Bryan W. Weber

CONTACT INFORMATION

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EDUCATION

Ph.D., Mechanical Engineering, University of Connecticut, 2014
M.S., Mechanical Engineering, University of Connecticut, 2010
B.S.E., Aerospace Engineering, Case Western Reserve University, 2009

PROFESSIONAL EXPERIENCE

Assistant Professor in Residence, *University of Connecticut* 2016–Present
Visiting Assistant Professor, *University of Connecticut* 2014–2016

- Conducting research on the combustion kinetics of alternative and traditional fuels
- Developing tools to improve reproducibility in experimental works
- Teaching undergraduate courses in thermal-fluids engineering
- Mentoring undergraduate students in the capstone design project

Lead Developer, *UConnRCMPy* 2015–Present

- Developing an open-source data analysis package for rapid compression machine experiments to encourage and improve reproducibility in experimental works
- Collaborating with other researchers to improve and extend the package
- Code is available on GitHub: https://github.com/bryanwweber/UConnRCMPy

Lead Developer, *ThermoState* 2016–Present

- Developing an open-source package to evaluate thermodynamic properties of common materials
- Used in several undergraduate Thermodynamics courses, with strong student approval
- Code is available on GitHub: https://github.com/bryanwweber/thermostate

Co-Lead Developer, *PyKED* 2016–Present

- Implemented a Python interface to the ChemKED database format for chemical kinetics experiments
- Collaborating with other researchers to define the database format, project governance, and community standards
- Code is available on GitHub: https://github.com/pr-omethe-us/PyKED

Contributing Developer, *Cantera* 2013–Present

- Contributing source code to the open-source software toolkit for chemical kinetics, thermodynamics, and transport processes
- Assisting users with usage of Cantera in the online support group
- Code is available on GitHub: https://github.com/Cantera/cantera

Graduate Research Assistant, *University of Connecticut* 2009–2014
Undergraduate Research Assistant, *Case Western Reserve University* 2007–2009
Combustion Diagnostics Laboratory — Director: C.J. Sung

- Conducted experimental and computational studies of the ignition properties of several alternative fuels and foundational fuels, with a focus on engine-relevant conditions.
- Designed a species sampling apparatus for time-resolved species measurements in the rapid compression machine, using gas chromatography/mass spectrometry to identify and quantify combustion intermediates.
- Analyzed kinetic models of combustion to determine the parameters controlling prediction of ignition delay and to improve the ability of the models to predict combustion events.

Teaching Experience

University of Connecticut, Storrs, CT, USA

Assistant Professor in Residence
Three-time recipient of Provost's Teaching Commendation

- Applied Thermodynamics — Spring 2016–2018
- Combustion for Energy Conversion — Fall 2016
- Fluid Dynamics 1 — Fall 2015, 2017
- Fluid Dynamics 2 (Compressible Flow) — Spring 2018
- Senior Capstone Design Project Lecturer/Mentor — 2014–2018
- Thermodynamic Principles — Fall 2014–2017; Spring 2015–2016; Summer 2017

Journal Publications

[12] **B.W. Weber** and K.E. Niemeyer. *ChemKED: a human- and machine-readable data standard for chemical kinetics experiments.* Accepted to International Journal of Chemical Kinetics, Dec. 2017.

[11] **B.W. Weber**, J.A. Bunnell, K. Kumar, and C.J. Sung. *Experiments and Modeling of the Autoignition of Methyl Pentanoate at Low to Intermediate Temperatures and Elevated Pressures in a Rapid Compression Machine.* Fuel, vol. 212, pp. 479–486, Jan. 2018.
doi:10.1016/j.fuel.2017.10.037

[10] K. Kumar, J.A. Bunnell, **B.W. Weber**, and C.J. Sung. *Autoignition of Methyl Propanoate and its Comparisons with Methyl Ethanoate and Methyl Butanoate.* Combustion and Flame, vol. 188, pp. 116–128, Jan. 2018.
doi:10.1016/j.combustflame.2017.09.027

[9] E.E. Dames, A.S. Rosen, **B.W. Weber**, C.W. Gao, C.J. Sung, and W.H. Green. *A Detailed Combined Experimental and Theoretical Study on Dimethyl Ether/Propane Blended Oxidation.* Combustion and Flame, vol. 168, pp.

310–330, Jun. 2016.
doi:10.1016/j.combustflame.2016.02.021

[8] G. Kukkadapu, **B.W. Weber**, and C.J. Sung. *Autoignition study of tetralin in a rapid compression machine at elevated pressures and low-to-intermediate temperatures.* Fuel, vol. 159, pp. 436–445, Nov. 2015.
doi:10.1016/j.fuel.2015.06.093

[7] **B.W. Weber**, C.J. Sung, and M.W. Renfro. *On the Uncertainty of Temperature Estimation in a Rapid Compression Machine.* Combustion and Flame, vol. 162, no. 6, pp. 2518–2528, Jun. 2015.
doi:10.1016/j.combustflame.2015.03.001
arxiv:1706.04243

