

Thomas H. Fletcher

**Professor and Chair, Chemical Engineering Department
Brigham Young University**

tom_fletcher@byu.edu

<http://www.et.byu.edu/~tom>

Education

- Ph. D. Chemical Engineering, Brigham Young University, 1983
- M. S. Chemical Engineering, Brigham Young University, 1980
- B. S. Chemical Engineering, Brigham Young University, 1979
(cum laude; minor: Mathematics)

Experience

- Chemical Engineering Department, **Brigham Young University**
 - Associate Professor, 1991-1997; Professor, 1997-present
 - Associate Chair, 2006-2016
 - Department Chair, 2016-present
 - Taught classes at BYU in Coal Combustion, Combustion Fundamentals, Combustion Modeling, Energy and the Environment, Chemical Reactor Design, Process Control, Unit Operations, Career Skills, and Material and Energy Balances.
- Advanced Combustion Engineering Research Center (**ACERC**) at BYU and the University of Utah
 - Associate Director, 1993-1997; Director as of Sept. 1, 1997
- Combustion Research Facility, **Sandia National Laboratories**, Livermore, California
 - Senior Member of Technical Staff, 1984-1991

Research Interests

- Solid fuel devolatilization and combustion science (coal, biomass, oil shale)
- Nitrogen evolution from organic materials
- Soot formation from aromatics
- Turbulence and combustion
- Laser and optical diagnostics in combustion systems
- Comprehensive combustion modeling
 - pulverized coal combustion/gasification
 - gas turbine combustion

Publications and Presentations

- 135 peer-reviewed publications
- Co-author on 1 book and 5 book chapters
- Advisor on 10 completed M.S. Theses and 22 completed Ph.D. Dissertations
- 259 presentations at national or international technical meetings

Major Coal-Related Models Developed

- Chemical Percolation Devolatilization (CPD) model for coal pyrolysis (1992)
- Pulverized Coal Gasification and Combustion in 2-dimensions (PCGC-2) (1983)

Professional Organizations and Service

- The Combustion Institute, ACS Division of Fuel Chemistry, ASME, AIChE
- Editorial Board of *Combustion and Flame* (2013-2018)
- Editorial Board of *Fire* (2017-present)
- Adjunct Faculty, Chemical Engineering Dept., University of Utah (2014-present)
- Co-Colloquia Chair, Solid Fuel Combustion, Int'l Symposium on Combustion (2016)
- Colloquia Chair, Solid Fuel Combustion, Int'l Symposium on Combustion (2018)

Awards/Recognition

- Elected Fellow of the Combustion Institute (2019)
- Izatt-Christensen Excellence in Research in BYU Chemical Engineering Dept. (2015)

- Excellence in Scholarship Award, College of Engineering, BYU (2014)
- Sponsored Research Award, BYU Office of Research (2012)
- J.J. Christensen Professorship in Chemical Engineering (2010-2015)
- Karl G. Maeser Excellence in Teaching Award, Brigham Young University, 2008
- Bill and Margaret Pope Professorship in Chemical Engineering (2002-2007)
- Outstanding Faculty Award in Chemical Engineering (1999, 2002, 2008)
- Best Paper Awards, Heat Transfer Committee, ASME Turbo Expo (2004; 2006(2), 2009)

Advisory Boards

- Air Liquide Delaware Research Center (2015-2018)
- Wormser Energy (2014-present)

Consulting

- ABB
- Air Liquide
- Air Products
- Airflow Sciences
- Babcock & Wilcox
- Con Edison
- DOE/NETL
- EPRI
- General Electric
- Geneva Steel
- Headwaters
- Pusan Clean Coal Centre
- Reaction Engineering International
- Sabic
- TRW
- Wormser Energy

External Research Funding

Funding Agency	Topic	Duration	Amount (in \$1000)	Collaborators
DOE/Sandia	Rates and Mechanisms of Coal Pyrolysis	1984-1991	\$ 2,100	
NSF/ACERC	Coal Devolatilization	8/91-4/99	\$ 264	
NSF/ACERC	3-D Coal Combustor Modeling	8/91-4/99	\$ 327	
NSF/ACERC	Soot in Coal Combustion	7/92-4/99	\$ 66	B. Webb
DOE/ATS	Advanced Turbine Combustor Modeling	9/93-8/97	\$ 134	L. D. Smoot, P. O Hedman, S. Brewster
DOE/UCR	Nitrogen in Coal Devolatilization	8/95-4/99	\$ 200	
NEDO (Japan)	Nitrogen in Coal Devolatilization	8/96-7/99	\$ 90	
Weber State University (U.S./Japan Initiative)	Nitrogen in Coal Devolatilization	8/96-8/98	\$ 20	
DOE/AFR	Char Combustion	8/97-7/98	\$ 75	W. C. Hecker, Advanced Fuel Research
DOE/UCR	Nitrogen Evolution and Soot Formation during Secondary Pyrolysis	8/97-7/00	\$ 180	D. Pershing, REI
ACERC	High Pressure Char Oxidation	9/99 -8/01	\$ 32	
Sandia	High Pressure Foam Decomposition	1/99-12/03	\$ 181	
DOE (sub to Brown University)	High Pressure Char Oxidation	10/00-8/04	\$ 182	
Adapco/Chevron-Texaco	Coal pyrolysis	5/04-12/04	\$ 5	
DOE (sub REC)	Modeling of a Solar-Powered CO2 Converter	1/02-12/05	\$ 75	
DOE OIT/Weyerhaeuser	Modeling Black Liquor and Biomass Devolatilization	1/-2-1/04	\$ 30	
USDA FS	Fundamental Combustion Characteristics of Live Fuels	9/01-9/06	\$ 230	
DOE LANL	Improved Combustion Physics for the LANL Wildland Fire Prediction Model (FIRETEC)	10/03-9/06	\$ 77	
Headwaters Energy Services	Nitrogen Evolution During Coal Pyrolysis	5/07-12/07	\$ 13	
DOE Sandia	High Pressure Foam Decomposition	6/03-8/08	\$ 190	
Siemens Power Generation	Nitrogen Evolution During Coal Pyrolysis	10/06-10-08	\$ 100	
DOE/UCR	A Mechanistic Investigation of Nitrogen Evolution and Corrosion with OxyCombustion	9/05-12/08	\$ 34	D. R. Tree
ORYXE	Mechanisms for Enhanced Coal Combustion Using an Additive	1/08-12/08	\$ 96	
DOE subUofU 10001740(Fletcher)	Char and Soot Gasification Kinetics	7/06-3/09	\$ 120	
DOE sub Clemson (Fletcher)	Deposition of Alternative (Syngas) Fuels on Turbine Blades with Film Cooling	8/05-5/09	\$ 296	J. Bons

GE Global Research	Gasification Kinetics at High Temperature and Pressure	5/08-9/10	\$	157	
NEDO	Formation of Soot and Aerosols from Hydrocarbon Fuels	12/96-5/99	\$	19	
Chevron/sub University of Utah	A Reaction Model for Oil Shale	12/07-12/10	\$	261	R. Pugmire
USDA FS 06-JV-11272166-060	Fundamental Combustion Characteristics of Live Wildland Fuels	8/06-7/11	\$	142	
DOE sub OSU DE-NT0005055	Designing Turbine Endwalls for Deposition Resistance	7/08-3/12	\$	154	J. Bons
DOE sub Energy Recovery Tech	High Efficiency Shale Oil Recovery	9/08-5/12	\$	30	
NSF CBET-0932842	A Fundamental Investigation of Fire Initiation and Fire Behavior in Sparse Vegetation	10/09-9/12	\$	301	
USDA sub GE Global Research	Development of Detailed and Simplified Kinetic Models of Biomass Gasification	10/09-11/13	\$	198	
GE Energy PO #900166823	Deposition of HFO Ash on Turbine Blades	1/11-12/13	\$	143	D. R. Tree
DOE sub UofU	Char and soot gasification kinetics and mechanisms	10/08-6/14	\$	345	
DOE sub UofU 10015374-BYU	Oil Shale Pyrolysis	4/11-9/14	\$	96	
USDA FS/JSFP	Determination of the Effects of Heating Mechanisms and Moisture Content on Ignition of Live Fuels	9/11-9/15	\$	186	
USDA FS/JSFP	Deriving fundamental statistical shrub fuel models by laser scanning and combustion experimentation	8/11-11/15	\$	224	
DOD AFRL/Conductive Composites	A Low-Cost CO Generator from CO ₂ and Carbon	12/14-5/16	\$	17	
ArcelorMittal	Kinetics of Coal Char Oxidation at Blast Furnace Injection Conditions	3/18-9/18	\$	8	
Chalmers University	Characterization of the Nitrogen Release during Char Oxidation of Coals and Biomass	10/18-4/19	\$	10	
DOE/sub UofU	Modeling of Coal Pyrolysis and Soot in High Performance Computing on Oxyfired Combustor	3/14-5/20	\$	577	D. O. Lignell
USDA FS	Exploration into the Effect of Terrain Slope on Fire Intensity	6/15-6/20	\$	90	
NSF 1603316	Merging of Horizontally and Vertically Separated Flames in Wildland Fires	8/16-7/20	\$	180	

USDA FS 16-JV-11272167-024	Fundamental Measurements and Modeling of Prescribed Fire Behavior in the Naturally Heterogeneous Fuel Beds of Southern Pine Forests	4/16-4/21	\$ 450	D. R. Weise
Total			\$ 8,706	
While at BYU			\$ 6,606	

Books and Book Chapters

1. Smith, L. K., L. D. Smoot, T. H. Fletcher, and R. J. Pugmire, "Chapter 3. Coal Characteristics, Structure, and Reaction Rates," in Fundamentals of Coal Combustion for Clean and Efficient Use, edited by L. D. Smoot, Elsevier, New York (1993).
2. Smith, L. K., L. D. Smoot, T. H. Fletcher, and R. J. Pugmire, The Structure and Reaction Processes of Coal, Plenum Press, New York (1994).
3. Liu, K., Z. Cui, and T. H. Fletcher, "Chapter 4. Coal Gasification," in H₂ and Syngas Production and Purification Technologies, edited by K. Liu, C. Song, and V. Subramani, AIChE and Wiley, Hoboken, New Jersey, pp. 156-218 (2010).
4. Fletcher, T. H., R. J. Pugmire, M. S. Solum, C. L. Mayne, A. M. Orendt, and J. C. Facelli, "Chapter 5: Chemical and Structural Characterization of Oil Shale from the Green River Formation," in Utah Oil Shale: Science, Technology, and Policy Perspectives, edited by J. Spinti, CRC Press, Boca Raton, FL, pp. 87-117 (2017). ISBN-13: 978-1-4987-2172-1
5. Fletcher, T. H., R. J. Pugmire, M. S. Solum, C. L. Mayne, "Chapter 6: Oil Shale Pyrolysis Rates and Mechanisms," in Utah Oil Shale: Science, Technology, and Policy Perspectives, edited by J. Spinti, CRC Press, Boca Raton, FL, pp. 119-156 (2017). ISBN-13: 978-1-4987-2172-1
6. Fletcher, T. H., "Chapter 6. Gasification Fundamentals," in Introduction to Gasification for IGCC Systems, edited by T. Wang and G. Stiegel, Woodhead Publishing, pp. 223–256 (2017). ISBN-13: 978-0-0810-0167-7

Peer-Reviewed Journal Articles (in reverse chronological order)

