R.R. Sekar, J.H. Baudino, and C.P. Colucci, "Utilizing Intake Air Oxygen Enrichment Technology to Reduce Cold-Phase Emissions", SAE952420, 1995.

H.K. Ng, V.J. Novick and R.R. Sekar, "Using Monatomic Nitrogen Induced by a Pulsed Arc to Remove Nitrogen Oxides from a Gas Stream", ASME ICE-Vol. 25-1, pp.73-80, 1995.

H.K. Ng, J.L. Anderson and D.J. Santini, "The Prospects for Electric/Hybrid Vehicles, 1995-2020: First-Stage Results of a Two-Stage Delphi Study", -Implementation of Technology, SAE International Report sp-1105,pp.123-135, Warrendale, Penn., 1995.

H.K. Ng, R.R. Sekar, S.W. Kraft and K.R.Stamper, "The Potential Benefits of Intake Air Oxygen Enrichment in Spark Ignition Engine Powered Vehicle", SAE932803, 1993.

A.O. zur Loye, T.L. McKinley, H.K. Ng, R. J. Primus, and D.L. Siebers, "Cycle-Resolved LDV Measurements in a Motored Diesel Engine and Comparison to K-e Model Predictions", SAE Transactions, Vol. 98, Sec. 3, pp.1142-1158, 1989.

Henry K. Ng and G.L. Borman,"The Effects of Fuel Aromatic Structure on Diesel Combustion", International Symposium on Diagnostics and Modeling of Reciprocating Engines, Tokyo, Japan, September 4-6, 1985.

Henry K. Ng and G. L. Borman, " The Effects of Fuel Molecular Structure on Diesel Exhaust Particulates", SAE P-138, p.338-346, 1983.

Conference Papers/Reports

H.K. Ng and P. Jacobsen, "The Effectiveness of Zirconia Coating on SIDI Two-Stroke Engine Pistons in Reducing Thermal Loading", ANL/ES/TM-153, June 1999.

Vyas, A., H. K. Ng, D. J. Santini, and J. L. Anderson, “Electric and Hybrid Electric Vehicles: A Technology Assessment Based on a Two-Stage Delphi Study”, Argonne National Laboratory Report ANL/ESD-36 (December 1997).

H.K. Ng, V.J. Novick, K.A. Piercucci, M.F. Geise, and R.R. Sekar, "The removal of Nitrogen Oxides from a Gas Stream using Monatomic Nitrogen Induced by a Pulsed Electric Arc", Argonne National Laboratory Technical Report, ANL/ESD/TM-87, 1995.

H.K. Ng and R.R. Sekar, "Potential Benefits of Oxygen-Enriched Intake Air in a Vehicle Powered by a Spark-Ignition Engine", Argonne National Laboratory Technical Report, ANL/ESD/TM-64, 1994.

T.M. Yonushonis, H.K. Ng, and R.C. Novak, "Thick Thermal Barrier Coatings", Proceedings of the 29th Automotive Technology Development Contractors' Coordination Meeting, October 22-25, 1991.

M.J. Jennings, T. Morel, S. Wahiduzzaman, and H.K. Ng, "High Temperature Engine Heat Transfer and Combustion Study", Proceedings of 29th Automotive Technology Development Contractors' Coordination Meeting, October 22-25, 1991.

Henry K. Ng and G.L. Borman, "An Investigation of the Effects of Fuel Properties on Combustion and Emission Mechanisms in Direct Injection

Professional Affiliation

Dr. Ng is a member of both SAE and the Combustion Institute, has served as committee member and as organizer and chairman at conferences. He was a participant in the DOE Diesel Working Group and also served as a research proposal referee for the National Research Council. He has reviewed more than 200 technical papers on engine combustion and emissions for SAE Transactions.

Patent

An apparatus (NITROGEN SPARK DE-NO_XER) for reducing NO_x emissions rom an internal combustion engine.(U.S. Patent 5,640,845)

An engine in-cylinder fuel spray impingement diagnostic with microwave elemetry (Application submitted).

Award

DOE/OTT 2000 Special Recognition - In recognition of outstanding achievement in the preparation of the Advanced Petroleum-Based Fuels RD&T for CIDI and Emission Control Systems Multiyear Program Plan.