

# 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; computational analysis of reaction mechanisms for combustion

## 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.E., *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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1016/j.combustflame.2011.02.005)

## CONFERENCE PUBLICATIONS AND PRESENTATIONS

S.S. Merchant (Presenting), W.H. Green, K.M. Van Geem, N. Hansen, **B.W. Weber**, and C.J. Sung. *Combustion of the Butanol Isomers: Reaction Pathways from High to Low Temperature*. 8<sup>th</sup> 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, and A.C. Davis. *Experiments and Modeling of the Autoignition of Methyl-Cyclohexane at High Pressure*. Paper 3A02, 8<sup>th</sup> US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.

	<p><b>B.W. Weber</b>, S.S. Merchant, C.J. Sung, and W.H. Green. <i>An Autoignition Study of iso-Butanol: Experiments and Modeling</i>. Paper 3A01, 8<sup>th</sup> US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.</p> <p>S.M. Sarathy, S. Park, W. Wang, P. Veloo, A.C. Davis, C. Togbé, <b>B.W. Weber</b>, C.K. Westbrook, O. Park, G. Dayma, Z. Luo, M.A. Oehlschlaeger, F. Egolfopoulos, T. Lu, W.J. Pitz, C.J. Sung, and P. Dagaut. <i>A Comprehensive Experimental and Modeling Study of iso-Pentanol Combustion</i>. Paper 2A12, 8<sup>th</sup> US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.</p> <p><b>B.W. Weber</b> and C.J. Sung. <i>Comparative Investigation of the High Pressure Autoignition of the Butanol Isomers</i>. Paper A-01, Fall Technical Meeting of the Eastern States Section of the Combustion Institute, Storrs, CT, October 2011.</p> <p>M.R. Harper, W.H. Green (Presenting), K.M. Van Geem, <b>B.W. Weber</b>, C.J. Sung, I. Stranic, D.F. Davidson, and R.K. Hanson. <i>Combustion of the butanol isomers: Reaction pathways at elevated pressures from low-to-high temperatures</i>. Paper #84, 7<sup>th</sup> International Conference on Chemical Kinetics, Massachusetts Institute of Technology, Cambridge, MA, July 2011.</p> <p><b>B.W. Weber</b> and C.J. Sung. <i>A Rapid Compression Study of the Butanol Isomers at Elevated Pressure</i>. Paper 1B13, 7<sup>th</sup> US National Technical Meeting of the Combustion Institute, Georgia Institute of Technology, Atlanta, GA, March 2011.</p> <p><b>B.W. Weber</b>, K. Kumar, and C.J. Sung. <i>Autoignition of Butanol Isomers at Low to Intermediate Temperature and Elevated Pressure</i>. Paper AIAA-2011-0316, 49<sup>th</sup> Annual Aerospace Sciences Meeting, Orlando, FL, January 2011.</p>
CONFERENCE POSTERS	<p><b>B.W. Weber</b> and C.J. Sung. <i>Validation of Kinetic Models of the Butanol Isomers At High Pressure using a Rapid Compression Machine</i>. Poster T40, 7<sup>th</sup> International Conference on Chemical Kinetics, Massachusetts Institute of Technology, Cambridge, MA, July 2011.</p> <p><b>B.W. Weber</b>. <i>Autoignition of n-Butanol at Elevated Pressure and Low to Intermediate Temperature</i>. 1<sup>st</sup> Combustion Energy Frontier Research Center Annual Meeting, Princeton University, Princeton, NJ, September 2010.</p> <p><b>B.W. Weber</b>, K. Kumar, and C.J. Sung. <i>An Investigation of Hydrocarbon Flames using Probe Sampling and Gas Chromatography/Mass Spectrometry</i>. Support of Undergraduate Research and Creative Endeavors Symposium and Poster Session, Case Western Reserve University, Cleveland, OH, April 2009.</p>
OTHER PRESENTATIONS	<p><b>B.W. Weber</b> and C.J. Sung. <i>Analysis of Hydrocarbon Fuels using Gas Chromatography/Mass Spectrometry</i>. Summer Undergraduate Research in Energy Sciences Program, Dominion Energy East Ohio Branch, Cleveland, OH, August 2008.</p>
RESEARCH EXPERIENCE	<p><b>Combustion Diagnostics Laboratory</b> 2007-Present  University of Connecticut, Storrs, CT, USA  Case Western Reserve University, Cleveland, OH, USA</p> <p>Projects:</p> <ul style="list-style-type: none"> <li>Experimentally and computationally studying the ignition properties of the butanol isomers, iso-pentanol, methyl-cyclohexane, and propene over a wide range of pressure, temperature, and fuel-loading conditions</li> <li>Designing a species sampling apparatus for time-resolved species measurements in the rapid compression machine</li> <li>Characterizing the components of heavy hydrocarbon fuels, including conventional and synthetic jet fuels, using gas chromatography/mass spectrometry</li> </ul>

## TEACHING EXPERIENCE

### University of Connecticut, Storrs, CT, USA

Fall 2012 – Spring 2013

Spring 2013 – Instructor for ENGR 1166: Introduction to Mechanical Engineering  
Supervisor: Prof. Kevin Murphy

- 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 2<sup>nd</sup> 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  
Supervisor: Prof. Chih-Jen Sung

- 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

## PROFESSIONAL EXPERIENCE

### Combustion Energy Frontier Research Center Lead Chair, Junior Associates Committee

2012-Present

- 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 Graduate Predoctoral Fellowship Award

2013

First Place, awarded for the best research presentation and poster at the 2013 Mechanical Engineering Graduate Research Competition

### University of Connecticut Graduate Assistantship in Areas of National Need

2010

Awarded in the area of Sustainable Energy Technologies

### Case Western Reserve University, Department of Mechanical and Aerospace Engineering, Fred H. Vose Prize

2009

Awarded to the senior showing the most promise for future leadership

### Case Western Reserve University, Summer Undergraduate Research in Energy Sciences Grant

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), LabView

Software Packages:

- CHEMKIN-II and associated programs (SENKIN, etc.)
- CHEMKIN-Pro
- Microsoft Office, T<sub>E</sub>X (X<sub>Y</sub>T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X, B<sub>I</sub>B<sub>T</sub>E<sub>X</sub>), Google Docs
- Solidworks 3D Modeling

Operating Systems:

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