135. Fletcher, T. H., D. Haycock, S. Tollefsen, and D. O. Lignell, "Merging of Horizontally- and Vertically-separated Small-scale Buoyant Flames," *Fire*, **4**, 51 (2021).
134. Weise, D. R., T. H. Fletcher, M.-S. Safdari, E. Amini, and J. Palarea-Albaladejo, Determining the Effects of Plant Species, Moisture Content and Heating Mode on Pyrolyzates using Compositional Data Analysis," *International Journal of Wildland Fire* (2021). DOI: 10.1071/WF20126
133. Amini, E., Safdari, M.-S. Safdari, N. Johnson, D. R. Weise, and T. H. Fletcher, "Pyrolysis Kinetics of Wildland Vegetation Using Model-Fitting Methods," *Journal of Analytical and Applied Pyrolysis*, **157**, 105167: 1-12 (2021). DOI: 10.1016/j.jaap.2021.105167
132. Richards, A., D. Haycock, J. Frandsen, and T. H. Fletcher, "A Review of Coal Heating Value Correlations with Application to Coal Char, Tar, and Other Fuels," *Fuel*, 118942:1-16 (2021). DOI: 10.1016/j.fuel.2020.118942
131. Rahmati, M., M.-S. Safdari, T. H. Fletcher, M. D. Argyle, C. Bartholomew, "Chemical Sintering of Cobalt Catalysts during Fischer-Tropsch Synthesis," *Chemical Reviews*, **120**, 4455-4533. (2020). DOI: 10.1021/acs.chemrev.9b00417
130. Edland, R., N. Smith, T. Allgurén, C. Fredriksson, F. Normann, D. Haycock, C. Johnson, T. H. Fletcher, and K. Andersson, "Evaluation of NO_x-reduction Measures for Iron Ore Rotary Kilns," **34**, 4934–4948, *Energy and Fuels* (2020). DOI: 10.1021/acs.energyfuels.9b04091

129. Safdari, M.-S., E. Amini, D. R. Weise, and T. H. Fletcher, "Comparison of Pyrolysis of Live Wildland Fuels Heated by Radiation vs. Convection," *Fuel*, **268**, 117342:1-12 (2020). DOI: 10.1016/j.fuel.2020.117342
128. Yang, H. T. H. Fletcher, Y. Li, L. Jin, S. Li, Y. Shang, and H. Hu, "Modeling the Influence of Changes in Aliphatic Structure on Char Surface Area during Coal Pyrolysis," *AIChE Journal*, **66**, e16834 (2020). DOI: 10.1002/aic.16834
127. Fletcher, T. H., "A review of 30 years of research using the CPD model," invited paper, *Energy and Fuels*, **33**, 12123-12153 (2019). DOI: 10.1021/acs.energyfuels.9b02826
126. Holland, T., T. H. Fletcher, and O. Seneca, "Review of Carbonaceous Annealing Effects on O₂ and CO₂ Coal Reactivity," *Energy and Fuels*, **33**, 10415–10434 (2019). DOI: 10.1021/acs.energyfuels.9b02698
125. Richards, A. P., C. Johnson, and T. H. Fletcher, "Correlations of the Elemental Compositions of Primary Coal Tar and Char," *Energy and Fuels*, **33**:10, 9520-9537 (2019). DOI: 10.1021/acs.energyfuels.9b01627
124. Amini, E., M-S. Safdari, D. R. Weise, and T. H. Fletcher, "Pyrolysis Kinetics of Live and Dead Wildland Vegetation from the Southern United States," *Journal of Analytical and Applied Pyrolysis*, **149**, 104613:1-14 (2019). DOI: 10.1016/j.jaap.2019.05.002
123. Wang, D., T. H. Fletcher, S. Mohanty, H. Hu, and E. G. Eddings, "Modified CPD Model for Coal Devolatilization at UCTT Conditions," *Energy & Fuels*, **33**, 2981-2993 (2019).
122. Safdari, M-S., E. Amini, D. R. Weise, and T. H. Fletcher, "Heating Rate and Temperature Effects on Pyrolysis Products from Live Wildland Fuels," *Fuel*, **242**, 295-304 (2019). DOI: 10.1016/j.fuel.2019.01.040
121. Amini, E., M-S. Safdari, J. T. Young, D. R. Weise, and T. H. Fletcher, "Characterization of pyrolysis products from slow pyrolysis of live and dead vegetation native to the southern United States," *Fuel*, **235**, 1475-1491 (2019). DOI: 10.1016/j.fuel.2018.08.112
120. Safdari, M-S., M. Rahmati, E. Amini, J. E. Howarth, J. P. Berryhill, M. Diertenberger, D. R. Weise, and T. H. Fletcher, "Characterization of Pyrolysis Products from Fast Pyrolysis of Live and Dead Vegetation," *Fuel*, **229**, 151-166 (2018). DOI: 10.1016/j.fuel.2018.04.166
119. Rahmati, M., B. Huang, L. M. Schofield, T. H. Fletcher, B. F. Woodfield, W. C. Hecker, C. H. Bartholomew, and M. D. Argyle, "Effects of Ag Promotion and Preparation Method on Fischer-Tropsch Activity and Selectivity Properties of Cobalt Supported Catalysts on Silica-doped Alumina," *Journal of Catalysis*, **362**, 118-128 (2018). DOI: 10.1016/j.jcat.2018.03.027
118. Laycock, R. G. and T. H. Fletcher, "Formation of Deposits from Heavy Fuel Oil Ash in an Accelerated Deposition Facility at Temperatures up to 1219°C," *Fuel Processing Technology*, **175**, 35-43 (2018). DOI: 10.1016/j.fuproc.2018.03.003
117. Weise, D. R., T. H. Fletcher, W. Cole, S. Mahalingam, X. Zhou, L. Sun, and J. Li, "Fire Behavior in Chaparral – Evaluating Flame Models with Laboratory Data," *Combustion and Flame*, **191**, 500-512 (2018). DOI: 10.1016/j.combustflame.2018.02.012
116. Laycock, R. G. and T. H. Fletcher, "Erratum to "Erratum: 'Time-Dependent Deposition Characteristics of Fine Coal Fly Ash in a Laboratory Gas Turbine Environment' [ASME J. Turbomach., 2012, 135(2), p. 021003; DOI:10.1115/1.4006639]" ASME. J. Turbomach. 2017; 139(12):127001-127001-2. doi:10.1115/1.4037911," *ASME J. Turbomachinery*, **140**(4), 047001-047001-1 (2018). DOI: 10.1115/1.4039142

115. Gallacher, J. R., B. Ripa, B. Butler, and T. H. Fletcher, "Lab-Scale Observations of Flame Attachment on Slopes with Implications for Firefighter Safety Zones," *Fire Safety Journal*, **96**, 93-104 (2018). DOI: 10.1016/j.firesaf.2018.01.002
114. Rahmati, M., B. Hong, M. K. Mortenson, K. Keyvanloo, W. C. Hecekr, T. H. Fletcher, and M. D. Argyle, "Effect of Different Alumina Supports on Performance of Cobalt Fischer-Tropsch Catalysts," *Journal of Catalysis*, **359**, 92-100 (2018). DOI: 10.1016/j.jcat.2017.12.022
113. Laycock, R. and T. H. Fletcher, "Errata to 'Time-Dependent Deposition Characteristics of Fine Coal Flyash in a Laboratory Gas Turbine Environment' (*J. Turbomach.* 2012;135(2):021003-021003-8. doi:10.1115/1.4006639)," *Journal of Turbomachinery*, **139**(12):127001-127001-2 (2017). DOI: 10.1115/1.4037911
112. Holland, T., S. Bhat, P. Marcy, J. Gattiker, J. D. Kress, and T. H. Fletcher, "Modeling Effects of Annealing on Coal Char Reactivity to O₂ and CO₂ Based on Preparation Conditions," *Energy and Fuels*, **31**, 10727-10744 (2017). DOI: 10.1021/acs.energyfuels.7b01888
111. Josephson, A. J., N. D. Gaffin, S. T. Smith, T. H. Fletcher, D. O. Lignell, "Modeling Soot Oxidation and Gasification with Bayesian Statistics," *Energy & Fuels*, **31**, 11291-11303 (2017). DOI: 10.1021/acs.energyfuels.7b00899
110. Safdari, M-S., M. Rahmati, F. Fazlollahi, T. H. Fletcher, and W. V. Wilding, "Development of Bioreactors for Comparative Study of Natural Attenuation, Biostimulation, and Bioaugmentation of Petroleum-hydrocarbon Contaminated Soil," *Journal of Hazardous Materials*, **342**, 270-278 (2018). DOI: 10.1016/j.jhazmat.2017.08.044
109. Yang, H., T. H. Fletcher, S. Li, H. Hu, and Y. Li, "Model for the Evolution of Pore Structure in a Lignite Particle during Pyrolysis : 2. Influence of Cross-linking Reactions, Molten Metaplast and Molten Ash on Particle Surface Area," *Energy and Fuels*, **31**, 8036-8044 (2017). DOI: 10.1021/acs.energyfuels.7b01163
108. Holland, T. and T. H. Fletcher, "A Comprehensive Model of Single Particle Pulverized Coal Combustion Extended to Oxy-coal Conditions," *Energy and Fuels*, **31**, 2722-2739 (2017). DOI: 10.1021/acs.energyfuels.6b03387
107. Prince, D. R., C. Shen, and T. H. Fletcher, "Semi-empirical Model for Fire Spread in Shrubs with Spatially-defined Fuel Elements and Flames," *Fire Technology*, **53**, 1439-1469 (2017). DOI: 10.1007/s10694-016-0644-9
106. Mohammad-S. Safdari, H.-R. Kariminia, Z. G. Nejad, and T. H. Fletcher, "Study Potential of Indigenous *Pseudomonas Aeruginosa* and *Bacillus Subtilis* in Bioremediation of Diesel-contaminated Water," *Water, Air, & Soil Pollution*, **228**:37, 1-7 (2017). DOI: 10.1007/s11270-016-3220-5
105. Holland, T. and T. H. Fletcher, "Global Sensitivity Analysis for a Comprehensive Char Conversion Model in Oxy-fuel Conditions," *Energy and Fuels*, **30**, 9339-9350 (2016). DOI: 10.1021/acs.energyfuels.6b02190
104. Richards, A. P. and T. H. Fletcher, "A Comparison of Simple Global Kinetic Models for Coal Devolatilization with the CPD Model," *Fuel*, **185**, 171-180 (2016). DOI: 10.1016/j.fuel.2016.07.095
103. Josephson, A. J., D. O. Lignell, A. L. Brown, and T. H. Fletcher, "Revision to Modeling Soot Derived from Pulverized Coal," *Energy & Fuels*, **30**, 5198-5199 (2016). DOI: 10.1021/acs.energyfuels.6b01007.