[6] S.M. Burke, U. Burke, R. Mc Donagh, O. Mathieu, I. Osorio, C. Keesee, A. Morones, E.L. Petersen, W. Wang, T.A. DeVerter, M.A. Oehlschlaeger, B. Rhodes, R.K. Hanson, D.F. Davidson, **B.W. Weber**, C.J. Sung, J. Santner, Y. Ju, F.M. Haas, F.L. Dryer, E.N. Volkov, E.J. Nilsson, A.A. Konnov, M. Alrefae, F. Khaled, A. Farooq, P. Dirrenberger, P.A. Glaude, F. Battin-Leclerc, and H.J. Curran. *An Experimental and Modeling Study of Propene Oxidation. Part 2: Ignition Delay Time and Flame Speed Measurements.* Combustion and Flame, vol. 162, no. 2, pp. 296–314, Feb. 2015.
doi:10.1016/j.combustflame.2014.07.032

[5] **B.W. Weber**, W.J. Pitz, M. Mehl, A.C. Davis, E.J. Silke, and C.J. Sung. *Experiments and Modeling of the Autoignition of Methylcyclohexane at High Pressure.* Combustion and Flame, vol. 161, no. 8, pp. 1972–1983, Aug. 2014.
doi:10.1016/j.combustflame.2014.01.018
arxiv:1706.02996

[4] 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, vol. 160, no. 12, pp. 2712–2728, Dec. 2013.
doi:10.1016/j.combustflame.2013.06.022

[3] **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, Mar. 2013.
doi:10.1021/ef302195c
arxiv:1706.02965

[2] 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

[1] **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
arxiv:1706.00867

Grants, Awards, and Fellowships

2018-06-01–2018-06-30 — "Integration of Software-Based Problem Solving in Thermodynamics Instruction"
University of Connecticut Provost Mini-Grant
Funding: $5,000, PI

2017-01-01–2017-05-31 — "Measurement of Chemical Pathways During Autoignition at High Pressure"
NASA Connecticut Space Grant Consortium
Funding: $20,000, PI

2014-01-21–2014-05-02 — "High Pressure Ignition Chemistry of Alternative Fuels"
University of Connecticut Doctoral Dissertation Fellowship
Funding: $2,000

2013-04-01–2013-05-01 — "Experiments and Detailed Modeling of Butanol Ignition"
Department of Mechanical Engineering Graduate Predoctoral Fellowship
Funding: $2,000

2013-01-22–2013-05-03 — Graduate Teaching Fellowship
Department of Mechanical Engineering
University of Connecticut

2010-01-06–2010-05-22 — "Assessing the Feasibility of Substituting Biofuels for Conventional Hydrocarbon Fuels"
University of Connecticut GAANN Fellowship in Sustainable Energy Technologies
Funding: $7,599

2009-05-16 — Fred H. Vose Prize
Department of Mechanical and Aerospace Engineering
Case Western Reserve University

2008-06-01–2008-08-31 — "Investigation of Hydrocarbon Flame Structure using Probe Sampling and GC/MS"
Case Western Reserve University Summer Undergraduate Research in Energy Sciences Grant
Funding: $3,500

Conference Publications and Presentations

[18] **B.W. Weber** and K.E. Niemeyer (Presenting). *ChemKED: a human- and machine-readable data standard for chemical kinetics experiments.* Paper MUQ004, 10th International Conference on Chemical Kinetics, Chicago, IL, May 2017.
arxiv:1706.01987v2
figshare:10.6084/m9.figshare.5033417

[17] **B.W. Weber** (Presenting) and C.J. Sung. *UConnRCMPy: Python-based data analysis for Rapid Compression Machines.* Paper 2D19, 10th US National Technical Meeting of the Combustion Institute, College Park, MD, Apr. 2017.
arxiv:1706.01984
figshare:10.6084/m9.figshare.5089597

[16] **B.W. Weber** (Presenting) and K.E. Niemeyer. *ChemKED: a human- and machine-readable data standard for chemical kinetics experiments.* Paper 1D11, 10th US National Technical Meeting of the Combustion Institute, College Park, MD, Apr. 2017.
arxiv:1706.01987v1
figshare:10.6084/m9.figshare.5082709

[15] **B.W. Weber** (Presenting), J. Bunnell, K. Kumar, and C.J. Sung. *Autoignition of Methyl Valerate at Low to Intermediate Temperatures and Elevated Pressures in a Rapid Compression Machine.* Paper 2D01, 10th US National Technical Meeting of the Combustion Institute, College Park, MD, Apr. 2017.
arxiv:1706.01483
figshare:10.6084/m9.figshare.5089594

[14] H. Wang, **B.W. Weber**, R. Fang (Presenting), and C.J. Sung. *High-Pressure Autoignition of Binary Blends of Methanol and Dimethyl Ether.* Paper 3D01, 10th US National Technical Meeting of the Combustion Institute, College Park, MD, Apr. 2017.
arxiv:1706.01485

