Curriculum Vitae

Dr. Joel Hiltner

Education:

1992 B.S.M.E. (Summa Cum Laude) from The Ohio State University
1993 Masters degree in Mechanical Engineering from The Ohio State University
1997 Ph.D. in Mechanical Engineering from The Ohio State University

Work Experience:

1991 – 1997 Graduate research fellow in the Department of Mechanical Engineering at The Ohio State University. Research topic for Masters and Ph.D. programs involved optical diagnostics in internal combustion engines. Primary researcher on projects funded by Honda R&D of Japan and several U.S. Tier I automotive suppliers. Graduate studies supported by a National Science Foundation Fellowship, Ohio State University Presidential Scholars Program, and yearly grants from Honda of America.

May 1997 – July 1998 Caterpillar Engine Research, Alternative Fuels Group, Peoria Illinois. Work included thermodynamic and fluid dynamic modeling, testing, and design of internal combustion engines for heavy duty mobile and stationary applications.

Sept. 1998 – Sept. 1999 Post-doctoral research fellow at Trinity College, Dublin, Ireland. Primary researcher on European Union funded project aimed at minimizing emissions from pulse combustors for stationary applications. Designed and fabricated optical test combustor as well as conducting detailed chemical kinetic and fluid dynamic modeling.

Sept. 1999 – Feb. 2000 Visiting research fellow at University of California at Berkeley. Worked with team of researchers developing Homogeneous Charge Compression Ignition engine for high efficiency, low NO_x operation. Project included cycle simulation as well as development of engine test facility and extensive engine testing.

Mar. 2000 – Jan. 2001 Visiting fellow, RMIT University, Melbourne, Australia. Developed and taught a senior level class on engines and drive trains. Worked with local automotive industry (Ford of Australia, GM Holden) to develop engine test cell for future research and student instruction. Created web enabled course content to allow distance learning by students worldwide through RMIT.

Aug. 1998 – Present Chief engineer for Hiltner Combustion Systems. Work focused on efficiency and emissions improvements through combustion system development for heavy duty spark ignited engines. Efforts include modeling of non-traditional engines and engine cycles, optimization of spark ignited natural gas engines for stationary power generation, and the development of experimental and analysis tools for engine test cell applications.

Selected Publications:

Hiltner, J.D., and Samimy, M., "A Study of In-Cylinder Mixing in a Natural Gas Powered Engine by Planar Laser Induced Fluorescence", SAE Paper Number 961102, 1996.

Hiltner, J.D., and Samimy, M., "The Impact of Injection Timing on Mixture Formation in a Natural Gas Powered Engine", SAE Paper Number 971708, 1997.

Hiltner, J.D., "The Impact of Fuel Distribution on Cyclic Combustion Variations in a Natural Gas Fuelled, Spark Ignition Engine", Ph.D. Dissertation, The Ohio State University, 1997.

Hiltner, J.D., Fiveland, S.B., Willi, M.L., Agama J.R., "System Efficiency Issues for Natural Gas Fueled HCCI Engines in Heavy-Duty Stationary Applications", SAE Paper #2002-01-0417.

Hiltner, J.D., Mauss, F., Johansson, B., Agama, J.R., "HCCI Operation with Natural Gas: Fuel Composition Implications", ASME Journal of Engineering for Gas Turbines and Power, July 2003, pages 837-844.

Hiltner, J.D., Fiveland, S.B., "Development Considerations for Lean Burn Natural Gas Engines Employing the Miller Cycle", 24th CIMAC World Congress on Combustion Engine Technology, Kyoto, June 2004.

Hiltner, J.D., "Combustion System Development and Simulation Tools for Engines Operating on Gasified Biomass Fuels", 5th Dessau Gas Engine Conference, Dessau, March, 2007.

Flory, M.S., Hiltner, J.D., "Engine Control System Development Using Rapid Prototyping Hardware and Software", 25th CIMAC World Congress on Combustion Engine Technology, Vienna, May 2007.

Michael Flory

71 Acton Road, Columbus, OH 43214
msf@hiltnercombustionsystems.com · (614) 405-7678

EXPERIENCE

SUMMIT SYSTEMS ENGINEERING, LTD. (2004-Present) **Columbus, OH**

Founder, 2004-Present

Partnered in engineering consulting firm specializing in engine system modeling, engine control system algorithm development and after-treatment system integration. Major projects have included the following:

- Developed transient system model of stationary natural gas power generation engine using graphical programming software. Coded and validated new core engine control algorithms using the transient engine model and then migrated the new control system to a rapid prototyping system for prove out. After debugging the system, further control system refinement was performed on a running engine. Demonstrated vastly improved transient characteristics of generator set to client's customers helping secure multi-million dollar order. Client is now able to offer the only natural gas electrical power generation platform on the market meeting ISO 8528-5 transient engine specifications.
- Designed and built single cylinder test engine controller using generally available control system software/hardware. Developed, tested and implemented engine control algorithms in a virtual environment and then implemented the algorithms in a robust, real-time control system. The system capable of reading in multiple sensor inputs, processing the inputs, generating command outputs and controlling actuators using analog signals and a Controller Area Network (CAN). A fivefold reduction in testing time was achieved while vastly improving test data quality and test cell flexibility.
- Conducted several different market studies for new technology implementation including application of Stirling engine technology for recreational vehicle portable power generation, use of Stirling engine for residential combined heating and power markets in Europe and investigated waste heat desalination systems. Summarized results into final reports and provided actionable recommendations to client.

HONDA R&D AMERICAS, INC. (2003-2004) **Raymond, OH**

Senior Engine Research Engineer, Engine Calibration

- Section project leader and calibration data manager for 2005 MY Pilot. Responsibilities included maintaining, coordinating and releasing over 5,000 calibration parameter settings, implementing engine control software changes, holding weekly data correlation meetings and issuing new software releases.
- Reported test results to chief engineers at major program milestones and addressed drivability concerns during senior management drive evaluations.

FORD MOTOR COMPANY (1996-2003) **Dearborn, MI**

Senior Product Development Engineer, Advanced Powertrain 2001-2003

- Lead calibration engineer for prototype variable displacement engine project. Demonstrated vehicle level fuel economy and specified control/after-treatment system. Assisted in development and validation of torque-based control algorithms. US patents issued 6,817,336, 6,772,724 and 6,694,948.
- Managed $150K capital expenditure budget and coordinated engineering efforts to deliver a tenfold reduction in vehicle exhaust emissions on new V8 engine architecture.
- Applied and developed powertrain calibration and control strategies to engine and after-treatment systems in order to meet SULEV tailpipe emissions standards.
- Coordinated calibration efforts with external catalyst suppliers and internal technical specialists to develop optimized catalyst precious metal loadings, cell densities and after-treatment system volumes.

EDUCATION

UNIVERSITY OF MICHIGAN **Ann Arbor, MI**

December 2002 University of Michigan Ross School of Business MBA

- Emphases in Corporate Strategy and Technology Management

OHIO STATE UNIVERSITY **Columbus, OH**

August 1996 College of Mechanical Engineering Master of Science

August 1995 College of Mechanical Engineering Bachelor of Science