102. Laycock, R. and T. H. Fletcher, "Independent Effects of Surface and Gas Temperature on Coal Flyash Deposition in Gas Turbines at Temperatures up to 1400°C," *ASME Journal for Gas Turbines and Power*, **138**, 021402-1 thru 8 (February, 2016). DOI: 10.1115/1.4031318
101. Li, S., H. Yang, T. H. Fletcher, and M. Dong, "Model for the Evolution of Pore Structure in a Lignite Particle during Pyrolysis," *Energy & Fuels*, **29**, 5322-5333 (2015). DOI: 10.1021/acs.energyfuels.5b00726
100. Fletcher, T. H., D. Barfuss, and R. J. Pugmire, "Modeling Light Gas and Tar Yields from Pyrolysis of Green River Oil Shale Demineralized Kerogen Using the CPD Model," *Energy & Fuels*, **29**, 4921-4926 (2015). DOI: 10.1021/acs.energyfuels.5b01146
99. Yang, H. Li, S., T. H. Fletcher, M. Dong, "Simulation of the Swelling of High Volatile Bituminous Coal during Pyrolysis: 2. Influence of the Maximum Particle Temperature", *Energy & Fuels*, **29**, 3953–3962 (2015). DOI: 10.1021/acs.energyfuels.5b00609
98. Lewis, A. D., T. M. Holland, N. R. Marchant, E. G. Fletcher, D. J. Henley, E. G. Fuller, and T. H. Fletcher, "Steam Gasification Rates of Three Bituminous Coal Chars in an Entrained-Flow Reactor at Pressurized Conditions," *Energy and Fuels*, **29**, 1479–1493 (2015). DOI: 10.1021/ef502608y
97. Shen, C. and T. H. Fletcher, "Fuel Element Combustion Properties for Live Wildland Utah Shrubs," *Combustion Science and Technology*, **187**, 428–444 (2015). DOI: dx.doi.org/10.1080/00102202.2014.950372
96. Yang, H., S. Li, T. H. Fletcher, M. Dong, "Simulation of the Plastic Swelling of High Volatile Bituminous Coal during Pyrolysis," *Energy and Fuels*, **28**, 7216–7226 (2014). DOI: 10.1021/ef5016846
95. Lewis, A. D., E. G. Fletcher, and T. H. Fletcher, "CO₂ Char Gasification Rates of Sawdust, Switchgrass, and Corn Stover in a Pressurized Entrained-Flow Reactor," *Energy and Fuels*, **28**, 5812-5825 (September, 2014). DOI: 10.1021/ef500903c
94. Prince, D. R. and T. H. Fletcher, "Differences in Burning Behavior of Live and Dead Leaves, Part 1: Measurements," *Combustion Science and Technology*, **186**, 1844–1857 (2014). DOI: 10.1080/00102202.2014.923412
93. Lewis, A. D., E. G. Fletcher, and T. H. Fletcher, "CO₂ Gasification Rates of Petroleum Coke in a Pressurized Flat-Flame Burner Entrained-Flow Reactor," *Energy and Fuels*, **28**, 4447-4457 (2014). DOI: 10.1021/ef500690j
92. Yang, H., S. Li, T. H. Fletcher, M. Dong, and W. Zhou, "Simulation of the Evolution of Pressure in a Lignite Particle during Pyrolysis," *Energy & Fuels*, **28**, 3511-3518 (2014). DOI: 10.1021/ef500584q
91. Fletcher, T. H., R. Gillis, J. Adams, T. Hall, C. L. Mayne, M. S. Solum, and R. J. Pugmire, "Characterization of Macromolecular Structure Elements from a Green River Oil Shale, II. Characterization of Pyrolysis Products by ¹³C NMR, GC/MS, and FTIR," *Energy & Fuels*, **28**, 2959–2970 (2014). DOI: 10.1021/ef500095j
90. Prince, D. R., M. E. Fletcher, C. Shen, and T. H. Fletcher, "Application of L-Systems to Geometrical Construction of Chamise and Juniper Shrubs," *Ecological Modelling*, **273**, 86-95 (2014). DOI: 10.1016/j.ecolmodel.2013.11.001
89. Solum, M. S., C. L. Mayne, A. M. Orendt, R. J. Pugmire, J. Adams, T. H. Fletcher, "Characterization of Macromolecular Structure Elements from a Green River Oil Shale, I. Extracts," *Energy and Fuels*, **28**, 453-465 (2014). DOI: 10.1021/ef401918u
88. Hillier, J. L., T. H. Fletcher, M. S. Solum, and R. J. Pugmire, "Characterization of Macromolecular Structure of Pyrolysis Products from a Colorado Green River Oil Shale,"

- Industrial and Engineering Chemistry Research*, **52**, (44), 15522-15532 (2013). DOI: 10.1021/ie402070s
87. Shurtz, R. C. and T. H. Fletcher, "Coal Char-CO₂ Gasification Measurements and Modeling in a Pressurized Flat-Flame Burner," *Energy & Fuels*, **27**, 3022-3038 (2013). DOI: 10.1021/ef400253c
 86. Laycock, R. G. and T. H. Fletcher, "Time-dependent Deposition Characteristics of Fine Coal Flyash in a Laboratory Gas Turbine Environment," *ASME Journal of Turbomachinery*, **135**, 21003-1 thru 8 (2013).
 85. Lewis, A. D. and T. H. Fletcher, "Prediction of Sawdust Pyrolysis Yields from a Flat-Flame Burner Using the CPD Model," *Energy & Fuels*, **27**, 942-953 (2013). DOI: 10.1021/ef3018783
 84. Ai, W., N. Murray, T. H. Fletcher, S. Harding, J. P. Bons, "Effect of Hole Spacing on Deposition of Fine Coal Flyash Near Film Cooling Holes," *Journal of Turbomachinery*, **134**:4, 041021-1 thru 9 (July, 2012).
 83. Ai, W. and T. H. Fletcher, "Computational Analysis of Conjugate Heat Transfer and Particulate Deposition on a High Pressure Turbine Vane," *Journal of Turbomachinery*, **134**:4, 041020-1 thru 12 (July, 2012).
 82. Ai, W., N. Murray, T. H. Fletcher, S. Harding, S. Lewis, and J. Bons, "Deposition Near Film Cooling Holes on a High Pressure Turbine Vane," *Journal of Turbomachinery*, **134**:4, 041013-1 thru 11 (July, 2012).
 81. Fletcher, T. H., H. R. Pond, J. Webster, and L. L. Baxter, "Prediction of Tar and Light Gas during Pyrolysis of Black Liquor and Biomass," *Energy & Fuels*, **26**, 3381-3387 (2012). doi 10.1021/ef300574n
 80. Shurtz, R. C., J. W. Hogge, K. C. Fowers, G. S. Sorensen, and T. H. Fletcher, "A Coal Swelling Model for Pressurized High Particle Heating Rate Pyrolysis Applications," *Energy & Fuels*, **26**, 3612-3627 (2012). DOI: 10.1021/ef300442r
 79. Sowa, J. M. and T. H. Fletcher, "Investigation of an Iron-Based Additive on Coal Pyrolysis and Char Oxidation at High Heating Rates," *Fuel Processing Technology*, **92**, 2211-2218 (2011).
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6. Pugmire, R. J., T. H. Fletcher, and D. B. Genetti, "Predicting ^{13}C NMR Measurements Based on Coal Elemental Composition," poster presented at the 9th Annual ACERC Conference, Provo, Utah (April 5-6, 1995).
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25. Fletcher, T. H. and D. Genetti, "Advancements in Modeling Coal Pyrolysis Based on Chemical Structure," oral presentation at the 13th Annual ACERC Conference, Provo, Utah (February 25-26, 1999).
26. Hong, J. and T. H. Fletcher, "Analytical Expressions for Predicting the Effectiveness Factor for the mth Order and Langmuir Rate Equations in Spherical Coordinates," poster presented at the 13th Annual ACERC Conference, Provo, Utah (February 25-26, 1999).
27. Genetti, D. and T. H. Fletcher, "An Advanced Model for Coal Nitrogen Pyrolysis Based on Chemical Structure," poster presented at the 13th Annual ACERC Conference, Provo, Utah (February 25-26, 1999).
28. Perry, S. T., and T. H. Fletcher, "A Global Mechanisms for Nitrogen Release during Primary Coal Devolatilization," poster presented at the 13th Annual ACERC Conference, Provo, Utah (February 25-26, 1999).
29. Zhang, H. and T. H. Fletcher, "Nitrogen Transformations during Secondary Coal Pyrolysis," poster presented at the 13th Annual ACERC Conference, Provo, Utah (February 25-26, 1999).
30. Fletcher, T. H., S. T. Perry, R. J. Pugmire, and M. S. Solum, "A Global Free-Radical Mechanism for Nitrogen Release during Coal Devolatilization Based on Chemical Structure," oral presentation at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
31. Hedman, P. O. and T. H. Fletcher, "Observations of Flame Behavior in a Laboratory-Scale Premixed Natural Gas/Air Gas Turbine Combustor: Planar Laser Induced Fluorescence (PLIF) of OH," oral presentation at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
32. Pugmire, R. J., M. S. Solum, H. Zhang, and T. H. Fletcher, "Soot Characterization by Solid-State NMR," oral presentation at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
33. Fletcher, T. H. and D. Clayton, "Decomposition of Low-Density Polyurethane Foam at High Pressure," poster presented at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
34. Hong, J., W. C. Hecker, and T. H. Fletcher, "Modeling Char Oxidation at Atmospheric and Elevated Pressures using an Intrinsic Langmuir Rate Equation and an Effectiveness Factor," poster presented at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
35. Parker, J. T., T. H. Fletcher, R. E. Winans, and S. Seifert, "Small Angle X-Ray Scattering Study of Coal Soot Formation," poster presented at the 14th Annual ACERC Conference, Salt Lake City, Utah (February 17-18, 2000).
36. Fletcher, T. H., D. Zeng, M. Clark, B. Crenshaw, and W. C. Hecker, "High Pressure Coal Combustion," presented at the 16th Annual ACERC Conference, Provo, Utah (March 14-15, 2002).
37. Clayton, D. and T. H. Fletcher, "High Pressure Thermal Decomposition of Two Rigid Closed-Cell Foams," poster presented at the 16th Annual ACERC Conference, Provo, Utah (March 14-15, 2002).

38. Fletcher, T. H., D. Zeng, M. Clark, B. Crenshaw, and W. C. Hecker, "High Pressure Char Combustion," poster presented at the 16th Annual ACERC Conference, Provo, Utah (March 14-15, 2002).
39. Lahn, S., H. R. Pond, T. H. Fletcher, and L. L. Baxter, "CPD Modeling for Black Liquor Devolatilization," poster presented at the 16th Annual ACERC Conference, Provo, Utah (March 14-15, 2002).
40. Fletcher, T. H., L. L. Baxter, J. Engstrom, and J. Butler, "Fundamental Combustion Rates of Live Fuels," presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
41. Pond, H. R., T. H. Fletcher, and L. L. Baxter, "Prediction of Tar and Light Gas During Pyrolysis of Black Liquor and Biomass," presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
42. Zeng, D., M. Clark, and T. H. Fletcher, "High Pressure Coal Pyrolysis," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
43. Lu, H., J. Scott, L. L. Baxter, and T. H. Fletcher, "Effects of Particle Shape and Size on Particle Reactivity," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
44. Ip, E., H. Lu, J. Scott, L. L. Baxter, T. H. Fletcher, and K. Whitty, "Surface Temperature Distribution Measurement Using Imaging Cameras," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
45. Webster, J., L. L. Baxter, and T. H. Fletcher, "Black Liquor Pyrolysis," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
46. Damstedt, B., D. Dunaway, S. Lokare, R. Marsh, D. Rogers, C. Wu, L. L. Baxter, T. H. Fletcher, and D. R. Tree, "The Study of SO_x Reduction by K₂CO₃ in Petroleum Coke Combustion," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
47. Damstedt, B., R. March, C. Wu, L. L. Baxter, T. H. Fletcher, and D. R. Tree, "Fuel-Nitrogen Functional Groups and Their Evolution in Low-Grade Fuel Combustion," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
48. Hardy, S., D. Morse, R. Price, T. H. Fletcher, and S. C. Hill, "Modeling the Direct Solar Conversion of CO₂ to CO," poster presented at the 17th Annual ACERC Conference, Salt Lake City, Utah (February 20-21, 2003).
49. Zeng, D., T. Gunderson, W. C. Hecker, and T. H. Fletcher, "Swelling Properties and Intrinsic Reactivities of Coal Chars Produced at Elevated Pressures and High Heating Rates," oral presentation and poster presented at the 18th Annual ACERC Conference, Provo, Utah (February 12-13, 2004).
50. Lu, H., J. Scott, M. Vickers, B. Ripa, R. Farr, T. H. Fletcher, and L. L. Baxter, "Effects of Particle Shape and Size on Biomass Reactivity," oral presentation and poster presented at the 18th Annual ACERC Conference, Provo, Utah (February 12-13, 2004).
51. Price, R. J., T. H. Fletcher, R. J. Jensen, "The Solar Conversion of CO₂ to CO and O₂," poster presented at the 18th Annual ACERC Conference, Provo, Utah (February 12-13, 2004).
52. Smith, S. G., T. H. Fletcher, L. L. Baxter, and D. R. Weise, "Ignition Behavior of Live California Chaparral Leaves," poster presented at the 18th Annual ACERC Conference, Provo, Utah (February 12-13, 2004).
53. Clark, M., T. H. Fletcher, and R. R. Linn, "Improvements to a Wildland Fire Model," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).

