Bryan W. Weber

Contact Information

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Research Interests

Combustion Engineering: Alternative biofuels including alcohols and biodiesel; design of novel experimental methods for combustion analysis

Education

University of Connecticut, Storrs, CT, USA

Ph.D., Mechanical Engineering, Planned 2014

Working Dissertation Title: *High Pressure Ignition Chemistry of Alternative Fuels*
Advisor: Professor Chih-Jen (Jackie) Sung

M.S., Mechanical Engineering, August 2010

Thesis Title: *Autoignition of n-Butanol at Low to Intermediate Temperature and Elevated Pressure*
Advisor: Professor Chih-Jen (Jackie) Sung

Case Western Reserve University, Cleveland, OH, USA

B.S., *Cum Laude* Aerospace Engineering, May 2009

Senior Project Title: *Analysis of Heavy Hydrocarbon Fuels using Gas Chromatography with Mass Spectrometry*
Advisor: Professor Chih-Jen (Jackie) Sung

Journal Publications

S.M. Sarathy, S. Park, **B.W. Weber**, W. Wang, P.S. Veloo, A.C. Davis, C. Togbé, C.K. Westbrook, O. Park, G. Dayma, Z. Luo, M.A. Oehlschlaeger, F.N. Egolfopoulos, T. Lu, W.J. Pitz, C.J. Sung, and P. Dagaut. *A Comprehensive Experimental and Modeling Study of iso-Pentanol Combustion.* Combustion and Flame, Aug. 2013. doi:10.1016/j.combustflame.2013.06.022

B.W. Weber and C.J. Sung. *Comparative Autoignition Trends in Butanol Isomers at Elevated Pressure.* Energy and Fuels, vol. 27, no. 3, pp. 1688-1698, Feb. 2013. doi:10.1021/ef302195c

T. Tsujimura, W.J. Pitz, F. Gillespie, H.J. Curran, **B.W. Weber**, Y. Zhang, and C.J. Sung. *Development of Isopentanol Reaction Mechanism Reproducing Autoignition Character at High and Low Temperatures.* Energy and Fuels, vol. 26, no. 8, pp. 4871-4886, Aug. 2012. doi:10.1021/ef300879k

B.W. Weber, K. Kumar, Y. Zhang, and C.J. Sung. *Autoignition of n-butanol at elevated pressure and low-to-intermediate temperature.* Combustion and Flame, vol. 158, no. 5, pp. 809-819, Mar. 2011. doi:10.1016/j.combustflame.2011.02.005

Conference Papers and Presentations

S.S. Merchant (Presenting), W.H. Green, K.M. Van Geem, N. Hansen, **B.W. Weber**, C.J. Sung. *Combustion of the Butanol Isomers: Reaction Pathways from High to Low Temperature.* 8th International Conference on Chemical Kinetics, University Seville, Seville, Spain, July 2013.

B.W. Weber, W.J. Pitz, C.J. Sung, M. Mehl, E.J. Silke, A.C. Davis. *Experiments and Modeling of the Autoignition of Methyl-Cyclohexane at High Pressure.* Paper 3A02, 8th US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.

B.W. Weber, S.S. Merchant, C.J. Sung, and W.H. Green. *An Autoignition Study of iso-Butanol: Experiments and Modeling.* Paper 3A01, 8th US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.

S.M. Sarathy, S. Park, W. Wang, P. Veloo, A.C. Davis, C. Togbé, **B.W. Weber**, C.K. Westbrook, O. Park, G. Dayma, Z. Luo, M.A. Oehlschlaeger, F. Egolfopoulos, T. Lu, W.J. Pitz, C.J. Sung, P. Dagaut. *A Comprehensive Experimental and Modeling Study of iso-Pentanol Combustion.* Paper 2A12, 8th US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.

B.W. Weber and C.J. Sung. *Comparative Investigation of the High Pressure Autoignition of the Butanol Isomers.* Paper A-01, Fall Technical Meeting of the Eastern States Section of the Combustion Institute, Storrs, CT, October 2011.

M.R. Harper, W.H. Green (Presenting), K.M. Van Geem, **B.W. Weber**, C.J. Sung, I. Stranic, D.F. Davidson, R.K. Hanson. *Combustion of the butanol isomers: Reaction pathways at elevated pressures from low-to-high temperatures.* Paper #84, 7th International Conference on Chemical Kinetics, Massachusetts Institute of Technology, Cambridge, MA, July 2011.

B.W. Weber and C.J. Sung. *A Rapid Compression Study of the Butanol Isomers at Elevated Pressure.* Paper 1B13, 7th US National Technical Meeting of the Combustion Institute, Georgia Institute of Technology, Atlanta, GA, March 2011.