[13] **B.W. Weber** and K.E. Niemeyer (Presenting). *Introducting ChemKED: a human- and machine-readable data standard for chemical kinetics experiments.* 16th International Conference on Numerical Combustion, Orlando, FL, Apr. 2017.
figshare:10.6084/m9.figshare.4818448

[12] **B.W. Weber** (Presenting) and C.J. Sung. *UConnRCMPy: Python-based data analysis for Rapid Compression Machines.* 15th Python in Science Conference, Austin, TX, Jul. 2016.
figshare:10.6084/m9.figshare.5089573
http://conference.scipy.org/proceedings/scipy2016/bryan_weber.html

[11] G. Kukkadapu (Presenting), **B.W. Weber**, and C.J. Sung. *Autoignition study of tetralin in a rapid compression machines at elevated pressures and low-to-intermediate temperatures.* Paper 1G05, 9th US National Technical Meeting of the Combustion Institute, Cincinnati, OH, May 2015.

[10] K. Kumar (Presenting), J. Bunnell, **B.W. Weber**, and C.J. Sung. *Autoignition of methyl-propanoate and a comparison with its selected ester homologs.* Paper 1G07, 9th US National Technical Meeting of the Combustion Institute, Cincinnati, OH, May 2015.

[9] E.E. Dames (Presenting), **B.W. Weber**, A. Rosen, C.W. Gao, C.J. Sung, and W.H. Green. *Towards a comprehensive DME/propane blended combustion kinetic model.* Paper 2F16, 9th US National Technical Meeting of the Combustion Institute, Cincinnati, OH, May 2015.

[8] 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.* 8th International Conference on Chemical Kinetics, University Seville, Seville, Spain, Jul. 2013.

[7] **B.W. Weber** (Presenting), 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, 8th US National Technical Meeting of the Combustion Institute, Park City, UT, May 2013.
arxiv:1706.01828
figshare:10.6084/m9.figshare.5089564

[6] **B.W. Weber** (Presenting), 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.
arxiv:1706.01827
figshare:10.6084/m9.figshare.5089555

[5] S.M. Sarathy, S. Park, W. Wang, P. Veloo, A.C. Davis, C. Togbé, **B.W. Weber** (Presenting), 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. *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.

[4] **B.W. Weber** (Presenting) 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, Oct. 2011.
arxiv:1706.01842
figshare:10.6084/m9.figshare.5089540

[3] M.R. Harper, W.H. Green (Presenting), K.M. Van Geem, **B.W. Weber**, C.J. Sung, I. Stranic, D.F. Davidson, and 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, Cambridge, MA, Jul. 2011.

[2] **B.W. Weber** (Presenting) 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, Atlanta, GA, Mar. 2011.
arxiv:1706.01832
figshare:10.6084/m9.figshare.5089519

[1] **B.W. Weber** (Presenting), 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, Jan. 2011.
arxiv:1706.01837
figshare:10.6084/m9.figshare.5089537

Conference Posters

[4] R. Fang, N. Curtis, **B.W. Weber**, and C.J. Sung. *Fast sampling system for simultaneous speciation and ignition delay measurements in a rapid compression machine.* Poster P11, 10th US National Technical Meeting of the Combustion Institute, College Park, MD, Apr. 2017.

[3] **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, Cambridge, MA, Jul. 2011.
figshare:10.6084/m9.figshare.5089456

[2] **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, Sep. 2010.
figshare:10.6084/m9.figshare.5084803

[1] **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, Apr. 2009.
figshare:10.6084/m9.figshare.5084797

Other Presentations

[1] **B.W. Weber** and C.J. Sung. *An Investigation of Hydrocarbon Flames using Probe Sampling and Gas Chromatography/Mass Spectrometry.* Summer Undergraduate Research in Energy Sciences Program, Dominion Energy East Ohio Branch, Cleveland, OH, Aug. 2008.
figshare:10.6084/m9.figshare.5098933

Professional Service

Combustion Energy Frontier Research Center (CEFRC) 2012–2014
Lead Chair, Junior Associates Committee

- Coordinate monthly teleconferences for graduate students and post-doctoral researchers in the CEFRC where junior members of the CEFRC present recent research results to the group.
- Act as the liaison between the Center's principal investigators and the junior members.

U.S. Department of Energy 2013–2014
Member, EFRC Newsletter Editorial Board

- Contribute articles to the Energy Frontier Research Centers (EFRC) newsletter describing recent scientific advances resulting from EFRC research, including:
  - "Burning Butanol in a Better Engine"
  - "The Advantage of Renewable Fuels in High-Efficiency Engines"
  - "Confined Catalysts Last Longer"
- Edit articles written by other board members for factual and grammatical correctness.

Journal Referee

- Combustion and Flame
- Energy & Fuels
- Proceedings of the Combustion Institute
- Fuel
- Combustion Science & Technology
- Industrial & Engineering Chemistry Research
- Society of Automotive Engineers World Congress
- Measurement

Professional Memberships

American Chemical Society - Member
American Institute of Aeronautics and Astronautics - Member
American Society of Mechanical Engineers - Member
The Combustion Institute - Member