54. Smith, S. G., G. S. Spittle, B. M. Pickett, M. M. Woodhouse, T. H. Fletcher, and D. R. Weise, "Effect of Moisture on Combustion of Live Leaves," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
55. Zeng, D., B. Christensen, W. C. Hecker, and T. H. Fletcher, "The Effect of Pressure on Coal Pyrolysis, Char Intrinsic Reactivity, and Morphology," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
56. Zeng, D., W. C. Hecker, and T. H. Fletcher, "The Effect of Pressure on Char Combustion Kinetics," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
57. King, N., W. V. Wilding, and T. H. Fletcher, "Modeling Vapor/Liquid Equilibrium of Polymer/Solvent Solutions During Thermal Decomposition of Removable Epoxy Foam," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
58. Price, R. and T. H. Fletcher, "Improvements to the Coal Submodels in Star-CD," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
59. Wooters, T. J., T. H. Fletcher, and L. L. Baxter, "CPD Modeling of Black Liquor Pyrolysis," poster presented at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
60. Fletcher, T. H. and D. Zeng, "The Effect of Pressure on Coal Pyrolysis and Char Morphology," oral presentation at the 19th Annual ACERC Conference, Provo, Utah (February 17-18, 2005).
61. Zeng, D., and T. H. Fletcher, "High Pressure High Temperature O₂-Char Reactivity Experiments," oral presentation at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
62. King, N., W. V. Wilding, and T. H. Fletcher, "Modeling Vapor/Liquid Equilibrium of Polymer/Solvent Solutions During Thermal Decomposition of Removable Epoxy Foam," poster presented at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
63. Pickett, B., M. Woodhouse, L. Haake, D. Weise, and T. H. Fletcher, "Effect of Moisture on Combustion of Live Leaves," poster presented at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
64. Clark, M., T. H. Fletcher, and R. R. Linn, "A Subgrid Gas-Phase Combustion Model for *FIRETEC*," poster presented at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
65. Price, R., R. Jensen, and T. H. Fletcher, "Modeling the Direct Solar Conversion of CO₂ to CO and O₂," poster presented at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
66. Fletcher, D., S. Grange, J. Crosby, J. Wammack, J. Bons, and T. H. Fletcher, "Evolution of Surface Deposits on a High Pressure Turbine Blade," poster presented at the 20th Annual ACERC Conference, Provo, Utah (February 16-17, 2006).
67. Crosby, J., W. Ai, S. Lewis, A. Mason, R. Laycock, T. H. Fletcher, and J. Bons, "Effects of Particle Size, Gas Temperature, and metal Temperature on High Pressure Turbine Deposition in Land Based Gas Turbines from Various Synfuels," oral presentation at the 21st Annual ACERC Conference, Provo, Utah (February 27-28, 2007).
68. Price, R. and T. H. Fletcher, "Implementation of PCGC-3 Coal Combustion Submodels into STAR-CD," oral presentation at the 21st Annual ACERC Conference, Provo, Utah (February 27-28, 2007).
69. King, N., T. H. Fletcher, W. V. Wilding, and K. L. Erickson, "Vapor/Liquid Equilibrium of Polymer Solutions during Thermal Decomposition of Removable Epoxy Foam," poster presented at the 21st Annual ACERC Conference, Provo, Utah (February 27-28, 2007).

70. Pickett, B. M., S. Christensen, J. Fletcher, C. Isackson, T. Do, T. H. Fletcher, and D. Weise, "Combustion Behavior of Fresh Wildland Forest Fuels," poster presented at the 21st Annual ACERC Conference, Provo, Utah (February 27-28, 2007).
71. Price, R. and T. H. Fletcher, "Premixed Turbulent Combustion Measurements," poster presented at the 21st Annual ACERC Conference, Provo, Utah (February 27-28, 2007).
72. Ai, W. and T. H. Fletcher, "Deposition of Particulate from Coal-Derived Syngas on Turbine Blades with Film Cooling," oral presentation and poster at the 22nd Annual ACERC Conference, Provo, Utah (February 26-27, 2008).
73. Hillier, J. and T. H. Fletcher, "Kinetics of Kerogen Extracted from Green River Oil Shale Measured at Different Pressures," oral presentation and poster at the 22nd Annual ACERC Conference, Provo, Utah (February 26-27, 2008).
74. Shurtz, R., D. Johnson, T. H. Fletcher, M. S. Solum, and R. J. Pugmire, "Soot Formation from Coal Tar Surrogates under Gasification Conditions," oral presentation and poster at the 22nd Annual ACERC Conference, Provo, Utah (February 26-27, 2008).
75. Sowa, J., K. Kolste, and T. H. Fletcher, "Investigation of Nitrogen Release during Pyrolysis in an Oxycombustion Process," oral presentation and poster at the 22nd Annual ACERC Conference, Provo, Utah (February 26-27, 2008).
76. Pickett, B. M., C. Isackson, R. Miller, T. H. Fletcher, B. W. Butler, and D. R. Weise, "Burning Characteristics of Multiple Moist Forest Fuel Samples," poster presented at the 22nd Annual ACERC Conference, Provo, Utah (February 26-27, 2008).
77. Ai, W., S. Harding, R. Laycock, N. Murray, D. Rappleye, T. H. Fletcher, and J. P. Bons, "Computational Analysis of Conjugate Heat Transfer and Particulate Deposition Prediction," oral presentation and poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
78. Cole, W. J., B. M. Pickett, and T. H. Fletcher, "A Semi-empirical Multi-leaf Model for Fire Spread through a Manzanita Bush," oral presentation and poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
79. Sowa, J., K. Kolste, and T. H. Fletcher, "Investigation of Nitrogen Release during Coal Pyrolysis in an Oxyfuel Combustion Process," oral presentation and poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
80. Hillier, J. and T. H. Fletcher, "An Improved Method for Determination of Kinetic Parameters from Constant Heating Rate TGA Oil Shale Pyrolysis Data," oral presentation and poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
81. Shurtz, R., D. Johnson, D. Prince, J. Van Wagoner, G. Sorenson, and T. H. Fletcher, "A Pressurized Flat-Flame Burner for Gasification Studies," poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
82. Kim, R., K. Kolste, C. Jeon, J. Song, and T. H. Fletcher, "Nitrogen Release during Devolatilization in Coals Utilized in Korea," poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
83. Adams, C., T. H. Fletcher, K. Fowers, D. Hinckley, B. Alexander, C. Moss, "The CHES Process: High Efficiency Shale Oil Recovery," poster at the 23rd Annual ACERC Conference, Provo, Utah (February 23-24, 2009).
84. Shurtz, R. and T. H. Fletcher, "Pressurized Coal Pyrolysis and CO₂ Gasification at High Initial Heating Rates," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).

86. Lewis, A. and T. H. Fletcher, "Predicting Sawdust Pyrolysis Yields Using the CPD Code with a Tar Cracking Model," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
87. Pugmire, R. J., M. S. Solum, R. Shurtz, and T. H. Fletcher, "Structure Transformations of Coal to Char and Tar/Soot Formation during Gasification," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
88. Dennis, M., W. Cole, and T. H. Fletcher, "Effects of Wind on Flame Characteristics of Leaves and Needles," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
89. Cole, W., M. Dennis, and T. H. Fletcher, "Observations of Burning Bush Behavior as a Function of Wind and Moisture Content," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
90. Andersen, B., W. Cole, M. Dennis, and T. H. Fletcher, "Modeling a Burning Bush with and without Wind using a Semi-Empirical Model," oral presentation and poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
91. Laycock, R., D. Rappleye, J. Gallacher, W. Ai, T. H. Fletcher, and J. P. Bons, "Deposition of Particulate from Coal-derived Syngas on Turbine Blades with Film Cooling," poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).
92. Hillier, J., T. Bezzant, and T. H. Fletcher, "Structural Information of an Organic Sample from Pyrolysis Products," poster at the 24th Annual ACERC Conference, Provo, Utah (February 25-26, 2010).

Student M.S. Theses

1. Flores, D. V., "The Use of Two Mixture Fractions to Treat Coal Combustion Products in Turbulent Pulverized-Coal Flames," M.S. Thesis, Chemical Engineering Department, Brigham Young University (April, 1996).
2. Watt, M., "The Chemical Structure of Coal Tar and Char During Devolatilization," M.S. Thesis, Chemical Engineering Department, Brigham Young University (August, 1996).
3. Mallampalli, H., "Evaluation of CH₄/NO Global Mechanisms Used for Modeling Lean Premixed Turbulent Combustion of Natural Gas," M.S. Thesis, Chemical Engineering Department, Brigham Young University (August, 1996).
4. Brown, Alexander L., "Modeling Soot in Pulverized Coal Flames," M.S. Thesis, Mechanical Engineering Department, Brigham Young University (August, 1997).
5. Hambly, Eric M., "The Chemical Structure of Coal Char and Tar during Devolatilization," M.S. Thesis, Chemical Engineering Department, Brigham Young University (April, 1998).
6. Genetti, D. B., "An Advanced Model of Coal Devolatilization Based on Chemical Structure," M.S. Thesis, Chemical Engineering Department, Brigham Young University (April, 1999).
7. Smith, S. G., "Effects of Moisture on Combustion Characteristics of Live California Chaparral and Utah Foliage," M.S. Thesis, Chemical Engineering Department, Brigham Young University (August, 2005).
8. Sowa, J. M., "Studies of Coal Nitrogen Release Chemistry for Oxyfuel Combustion and Chemical Additives," M.S. Thesis, Chemical Engineering Department, Brigham Young University (December, 2009).

9. Lewis, A. D., "Sawdust Pyrolysis and Petroleum Coke CO₂ Gasification at High Heating Rates," M.S. Thesis, Chemical Engineering Department, Brigham Young University (April, 2011).
10. Shen, C., "Application of Fuel Element Combustion Properties to a Semi-Empirical Flame Propagation Model for Live Wildland Utah Shrubs," M.S. Thesis, Chemical Engineering Department, Brigham Young University (April, 2013).

Student Ph.D. Dissertations

1. Ma, J., "Soot Formation During Coal Pyrolysis," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (August, 1996).
2. Perry, S. T., "A Global Free-Radical Mechanism for Nitrogen Release during Coal Devolatilization Based on Chemical Structure," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 1999).
3. Hong, J., "Modeling Char Oxidation as a Function of Pressure Using an Intrinsic Langmuir Rate Equation," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (April, 2000).
4. Zhang, H., "Nitrogen Evolution and Soot Formation during Secondary Pyrolysis," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (April, 2001).
5. Clayton, D. J., "Modeling Flow Effects during Polymer Decomposition Using Percolation Lattice Statistics," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 2002).
6. Flores, D. V., "Analysis of Lean Premixed Turbulent Combustion Using Coherent Anti-Stokes Raman Spectroscopy Temperature Measurements," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (April, 2003).
7. Zeng, D., "Effects of Pressure on Coal Pyrolysis at High Heating Rates and Char Combustion," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 2005).
8. Price, R., J., "Modeling Three Reacting Flow Systems with Modern Computational Fluid Dynamics," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University, (August, 2007).
9. Clark, M. M., "Development and Evaluation of a Sub-Grid Combustion Model for a Landscape Scale 3-D Wildland Fire Simulator," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (August, 2008).
10. King, N. H., "Vapor-Liquid Equilibrium of Polymer Solutions during Thermal Decomposition of Rigid Foams," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (August, 2008).
11. Pickett, B. M., "Effects of Moisture on Combustion of Live Wildland Forest Fuels," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University, (August, 2008).
12. Ai, W., "Deposition of Particulate from Coal-derived Syngas on Gas Turbine Blades Near Film Cooling Holes," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 2009).
13. Hillier, J. L., "Pyrolysis Kinetics and Chemical Structure Considerations of a Green River Oil Shale and its Derivatives," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (April, 2011).