B.W. Weber, K. Kumar, and C.J. Sung. *Autoignition of Butanol Isomers at Low to Intermediate Temperature and Elevated Pressure.* Paper AIAA-2011-0316, 49th Annual Aerospace Sciences Meeting, Orlando, FL, January 2011.

Conference Posters

B.W. Weber and C.J. Sung. *Validation of Kinetic Models of the Butanol Isomers At High Pressure using a Rapid Compression Machine.* Poster T40, 7th International Conference on Chemical Kinetics, Massachusetts Institute of Technology, Cambridge, MA, July 2011.

B.W. Weber. *Autoignition of n-Butanol at Elevated Pressure and Low to Intermediate Temperature.* 1st Combustion Energy Frontier Research Center Annual Meeting, Princeton University, Princeton, NJ, September 2010.

B.W. Weber, K. Kumar, and C.J. Sung. *An Investigation of Hydrocarbon Flames using Probe Sampling and Gas Chromatography/Mass Spectrometry.* Support of Undergraduate Research and Creative Endeavors Symposium and Poster Session, Case Western Reserve University, Cleveland, OH, April 2009.

Other Presentations

B.W. Weber and C.J. Sung. *Analysis of Hydrocarbon Fuels using Gas Chromatography/Mass Spectrometry.* Summer Undergraduate Research in Energy Sciences Program, Dominion Energy East Ohio Branch, Cleveland, OH, August 2008.

Teaching Experience

University of Connecticut, Storrs, CT, USA Fall 2012 - Spring 2013

Spring 2013 – Instructor for ENGR 1166: Introduction to Mechanical Engineering

- Prepared and delivered lectures covering fundamental topics in Mechanical Engineering, including: Vector Math and Calculus, Statics, Dynamics, Solid Mechanics, Thermodynamics, Fluid Mechanics, and Heat Transfer
- Prepared and graded weekly homework assignments for 60 2nd semester engineering students
- Held weekly office hour sessions
  Lecture notes and sample homework problems are available on request

Fall 2012 – Teaching Assistant for ME 3239: Combustion for Energy Conversion

- Assisted the preparation and delivery of lecture material covering: Thermochemistry and Equilibrium, Chemical Kinetics, Fuels, and Emissions, and Reacting Flows
- Developed and presented lectures covering the fundamentals and operation of combustion modeling software
- Designed in-depth projects to explore combustion modeling using the CHEMKIN-Pro software
  Sample project assignments are available on request

Research Experience

Combustion Diagnostics Laboratory — 2007-Present

University of Connecticut, Storrs, CT, USA
Case Western Reserve University, Cleveland, OH, USA

Projects:

- Experimentally and computationally studying the ignition properties of the butanol isomers over a wide pressure range
- Designing a species sampling apparatus for time-resolved species measurements in the rapid compression machine
- Experimentally investigating the autoignition of iso-pentanol in the rapid compression machine
- Experimentally investigating the autoignition of methyl-cyclohexane in the rapid compression machine
- Characterizing the components of heavy hydrocarbon fuels, including conventional and synthetic jet fuels, using gas chromatography/mass spectrometry

Professional Experience

Combustion Energy Frontier Research Center — 2012-Present
Co-chair, Junior Associates Committee

- Coordinate monthly teleconferences for graduate students and post-doctoral researchers in the CEFRC
- Attend PI teleconferences on behalf of the junior members of the CEFRC
- Contributed to the Department of Energy EFRC newsletter with the article "Burning Butanol in a Better Engine"

Awards and Fellowships

University of Connecticut

- **Department of Mechanical Engineering** — **Spring 2013**
  Graduate Predoctoral Fellowship Award
  First Place, awarded for the best research presentation and poster at the 2013 Mechanical Engineering Graduate Research Competition

- **Graduate Assistantship in Areas of National Need** — **Spring 2010**
  Awarded in the area of Sustainable Energy Technologies

Case Western Reserve University

- **Fred H. Vose Prize** — **Spring 2009**
  Awarded to the senior in Mechanical and Aerospace Engineering at Case Western Reserve University showing the most promise for future leadership

- **Summer Undergraduate Research in Energy Sciences Grant** — **Summer 2008**
  Awarded for research to analyze the composition of traditional petroleum-based hydrocarbon fuels using GC/MS

Professional Memberships

AIAA - Student Member
ASME - Student Member
The Combustion Institute - Student Member

Skills

Programming/Scripting Languages:

- Python, MATLAB, FORTRAN 77, UNIX shell scripting (bash)

Software Packages:

- CHEMKIN-II and associated programs (SENKIN, etc.)
- CHEMKIN-Pro
- Microsoft Office, TEX (LATEX, BIBTEX), Google Docs
- Solidworks 3D Modeling

Operating Systems:

- Microsoft Windows (XP, Vista, 7, 8), Linux (Ubuntu)