14. Shurtz, R. C., "Effects of Pressure on the Properties of Coal Char under Gasification Conditions at High Heating Rates," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 2011).
15. Prince, D. R., "Measurement and Modeling of Fire Behavior in Leaves and Sparse Shrubs," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (July, 2014).
16. Lewis, A. D., "Gasification of Biomass, Coal, and Petroleum Coke at High Heating Rates and Elevated Pressure," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (November, 2014).
17. Gallacher, J. R., "The Influence of Season, Heating Mode and Slope Angle on Wildland Fire Behavior," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (February, 2016).
18. Laycock, R. G., "Particle Deposition Behavior from Coal-Derived Syngas in Gas Turbines at Modern Turbine Inlet Temperatures," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (July, 2017).
19. Holland, T. M., "A Comprehensive Coal Conversion Model Extended to Oxy-coal Conditions," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (July, 2017).
20. Safdari, Mohammad Saeed, "Characterization of Pyrolysis Products from Fast Pyrolysis of Live and Dead Vegetation," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (December, 2018).
21. Amiri, Elham, "Characterization of Slow Pyrolysis Behavior of Live and Dead Vegetation," Ph.D. Dissertation, Chemical Engineering Department, Brigham Young University (June, 2020).

Presentations at Technical Meetings

(requiring associated paper unless stated; ACERC meetings listed separately)

1. Fletcher, T. H., P. J. Smith, and L. D. Smoot, "Evaluation of a 2-D Coal Combustion Model," 1984 Spring Meeting of the Western States Section of the Combustion Institute, Boulder, Colorado (April, 1984).
2. Fletcher, T. H., P. J. Smith, L. L. Baxter, and L. D. Smoot, "Coal-Water Mixtures Modeling," First Annual Heat Engines Contractor's Meeting, U.S. DOE/METC, Morgantown, West Virginia (May, 1984).
3. Baxter, L. L., T. H. Fletcher, P. J. Smith, and L. D. Smoot, "Coal-Water Mixtures Combustion Model," 1984 Fall Meeting of the Western States Section of the Combustion Institute, Palo Alto, California (October, 1984).
4. Brown, B. W., K. B. Christensen, T. H. Fletcher, P. O. Hedman, P. J. Smith, and L. D. Smoot, "Modeling and Experimental Studies of An Entrained Flow Gasifier," presented at the AIChE 1984 Annual Meeting, San Francisco, California (November 25-30, 1984).
5. Holve, D. J., K. Gomi, and T. H. Fletcher, "Comparative Combustion Studies of Ultrafine Coal/Water Slurries and Pulverized Coal," presented at the Seventh International Symposium on Coal Slurry Fuels Preparation and Utilization, New Orleans, Louisiana (May 21-24, 1985).
6. Musarra, S. P., T. H. Fletcher, S. Niksa, and H. A. Dwyer, "Heat and Mass Transfer in the Vicinity of a Devolatilizing Coal Particle," presented at the 23rd ASME/AIChE National Heat Transfer Conference, Denver, Colorado (August, 1985).

7. Fletcher, T. H., "Sensitivity of Combustion Calculations to Devolatilization Rate Expressions," presented at the 1985 Fall Meeting of the American Flame Research Committee, Sandia National Laboratories, Livermore, California (October 17-18, 1985).
8. Holve, D. J., J. Hoorstra, and T. H. Fletcher, "The Influence of Size Distribution Characteristics in Heterogeneous Combustion," presented at the 1985 Fall Meeting of the American Flame Research Committee, Sandia National Laboratories, Livermore, California (October 17-18, 1985).
9. Smith, P. J. and T. H. Fletcher, "A Study of Two Chemical Reaction Models in Turbulent Coal Combustion," presented at the 1985 Fall Meeting of the Western States Section of the Combustion Institute, Davis, California (October 21-22, 1985).
10. Smith, P. J. and T. H. Fletcher, "A Study of Two Chemical Reaction Models in Turbulent Coal Combustion," presented at the ASME 107th Winter Annual Meeting (1986).
11. Niksa, S., A. R. Kerstein, and T. H. Fletcher, "Predicting Devolatilization at Typical Coal Combustion Conditions with the Distributed-Energy Chain Model," American Chemical Society Division of Fuel Chemistry Preprints, **31**:3, 237, Anaheim, California (September, 1986)
12. Niksa, S., A. R. Kerstein, and T. H. Fletcher, "Predicting Devolatilization at Typical Coal Combustion Conditions with the Distributed-Energy Chain Model," presented at the 2nd ASME/JSME Thermal Engineering Joint Conference, Honolulu, Hawaii (March, 1987).
13. Baxter, L. L., D. K. Ottesen, and T. H. Fletcher, "Spectral Emission Characteristic of Coal Particles," presented at the 1987 Spring Meeting of the Western States Section of the Combustion Institute, Provo, Utah (April, 1987).
14. Fletcher, T. H., Baxter, L. L., and Ottesen, D. K., "Spectral Emissivities of Size-Graded Coal Particles: Implications for Pyrometry," *1987 International Conference on Coal Science*, ed. Moulijn, J. A., Nater, K. A., and Chermin, H. A. G., Elsevier, New York, p. 945 (1987).
15. Fletcher, T. H., L. L. Baxter, and D. K. Ottesen, "Spectral Emission Characteristics of Size-Graded Coal Particles," ACS Division of Fuel Chemistry preprints, **32**:3, 42-50, New Orleans, Louisiana (1987).
16. Fletcher, T. H., "Kinetics of Rapid Coal Devolatilization," presented at the 1987 PETC/METC AR&TD Contractors' Review Meeting, Morgantown, West Virginia (October 14-16, 1987).
17. Grant, D. M., R. J. Pugmire, T. H. Fletcher, and A. R. Kerstein, "A Chemical Model of Coal Devolatilization Using Percolation Lattice Statistics," presented at the 1988 Spring Meeting of the Western States Section of the Combustion Institute, Salt Lake City, Utah (March, 1988). Also in ACS Division of Fuel Chemistry preprints, **33**:2, 322 Toronto, Canada (June, 1988).
18. Fletcher, T. H., "Time-Resolved Temperature Measurements of Individual Coal Particles During Devolatilization," presented at the 1988 Spring Meeting of the Western States Section of the Combustion Institute, Salt Lake City, Utah (March, 1988). Presented at the poster session of the 22nd Symposium (International) on Combustion, Seattle, Washington (August, 1988).
19. Fletcher, T. H., "Kinetics of Rapid Coal Devolatilization," presented at the 1988 PETC/METC AR&TD Contractors' Review Meeting, Pittsburgh, Pennsylvania (September 6-9, 1988).

20. Fletcher, T. H., "Time-Resolved Particle Temperature and Mass Loss Measurements of a Bituminous Coal During Devolatilization," presented at the 1988 Fall Meeting of the Western States Section of the Combustion Institute, Dana Point, California (October 17-18, 1988).
21. Solum, M. S., R. J. Pugmire, D. M. Grant, T. H. Fletcher, and P. Solomon, "Solid State ^{13}C NMR Studies of Coal Char Structure Evolution," presented at the 1989 Spring Meeting of the Western States Section of the Combustion Institute, Pullman, Washington (March 20-21, 1989).
22. Fletcher, T. H., A. R. Kerstein, R. J. Pugmire, and D. M. Grant, "Prediction of the Effects of Heating Rate and Temperature on Pulverized Coal Devolatilization," presented at the First Symposium on Advances in Coal Spectroscopy, Snowbird, Utah (June 14-16, 1989).
23. Fletcher, T. H., A. R. Kerstein, R. J. Pugmire, R. J., and D. M. Grant, "A Chemical Percolation Model for Devolatilization: II. Temperature and Heating Rate Effects," ACS Division of Fuel Chemistry preprints, **34**:4, 1272, Miami Beach, Florida (1989).
24. Solum, M. S., R. J. Pugmire, D. M. Grant, T. H. Fletcher, and P. R. Solomon, "Solid State ^{13}C NMR Studies of Coal Char Structure Evolution," ACS Division of Fuel Chemistry preprints, **34**:4, 1337, Miami Beach, Florida (1989).
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128. Shurtz, R. C., T. H. Fletcher, B. Burgener, J. M. Sowa, and R. J. Pugmire, "Soot Formation Pathways from a Coal Tar Surrogate under Coal Gasification Conditions," presented at the International Conference on Coal Science and Technology, Nottingham, England (Aug. 28-31, 2007).
129. Bons, J. P., T. H. Fletcher, J. Crosby, S. Lewis, W. Ai, N. Murray, S. Harding, "Deposition of Alternative (Syngas) Fuels on Turbine Blades with Film Cooling" DOE/SCIES Contact Review Meeting, Clemson, SC (October 2007).
130. Shurtz, R. C., T. H. Fletcher, M. S. Solum, and R. J. Pugmire, "Soot Formation Pathways from Coal Tar Surrogates Under Coal Gasification Conditions," presented at the AIChE National Conference. Topical 2: New Frontiers in Energy Research, #9 - Advances in Gasification Research, Salt Lake City, UT (Nov. 5, 2007).
131. J. Hillier and T. H. Fletcher, "Kinetics of Kerogen Extracted from Green River Oil Shale Measured at Different Pressures," presented at the ACS National Meeting, Storch Award presentation session, New Orleans, LA (April, 2008).
132. W. Ai, N. Murray, T. H. Fletcher, S. Harding, S. Lewis, and J. P. Bons, "Deposition Near Film Cooling Holes on a High Pressure Turbine Vane" Paper GT2008-50901, presented at the ASME TurboExpo Meeting, Berlin, Germany (June, 2008).
133. Zamansky, V., B. Eiteneer, J. S. Ravichandra, C. Zeng, T. H. Fletcher, "Gasification Kinetics: Model Development and Validation," presented at the 25th Annual International Pittsburgh Coal Conference," Pittsburgh, PA (Sept 29-Oct 2, 2008).
134. Hillier, J. L., J. S. Fletcher, C. Isackson, J. Orgill, and T. H. Fletcher, "An Improved Method for Determination of Kinetic Parameters from Constant Heating Rate TGA Oil Shale Pyrolysis Data," presented at the ACS National Meeting, Salt Lake City, UT (March 22-26, 2009).
135. Zeng, D., S. Hu, A. N. Sayre, and T. H. Fletcher, "Mechanisms of Coal Secondary Pyrolysis and Soot Formation," presented at the 34th International Technical Conference on Clean Coal & Fuel Systems, Clearwater, FL (May 31-June 4, 2009).
136. Cole, W. J., B. M. Pickett, T. H. Fletcher, and D. R. Weise, "A Semi-empirical Multi-leaf Model for Fire Spread through a Manzanita Shrub," presented at the 6th U.S. National Combustion Institute Meeting, Ann Arbor, MI (May 17-20, 2009).
137. Sowa, J. M. and T. H. Fletcher, "Investigation of Nitrogen Release during Coal Pyrolysis in an Oxy-fuel Combustion Process," presented at the 6th U.S. National Combustion Institute Meeting, Ann Arbor, MI (May 17-20, 2009).
138. Ai, W. and T. H. Fletcher, "Computational Analysis of Conjugate Heat Transfer and Particulate Deposition on a High Pressure Turbine Vane," Paper GT2009-59573, ASME Turbo Expo, Orlando, FL (June 8-12, 2009).
139. Ai, W., R. G. Laycock, D. S. Rappleye, T. H. Fletcher, J. P. Bons, "Effect of Particle Size and Trench Configuration on Deposition from Fine Coal Flyash Near Film Cooling Holes," Paper GT2009-59571, ASME Turbo Expo, Orlando, FL (June 8-12, 2009).
140. Ai, W., N. Murray, T. H. Fletcher, S. Harding, J. P. Bons, "Effect of Hole Spacing on Deposition of Fine Coal Flyash Near Film Cooling Holes," Paper GT2009-59569, ASME Turbo Expo, Orlando, FL (June 8-12, 2009).
141. Lewis, S., B. Barker, J. Bons, W. Ai, and T. Fletcher, "Film Cooling Effectiveness and Heat Transfer Near Deposit-Laden Film Holes," Paper GT2009-59567, ASME Turbo Expo, Orlando, FL (June 8-12, 2009).

142. Zhu, H., X. Guo, C. Zeng, Y. Long, X. Zhang, Y. Peng, B. Eiteneer, V. Zamansky, and T. Fletcher, "Rapid Pyrolysis of Biomass in Wire-Mesh Reactor," presented at the Sino-Australia Symposium on Advanced Coal and Biomass Utilisation Technologies, Wuhan, China (December 9-11, 2009).
143. Long, Y., Z. Guo, C. Zeng, H. Zhu, B. Eiteneer, V. Zamansky, and T. Fletcher, "Analysis of Tar from Coal Rapid Pyrolysis in Wire Mesh Reactor by Gas-Chromatography/Mass Spectrometry with Headspace Sampling," presented at the Sino-Australia Symposium on Advanced Coal and Biomass Utilisation Technologies, Wuhan, China (December 9-11, 2009).
144. Guo, X., L. Chen, C. Zeng, Y. Long, W. Li, B. Eiteneer, V. Zamansky, and T. Fletcher, "Volatile Evolution Kinetics of Two Coals during Rapid Pyrolysis," presented at the Sino-Australia Symposium on Advanced Coal and Biomass Utilisation Technologies, Wuhan, China (December 9-11, 2009).
145. Zhao, X., C. Zeng, Y. Mao, W. Li, Y. Peng, T. Wang, B. Eiteneer, V. Zamansky, and T. Fletcher, "The Surface Characteristics and Reactivity of Residual Carbon in Coal Gasification Slag," presented at the Sino-Australia Symposium on Advanced Coal and Biomass Utilisation Technologies, Wuhan, China (December 9-11, 2009).
146. Fletcher, T. H., "Status of Gasification Technology Development," invited keynote presentation at the Sino-US New Energy Forum, Shanghai, China (September 14, 2009).
147. Eiteneer, B., R. Subramanian, S. Maghzi, C. Zeng, Z. Guo, Y. Long, L. Chen, R. JS, A. Raman, J. Jain, T. Fletcher, and R. Shurtz, "Gasification Kinetics: Modeling Tools Development and Validation," presented at the International Pittsburgh Coal Conference, Pittsburgh, PA (Sept. 20-23, 2009).
148. Shurtz, R. and T. H. Fletcher, "Pyrolysis and Gasification of a Sub-Bituminous Coal at High Heating Rates," presented at the International Pittsburgh Coal Conference, Pittsburgh, PA (Sept. 20-23, 2009).
149. Shurtz, R., T. H. Fletcher, R. J. Pugmire, and M. S. Solum, "The Use of 2-6-Dimethylmaphthalene and 6-(5H)-Phenanthridinone as Surrogates for Studying Soot Formation from Coal Tar," presented at the International Pittsburgh Coal Conference, Pittsburgh, PA (Sept. 20-23, 2009).
150. Cole, W. J., M. H. Dennis, T. H. Fletcher, and D. R. Weise, "The effects of wind on the flame characteristics of individual leaves," presented at the Western States Section of the Combustion Institute, UC Irvine, Irvine, CA (Oct. 26-27, 2009).
151. Bons, J., S. Lewis, W. Ai, and T. H. Fletcher, "**Deposition of Alternative (Syngas) Fuels on Turbine Blades with Film Cooling**," presented at the University Turbines Systems Research Workshop, U. Central Florida, Orlando, FL (Oct. 27-29, 2009).
152. Bons, J., R. Laycock, and T. H. Fletcher, "Designing Turbine Endwalls for Deposition Resistance with 1400°C Combustor Exit Temperatures and Syngas Water Vapor Levels," presented at the University Turbines Systems Research Workshop, U. Central Florida, Orlando, FL (Oct. 27-29, 2009).
153. Bons, J. R. and T. H. Fletcher, "Designing Turbine Endwalls for Deposition Resistance with 1400-C Combustor Exit Temperatures and Syngas Water Vapor Levels," presented at the FY10 Advanced Turbines Peer Review, NETL, Morgantown, WV (April 26-30, 2010).
154. Shurtz, R. and T. H. Fletcher, "Pressurized Coal Pyrolysis and Gasification at High Initial Heating Rates," presented at the U.S. Department of Energy ~ National Energy Technology Laboratory 2010 Multiphase Flow Science Workshop, Pittsburgh, PA (May 4-6, 2010)

155. Bons, J., T. H. Fletcher, and A. Ameri, "Designing Turbine Endwalls for Deposition Resistance with 1400C Combustor Exit Temperatures and Syngas Water Vapor Levels," presented at the 2010 University Turbine Systems Research Workshop, Penn State University (October 19-21, 2010).
156. Prince, D., B. Andersen, W. Cole, M. Dennis, T. H. Fletcher, "Modeling a Burning Shrub with and without Wind using a Semi-empirical Model," presented at the International Association of Wildland Fire 3rd Fire Behavior and Fuels Conference, Spokane, Washington (October 25-29, 2010).
157. Withers, D., M. Dennis, W. Cole, and T. H. Fletcher, "Effects of Wind on Flame Characteristics of Leaves and Needles," poster presented at the International Association of Wildland Fire 3rd Fire Behavior and Fuels Conference, Spokane, Washington (October 25-29, 2010).
158. Lewis, A., S. Goodrich, K. Kolste, G. Sorensen, and T. H. Fletcher, "Rapid Pyrolysis and CO₂ Gasification of Petroleum Coke and Sawdust in a High Pressure Flat-Flame Burner," presented at the 2010 AIChE Annual Meeting, Salt Lake City, UT (November 7-12, 2010).
159. Shurtz, R. C., G. Sorensen, S. Goodrich, T. H. Fletcher, "Pressurized Coal Pyrolysis and CO₂ Gasification at High Initial Heating Rates," presented at the 2010 AIChE Annual Meeting, Salt Lake City, UT (November 7-12, 2010).
160. Shurtz, R. C. and T. H. Fletcher, "A Coal Swelling Model for High Heating Rate Applications," presented at the 7th US National Combustion Institute Meeting, Georgia Institute of Technology, Atlanta, Georgia (March 20-23, 2011).
161. Lewis, A. D. and T. H. Fletcher, "Predicting Sawdust Pyrolysis Yields Using the CPD Code with a Tar Cracking Model," presented at the 7th US National Combustion Institute Meeting, Georgia Institute of Technology, Atlanta, Georgia (March 20-23, 2011).
162. R. G. Laycock and T. H. Fletcher, "Time-dependent deposition characteristics of fine coal flyash in a laboratory gas turbine environment," GT2011-46563, presented at the ASME Turbo Expo, Vancouver, Canada (June 6-10, 2011).
163. J. Bons, A. Ali, T. H. Fletcher, "Deposition of Particulate from Coal-Derived Syngas on Turbine Blades with Film Cooling," presented at the 2011 University Turbine Systems Research Workshop, Ohio State University (October 25 – 27, 2011).
164. Fletcher, T. H., A. M. Orendt, J. C. Facelli, M. S. Solum, C. L. Mayne, and M. Deo, "Oil Shale Pyrolysis Kinetics and Product Characterization," Unconventional Fuels Conference, University of Utah, Salt Lake City, UT (May 15, 2012).
165. T. H. Fletcher, "A Fundamental Investigation of Fire Initiation and Fire Behavior in Sparse Vegetation," poster presentation at the NSF 2012 CBET Grantee Conference, Baltimore, MD (June 6-8, 2012).
166. T. H. Fletcher, "Oil Shale 1: Chemical Structure and Pyrolysis," short course presentation to Statoil, Trondheim, Norway (October 8, 2012).
167. Shurtz, R. C. and T. H. Fletcher, "Coal Char-CO₂ Gasification Kinetics at High Temperature and Pressure," presented at the International Pittsburgh Coal Conference, Pittsburgh, PA (October 15 - 18, 2012).
168. Fletcher, M. E. and T. H. Fletcher, "Application of L Systems to Geometrical Construction of Chamise and Juniper Shrubs," presented at the 4th Fire Behavior and Fuels Conference, International Association of Wildland Fire, Raleigh, NC (Feb. 18-22, 2013).

169. Prince, D. R. and T. H. Fletcher, "Semi-empirical Fire Spread Simulator for Utah Juniper and Chamise Shrubs," poster presented at the 4th Fire Behavior and Fuels Conference, International Association of Wildland Fire, Raleigh, NC (Feb. 18-22, 2013).
170. Shen, C. and T. H. Fletcher, "Fuel Element Combustion Properties for Live Wildland Utah Shrubs," poster presented at the 4th Fire Behavior and Fuels Conference, International Association of Wildland Fire, Raleigh, NC (Feb. 18-22, 2013).
171. Fletcher, T. H., "The Role of Chemical Structure in Predictions of Coal Pyrolysis and Char Conversion," invited presentation at the Fourteenth International Conference on Numerical Combustion, San Antonio, TX (April 8-10, 2012).
172. Shen, C. and T. H. Fletcher, "Combustion Properties of Fuel Segments for Live Wildland Utah Shrubs," presented at the 8th US National Combustion Meeting, The Combustion Institute, Park City, Utah (May 19-22, 2013).
173. Lewis, A. D. and T. H. Fletcher, "Pyrolysis and CO₂ Gasification Rates of Biomass at High Heating-Rate Conditions," presented at the 8th US National Combustion Meeting, The Combustion Institute, Park City, Utah (May 19-22, 2013).
174. Lewis, A. D. and T. H. Fletcher, "Pyrolysis Kinetics and CO₂ Gasification Rates of Petroleum Coke at High Heating Rates and Elevated Pressure," presented at the 8th US National Combustion Meeting, The Combustion Institute, Park City, Utah (May 19-22, 2013).
175. Prince, D. R. and T. H. Fletcher, "Semi-empirical Fire Spread Simulator for Manzanita, Utah Juniper and Chamise Shrubs," presented at the 8th US National Combustion Meeting, The Combustion Institute, Park City, Utah (May 19-22, 2013).
176. Prince, D. R. and T. H. Fletcher, "A Combined Experimental and Theoretical Study of the Combustion of Live vs. Dead Leaves," presented at the 8th US National Combustion Meeting, The Combustion Institute, Park City, Utah (May 19-22, 2013).
177. Pugmire R. J., T. H. Fletcher, J. Hillier, M. Solum, C. Mayne, and A. Orendt, "Detailed Characterization and Pyrolysis of Shale, Kerogen, Kerogen Chars, Bitumen, and Light Gases from a Green River Oil Shale Core," presented at the 33rd Oil Shale Symposium, Golden, CO (Oct 14-16, 2013).
178. Fletcher, T. H., R. Gillis, J. Adams, T. Hall, C. L. Mayne, M. S. Solum, and R. J. Pugmire, "Characterization of Pyrolysis Products from a Utah Green River Oil Shale by ¹³C NMR, GC/MS, and FTIR," presented at the 33rd Oil Shale Symposium, Golden, CO (Oct 14-16, 2013).
179. Lansinger, V., J. Gallacher, T. H. Fletcher, "Seasonal Effects on the Ignition Characteristics of Live Fuels in Wildfires," presented at the student poster session of the 2013 AIChE Annual Meeting, San Francisco, CA (November 3-8, 2013).
180. Gallacher, J. R., V. Lansinger, S. Hansen, D. Jack, D. R. Weise, and T. H. Fletcher, "Effects of Season and Heating Mode on Ignition and Burning Behavior of Three Species of Live Fuel Measured in a Flat-flame Burner System," presented at the 2014 Spring Technical Meeting of the Western States Section of the Combustion Institute, California Institute of Technology, Pasadena, CA (March 24-25, 2014).
181. Lewis, A. D., E. G. Fletcher, and T. H. Fletcher, "Entrained-Flow CO₂ Gasification of Sawdust, Switchgrass, and Corn Stover Chars in a Pressurized Flat-Flame Burner Reactor," presented at the 2014 Spring Technical Meeting of the Western States Section of the Combustion Institute, California Institute of Technology, Pasadena, CA (March 24-25, 2014).
182. Lewis, A. D., N. R. Marchant, D. J. Henley, E. G. Fletcher, and T. H. Fletcher, "Steam Gasification Kinetics of Three Bituminous Coal Chars at High Heating Rates and Elevated Pressure," presented at the 2014 Spring Technical Meeting of the Western States Section of

- the Combustion Institute, California Institute of Technology, Pasadena, CA (March 24-25, 2014).
183. Yang, H., S. Li, T. H. Fletcher, M. Dong, W. Zhou, "Simulation of the Evolution of Pressure in a Lignite Particle during Pyrolysis," presented at the 2014 Spring Technical Meeting of the Western States Section of the Combustion Institute, California Institute of Technology, Pasadena, CA (March 24-25, 2014).
 184. Fletcher, T. H., A. D. Lewis, D. R. Prince, "Chemical Structure-Based Pyrolysis Models of Wood and Biomass for Possible Use in CFD Fire Simulations," presented at the 6th FM Global Open Source CFD Fire Modeling Workshop, Norwood, MA (May 15-16, 2014).
 185. Gallacher, J. R., V. Lansinger, S. Hansen, T. Ellsworth, D. R. Weise, and T. H. Fletcher, "Effects of Season and Heating Mode on Ignition and Burning Behavior of 10 Live Fuel Species Measured in a Flat-flame Burner System," poster presented at the 35th International Symposium on Combustion, San Francisco, CA (August 3-8, 2014).
 186. Fletcher, T. H., D. C. Barfuss, and R. J. Pugmire, "Modeling Oil Shale Pyrolysis using the Chemical Percolation Devolatilization Model," presented at the 34th Oil Shale Symposium, Golden, CO (October 13-15, 2014).
 187. Laycock, R. and T. H. Fletcher, "Independent Effects of Surface and Gas Temperature on Coal Flyash Deposition in Gas Turbines at Temperatures Up to 1400°C," presented at the 21st International Conference on Impacts of Fuel Quality on Power Production, Snowbird, Utah (October 26-31, 2014).
 188. Fletcher, T. H., J. Hillier, R. Gillis, J. Adams, D. Barfuss, C. L. Mayne, M. S. Solum, R. J. Pugmire, "Oil Shale: Structure and Reactions," invited seminar, BYU Chemistry Department (January 13, 2015).
 189. Fletcher, T. H., J. Hillier, R. Gillis, J. Adams, D. Barfuss, C. L. Mayne, M. S. Solum, R. J. Pugmire, "Oil Shale: Structure and Reactions," invited seminar, College of Engineering, University of Alabama Huntsville (January 29, 2015).
 190. Barfuss, D. and T. H. Fletcher, "Modeling Oil Shale Pyrolysis using the Chemical Percolation (CPD) Devolatilization Model," presented at the ninth annual Utah Conference on Undergraduate Research, Dixie State University, St. George, Utah (February 27th, 2015).
 191. Holland, T. and T. H. Fletcher, "Coal Particle Combustion," poster presented at the Stewardship Science Academic Programs (SSAP) Symposium, Santa Fe, New Mexico (March 11-12, 2015).
 192. Richards, A. and T. H. Fletcher, "A Modified Two-step Model of Devolatilization," presented at the 15th International Conference on Numerical Combustion, Avignon, France (April 19-22, 2015).
 193. Lignell, D., A. Josephson, B. Isaac, and T. H. Fletcher, "Large eddy simulation of soot formation in an oxy-coal combustor," presented at the 15th International Conference on Numerical Combustion, Avignon, France (April 19-22, 2015).
 194. Gallacher, J. R., V. Lansinger, S. Hansen, D. R. Weise, and T. H. Fletcher, "Effects of Season and Heating Mode on Ignition and Burning Behavior of Ten Species of Live Fuel Measured in a Flat-flame Burner System," presented at the 9th U.S. National Combustion Institute Meeting, Cincinnati, OH (May 17-20, 2015).
 195. Yashwanth, B. L., J. R. Gallacher, B. Shotorban, S. Mahalingam, T. H. Fletcher, and D. R. Weise, "Experimental and numerical investigation of the effect of heating modes and moisture content on pyrolysis and ignition of live fuels," presented at the 9th U.S. National Combustion Institute Meeting, Cincinnati, OH (May 17-20, 2015).

196. Shen, C., D. O. Lignell, and T. H. Fletcher, "Flame Merging Experiments in Low Speed, Non-Premixed Natural Gas Flames," presented at the 9th U.S. National Combustion Institute Meeting, Cincinnati, OH (May 17-20, 2015).
197. Chen, S., J. R. Gallacher, T. H. Fletcher, and D. R. Weise, "Experiments and Modeling of Fire Spread in Big Sagebrush and Chamise Shrubs in a Wind Tunnel," presented at the 9th U.S. National Combustion Institute Meeting, Cincinnati, OH (May 17-20, 2015).
198. Josephson, A. J., B. Isaac, D. O. Lignell, and T. H. Fletcher, "Large eddy simulation of an oxy-coal combustor," presented at the 9th U.S. National Combustion Institute Meeting, Cincinnati, OH (May 17-20, 2015).
199. Laycock, R. and T. H. Fletcher, "Independent effects of surface and gas temperature on coal flyash deposition in gas turbines at temperatures up to 1400°C," paper GT2015-43575, presented at the ASME Turbo Expo, Montreal, Canada (June 15-19, 2015).
200. Fletcher, T. H., "High Temperature, High Pressure Gasification of Coal Chars Prepared at High Heating Rates," presented at the Storch Symposium, 250th American Chemical Society National Meeting, Boston, Massachusetts (August 16-20, 2015).
201. Shen, C., M. E. Fletcher, J. R. Gallacher, D. R. Prince, and T. H. Fletcher, "Experiments and Modeling of Fire Spread in Big Sagebrush and Chamise Shrubs in a Wind Tunnel," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
202. Shen, C., D. O. Lignell, and T. H. Fletcher, "Flame Merging Experiments in Low Speed, Non-Premixed Natural Gas Flames," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
203. Gallacher, J. R., V. Lansinger, S. Smith, A. Doll, D. R. Weise and T. H. Fletcher, "The Ignition and Burning of Live Fuels Studied Using Natural Variation in Fuel Characteristics," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
204. Gallacher, J. R., V. Lansinger, S. Hansen, S. Smith, D. R. Weise and T. H. Fletcher, "The Effect of Heating Mode on the Ignition and Burning Behavior of 10 Live Shrub Fuels," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
205. Holland, T. and T. H. Fletcher, "Comprehensive Char Conversion Global Sensitivity Analysis," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
206. Richards, A. and T. H. Fletcher, "A Comparison of Global Kinetic Models for Coal Devolatilization," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
207. Kimball, D. C., B. W. Butler, and T. H. Fletcher, "Attachment of Flames on Slopes," presented at the Western States Section of the Combustion Institute, Brigham Young University, Provo, UT (October 5-6, 2015).
208. Fletcher, T. H. and R. J. Pugmire, "Using ¹³C NMR Chemical Structure Data to Model Oil Shale Pyrolysis for Green River and Estonian Oil Shale," presented at the 35th Oil Shale Symposium, Salt Lake City, Utah (October 5-6, 2015).
209. Fletcher, T. H., B. Adams, and C. Adams, "The CHESS Process: Environment Friendly, Low Cost Shale Oil Recovery," presented at the 35th Oil Shale Symposium, Salt Lake City, Utah (October 5-6, 2015).

210. Fletcher, T. H., “How Did a Trombone Player End Up Doing Research on Coal Combustion?” Izatt-Christensen Excellence in Research Award Presentation, Brigham Young University, Provo, UT (October 29, 2015).
211. Smith, S. A., J. R. Gallacher, and T. H. Fletcher, “Effects of Season and Heating Mode on Ignition and Burning Behavior of Ten Species of Live Fuel Measured in a Flat-flame Burner System,” presented at the undergraduate research session of the Annual AIChE Meeting, Salt Lake City, UT (November 9, 2015).
212. Shen, C., M. E. Fletcher, J. R. Gallacher, D. R. Prince, and T. H. Fletcher, “Experiments and Modeling of Fire Spread in Big Sagebrush and Chamise Shrubs in a Wind Tunnel,” presented at the 6th International Fire Ecology and Management Congress, San Antonio, Texas (November 16-20, 2015).
213. Gallacher, J. R., V. Lansinger, S. Smith, A. Doll, D. R. Weise and T. H. Fletcher, “The Ignition and Burning of Live Fuels Studied Using Natural Variation in Fuel Characteristics,” presented at the 6th International Fire Ecology and Management Congress, San Antonio, Texas (November 16-20, 2015).
214. Gallacher, J. R., V. Lansinger, S. Hansen, S. Smith, D. R. Weise and T. H. Fletcher, “The Effect of Heating Mode on the Ignition and Burning Behavior of 10 Live Shrub Fuels,” presented at the 6th International Fire Ecology and Management Congress, San Antonio, Texas (November 16-20, 2015).
215. Holland, T., S. Bhat, P. Marcy, J. Gattiker, J. D. Kress, and T. H. Fletcher, “Calibration and Extension of a Coal Char Annealing Model,” presented at the Western States Section of the Combustion Institute, University of Washington, Seattle, WA (March 21-22, 2016).
216. Richards, A. P. and T. H. Fletcher, “Elemental Analysis of Coal Combustion: Coal, Char, and Volatiles,” presented at the Western States Section of the Combustion Institute, University of Washington, Seattle, WA (March 21-22, 2016).
217. Gallacher, J. R., B. Ripa, B. Butler, and T. H. Fletcher, “The Influence of the Coanda Effect on Flame Attachment to Slopes and Firefighter Safety Zone Considerations,” presented at the Western States Section of the Combustion Institute, University of Washington, Seattle, WA (March 21-22, 2016).
218. Ripa, B., J. R. Gallacher, D. Kimball, B. Clark, B. Butler, and T. H. Fletcher, “Modeling the Coanda Effect for Fires on Slopes Using FDS, with Implications for Wildland Firefighter Safety,” presented at the Western States Section of the Combustion Institute, University of Washington, Seattle, WA (March 21-22, 2016).
219. Holland, T., S. Bhat, P. Marcy, J. Gattiker, J. D. Kress, and T. H. Fletcher, “Bayesian Uncertainty Quantification and Calibration of a Clean Coal Design Code,” presented at CO2 Summit II: Technologies and Opportunities, Santa Ana Pueblo, NM (April 10-14, 2016).
220. Holland, T., S. Bhat, J. D. Kress, and T. H. Fletcher, “Extension and Calibration of Coal Combustion Models,” poster presented at the Los Alamos National Laboratory Student Symposium, Los Alamos, NM (Aug. 3, 2016).
221. Safdari, S., H. R. Kariminia, and T. H. Fletcher, “Natural Attenuation and Biostimulation of Petroleum-Hydrocarbon Contaminated Soil in a Simulated Column,” presented at the 2016 AIChE Meeting, San Francisco, CA (November 13-17, 2016).
222. Holland, T. and T. H. Fletcher, “A Comprehensive Model of Single Particle Pulverized Coal Combustion Extended to Oxy-coal Conditions,” presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).

223. Shen, C., D. Prince, J. Gallacher, M. E. Fletcher, and T. H. Fletcher, "Semi-empirical Model for Fire Spread in Chamise and Big Sagebrush Shrubs with Spatially-Defined Fuel Elements and Flames," presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
224. Josephson, A. J., T. H. Fletcher, and D. O. Lignell, "Modeling Soot in Coal Systems," presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
225. Rahmati, M., M-S. Safdari, E. Amini, T. H. Fletcher, "Investigation of Merging Flames in Horizontal and Vertical Geometries," presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
226. Richards, A., T. Shutt, T. H. Fletcher, "A Comprehensive Model for Predicting Elemental Composition of Coal Pyrolysis Products," presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
227. Safdari, M.-S., M. Rahmati, E. Amini, and T. H. Fletcher, "Analysis of Pyrolysis Products from Live Shrub Fuels," presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
228. Weise, D., T. H. Fletcher, B. Shotorban, B. Butler, M. Princevac, T. J. Johnson, M. Dietenberger, W. Mell, R. Ottmar, A. Hudak, S. McAllister, W. M. Hao, J. O'Brien, S. Mahalingam, and J. Reardon, "Measuring and Modeling Pyrolysis to Improve Prediction of Prescribed Fire Behavior," poster presented at the 10th National Combustion Institute Meeting, University of Maryland (April 23-26, 2017).
229. Laycock, R. G. and T. H. Fletcher, "Formation of Deposits from Heavy Fuel Oil Ash in an Accelerated Deposition Facility at Temperatures up to 1206°C," paper GT2017-63724, presented at the ASME Turbo Expo, Charlotte, North Carolina (June 26-30, 2017).
230. Fletcher, T. H. and R. G. Laycock, "Particle Deposition Behavior of Ash from Various Fuels in Gas Turbine Environments at Temperatures up to 1400°C," Invited presentation at the Workshop on Ash-related Issues in Gas Turbines, Center for Advanced Studies, Ludwig Maximilians University, Munich, Germany (July 3-5, 2017).
231. Weise, D. R., T. H. Fletcher, S. Mahalingam, Z. Zhou, and L. Sun, "Fire Spread in Chaparral: Comparison of Data with Flame-Mass Loss Relationships," presented at the Eighth International Symposium on Scale Modeling (ISSM-8), Portland, Oregon (Sept 12-14, 2017).
232. Holland, T. and T. H. Fletcher, "Modeling Effects of Annealing on Coal Char Reactivity to O₂ and CO₂ Based on Preparation Conditions," presented at the Western States Section of the Combustion Institute, University of Wyoming, Laramie, WY (October 2-3, 2017).
233. Billings, B., M. Roberts, B. Butler, and T. H. Fletcher, Modeling the Coanda Effect with FDS and STARCCM+ to Predict the Effect of Fires on Slopes for Implications of Wildland Firefighter Safety," presented at the Western States Section of the Combustion Institute, University of Wyoming, Laramie, WY (October 2-3, 2017).
234. Rahmati, M., C. Harper, M. Butler, M.-S. Safdari, E. Amini, T. H. Fletcher, "Investigation of Merging Flames in Horizontal and Vertical Geometries," presented at the Western States Section of the Combustion Institute, University of Wyoming, Laramie, WY (October 2-3, 2017).
235. Amini, E., M.-S. Safdari, M. Rahmati, J. Howarth, J. DeYoung, and T. H. Fletcher, "Pyrolysis of Live Vegetation at Slow Heating Rates," presented at the Western States

- Section of the Combustion Institute, University of Wyoming, Laramie, WY (October 2-3, 2017).
236. Safdari, M.-S., J. Howarth, M. Rahmati, and T. H. Fletcher, "Study of Pyrolysis Products of Live and Dead Shrub Fuels from the Forest in the Southeastern United States," presented at the 2017 AIChE Annual Meeting, Minneapolis, MN (October 29-November 3, 2017).
 237. Scharko, N. K., M-S. Safdari, T. O. Danby, J. Howarth, T. N. Beiswenger, D. R. Weise, T. L. Myers, T. H. Fletcher, and T. J. Johnson, "Laboratory Measurements of Gas Phase Pyrolysis Products from Southern Wildland Fuels using Infrared Spectroscopy," presented at the American Geophysical Union Conference, New Orleans (December 11-15, 2017).
 238. Fletcher, T. H. and T. Holland, "Improvements to a Detailed Fundamental Char Conversion Model for Oxy-Coal Combustion," invited presentation, 2nd International Workshop on Oxy-Fuel Combustion, Bochum, Germany (February 14-15, 2018).
 239. Harper, C., M. Butler, M. Rahmati, and T. H. Fletcher, "Investigation of Merging Flames in Horizontal and Vertical Geometries," presented at the AIChE Regional Conference, Brigham Young University, Provo, UT (March 23-24, 2018).
 240. Amini, E., J. Howarth, J. DeYoung, and T. H. Fletcher, "Tar and Gas Composition from Slow Pyrolysis of 15 Live and Dead Plant Species from the Southeastern United States," presented at the Fire Continuum Conference, Missoula, MT (May 21-24, 2018).
 241. Safdari, M-S., J. P. Berryhill, and T. H. Fletcher, "Fast Pyrolysis of 15 Live and Dead Plant Species at Heating Rates Typical of Wildland Fires," presented at the Fire Continuum Conference, Missoula, MT (May 21-24, 2018).
 242. Rahmati, M., C. Harper, M. Butler, M-S. Safdari, E. Amini, and T. H. Fletcher, "Investigation of Flame Merging in Horizontal and Vertical Geometries," presented at the 10th FM Global Open Source CFD Fire Modeling Workshop, Norwood, MA (May 30-21, 2018).
 243. Yang, H., T. H. Fletcher, Y. Li, L. Jin, S. Li, Y. Shang, H. Hu, "Modeling the Influence of Changes in Aliphatic Structure on Char Surface Area during Coal Pyrolysis," presented at the 37th International Symposium on Combustion, Dublin, Ireland (July 29-August 3, 2018).
 244. Safdari, M-S., J. Berryhill, D. R. Weise, and T. H. Fletcher, "Bench-scale Measurement of Pyrolysis Products from Intact Live Fuels," presented at the 2019 AIChE Annual Meeting, Pittsburgh, PA (November 10-15, 2018).
 245. Weise, D. R., T. H. Fletcher, T. J. Johnson, W. Hao, M. Dietenberger, M. Princevac, B. Butler, S. McAllister, J. O'Brien, L. Loudermilk, R. Ottmar, A. Hudak, A. Kato, B. Shotorban, S. Mahalingam, W. E. Mell, "A Project to Measure and Model Pyrolysis to Improve Prediction of Prescribed Fire Behavior," presented at the 8th International Conference on Forest Fire Research, Coimbra, Portugal (November 10-16, 2018).
 246. Fletcher, T. H., M-S. Safdari, E. Amini, and D. R. Weise, "Bench-scale measurement of pyrolysis products from intact live fuels," presented at the 8th International Conference on Forest Fire Research, Coimbra, Portugal (November 10-16, 2018).
 247. Shen, C., T. H. Fletcher, and D. R. Weise, "Semi-empirical Fire Spread Model for Chamise and Big Sagebrush Shrubs with Spatially-Defined Fuel Elements and Flames," presented at the 8th International Conference on Forest Fire Research, Coimbra, Portugal (November 10-16, 2018). **DOI:** https://doi.org/10.14195/978-989-26-16-506_70

248. Cannon, F., K. Goodrich, B. Billings, T. H. Fletcher, B. Butler, and M. Hradisky,” Modeling the Wind Disturbances on Fires Near a Slope,” presented at the Utah Conference on Undergraduate Research, Weber State University (February 22, 2019).
249. Last, C., T. H. Fletcher, C. Shen, C. Van Wagoner, and T. Black, “Flame Merging Patterns in Two Dimensions Observed over Three Flames,” poster presented at the Utah Conference on Undergraduate Research, Weber State University (February 22, 2019).
250. Cannon, F., T. H. Fletcher, and C. Shen, “Modeling Flame Merging Behavior of Two Buoyant Flames as a Function of Horizontal and Vertical Separation Distance,” presented at the 11th U.S. National Combustion Meeting, Pasadena, CA (March 24-27, 2019).
251. Last, C., C. Van Wagoner, T. Black, C. Shen, and T. H. Fletcher, “Flame Merging Patterns in Two Dimensions Observed with Three Flames,” work-in-progress poster presented at the 11th U.S. National Combustion Meeting, Pasadena, CA (March 24-27, 2019).
252. Amini, E., M-S. Safdari, D. R. Weise, and T. H. Fletcher, “Kinetic Study of Slow Pyrolysis of Live and Dead Wildland Fuels,” presented at the 6th International Fire Behavior and Fuels Conference, Albuquerque, NM (April 29-May 3, 2019).
253. Cannon, F., K. Goodrich, B. Billings, T. H. Fletcher, B. Butler, and M. Hradisky, “Modeling the Wind Disturbances on Fires Near a Slope,” presented at the 6th International Fire Behavior and Fuels Conference, Albuquerque, NM (April 29-May 3, 2019).
254. Fletcher, T. H., D. O. Lignell, A. Josephson, A. Richards, and T. Holland, “Advances in Modeling Coal Pyrolysis, Char Combustion, and Soot Formation from Coal and Biomass Tar,” plenary presentation at the 9th International Symposium on Coal Combustion, Qingdao, China (July 21-24, 2019).
255. Amini, E., M-S. Safdari, D. R. Weise, and T. H. Fletcher, “Pyrolysis Kinetics of Live and Dead Wildland Vegetation from the Southern United States,” presented at the AIChE Annual Meeting, Orlando, FL (November 10-15, 2019).
256. Fletcher, T. H., “A review of 30 years of research using the CPD model,” plenary presentation at the 7th Sino-Australian Symposium on Advanced Coal and Biomass Utilisation Technologies, Wuhan, China (December 3-6, 2019).
257. Weise, D. R., T. H. Fletcher, M.-S. Safdari, E. Amini, and J. Palarea-Albaladejo, “Effect of Plant Species on Composition of Pyrolysis Products,” poster presented at the 3rd International Smoke Symposium, virtual meeting (April 20-24, 2020).
258. Tollefsen, S., D. Sabin, D. Haycock, D. O. Lignell, and T. H. Fletcher, “Analysis of Merged Flame Behavior from Two and Three Fuel Sources Separated both Vertically and Horizontally,” poster presented at the AIChE Western Student Regional Conference, Brigham Young University, Provo, Utah (October 2-3, 2020).
259. Haycock, D. J., S. Tollefsen, and T. H. Fletcher, “Flame Merging Correlations for Vertically- and Horizontally-separated Buoyant Flames,” presented at the AIChE Rocky Mountain Student Regional Conference, hosted virtually by Colorado State University, Fort Collins, CO (April 2-3, 2021). This paper was awarded first place in the student paper competition.