

2015 FALL TECHNICAL MEETING
WESTERN STATES SECTIONS OF THE COMBUSTION INSTITUTE
 Hosted by Brigham Young University, Provo, UT.
 Monday, 5 October 2015

7:15 – 4:00 Registration: Brigham Young University Conference Center Reception Area
7:15 – 7:45 Continental Breakfast: Brigham Young University Conference Center
7:45 - 8:00 Welcome Address: David O. Lignell, Brigham Young University
Welcoming Remarks: Alan Parkinson, the BYU Dean of the Ira A. Fulton College of Engineering and Technology
Opening Remarks: Anthony J. Marchese WSSCI Chair and Professor at Colorado State University
8:00 – 9:00 Invited Presentation: Prof. Philip J. Smith, University of Utah
Title: Exascale Computing and Coal-Fired Power Generation (really?)
Session Chair: David O. Lignell, Brigham Young University

9:00 – 9:20

BREAK - Brigham Young University Conference Center

Turbulent Flames
Room 2260
Session Chair: David L. Blunck

Fire
Room 2265
Session Chair: Thomas H. Fletcher

Kinetics
Room 2267
Session Chair: Gregory E. Bogin Jr.

9:20 – 9:40

1A01: Effects of flame configuration on chemistry tabulation
Shyam Menon¹, Runhua Zhao², Jagannath Jayachandran², Fokion N. Egolfopoulos²
¹Oregon State University
²University of Southern California

1B01: Laboratory experiments to study surface to crown fire transition in chaparral
Jeanette Cobian-Iñiguez¹, Chirawat Sanpakit¹, Joey Chong², Gloria Burke², Gabriel Dupont^{1,3}, David R. Weise², Marko Princevac¹
¹University of California
²USDA Forest Service
³École Nationale Supérieure d'ingénieurs de Caen

1C01: Preconditioning methods for acceleration of ignition solves with detailed chemistry
Michael A. Hansen, James C. Sutherland
 University of Utah

9:40 – 10:00

1A02: Tabulated chemistry approach based on reduced-dimension manifolds
Simon Lapointe, Bruno Savard, Guillaume Blanquart
 California Institute of Technology

1B02: Experiments and modeling of fire spread in big sagebrush and chamise shrubs in a wind tunnel
Chen Shen¹, Marianne E. Fletcher¹, Jonathan R. Gallacher¹, Dallan R. Prince¹, Thomas H. Fletcher¹, Carl A. Seielstad², David R. Weise³
¹Brigham Young University
²Univeristy of Montana
³USDA Forest Service

1C02: Initial investigation of pyJac: An analytical Jacobian generator for chemical kinetics
Kyle E. Niemeyer¹, Nicholas J. Curtis², Chih-Jen Sung²
¹Orgeon State University
²University of Connecticut

	Turbulent Flames Room 2260 Session Chair: David L. Blunck	Fire Room 2265 Session Chair: Thomas H. Fletcher	Kinetics Room 2267 Session Chair: Gregory E. Bogin Jr.
10:00 – 10:20	1A03: Effect of turbulent fluctuations on radiation emissions from a premixed flame <i>Jonathan M. Bonebrake, Aaron J. Fillo, David L. Blunck</i> <i>Oregon State University</i>	1B03: The effect of heating mode on the ignition and burning behavior of 10 live shrub fuels <i>Jonathan R. Gallacher¹, Victoria B. Lansinger¹, Sydney Hansen¹, Samantha Smith¹, David R. Weise², Thomas H. Fletcher¹</i> ¹ Brigham Young University ² USDA Forest Service	1C03: Investigation of <i>n</i>-pentane pyrolysis at elevated pressures in a variable pressure flow reactor <i>Mario H. Saldana, Gregory E. Bogin Jr.</i> <i>Colorado School of Mines</i>
10:20 – 10:40	1A04: Effects of fuel chemistry and turbulence intensity on turbulent consumption speed for large hydrocarbon fuels <i>Aaron J. Fillo, David L. Blunck</i> <i>Oregon State University</i>	1B04: Ignition temperatures of wood cylinders under convective heating <i>Sara McAllister, Mark Finney</i> <i>USDA Forest Service</i>	1C04: The combustion behavior of various hydrocarbons with complex molecular structure <i>K. Klock, A. Punase, A. Prakoso, B. Hascakir</i> <i>Texas A&M University</i>
10:40 – 11:00	BREAK – Brigham Young University Conference Center		
	Turbulent Flames Room 2260 Session Chair: John Hewson	Coal and Char Room 2265 Session Chair: James C. Sutherland	Carbon Capture Room 2267 Session Chair: Dave Frankman
11:00 – 11:20	1A05: Radiation emissions from turbulent diffusion flames burning large hydrocarbon fuels <i>Eric D. Zeuthen, David L. Blunck</i> <i>Oregon State University</i>	1B05: Global sensitivity analysis for a comprehensive char conversion model <i>Troy Holland, Thomas H. Fletcher</i> <i>Brigham Young University</i>	1C05: Overview of Cryogenic Carbon Capture™ process <i>Dave Frankman¹, Kyler Stitt¹, Andrew Baxter¹, Larry L. Baxter²</i> ¹ Sustainable Energy Solutions ² Brigham Young University
11:20 – 11:40	1A06: Flame length measurements and correlation for swirled pulverized fuel flames <i>Steven Owen¹, David Ashworth¹, Kenneth Kaiser², Hwanho Kim², Dale R. Tree¹</i> ¹ Brigham Young University ² Delaware Research and Technology Center	1B06: The effect of model fidelity on prediction of char burnout for single-particle coal combustion <i>Josh McConnell, James C. Sutherland</i> <i>University of Utah</i>	1C06: Economic and energy comparisons of carbon capture <i>Christopher D. Hoeger¹, Christopher S. Russell², Mark Jensen², Eric Mansfield¹, Larry L. Baxter²</i> ¹ Sustainable Energy Solutions ² Brigham Young University

	Turbulent Flames Room 2260 Session Chair: John Hewson	Coal and Char Room 2265 Session Chair: James C. Sutherland	Carbon Capture Room 2267 Session Chair: Dave Frankman
11:40 – 12:00	1A07: High-order CFD modeling of multispecies flows <i>Landon D. Owen, Stephen M.J. Guzik, Xinfeng Gao</i> <i>Colorado State University</i>	1B07: A comparison of global kinetic models for coal devolatilization <i>Andrew P. Richards, Thomas H. Fletcher</i> <i>Brigham Young University</i>	1C07: Dynamic optimization of the hybrid system of a baseline power generation unit and Cryogenic Carbon Capture <i>Seyed Mostafa Safdarnejad, John D. Hedengren, Larry L. Baxter</i> <i>Brigham Young University</i>
12:00 – 12:20	1A08: Contaminant entrainment from a gasoline pool fire <i>Alexander L. Brown¹, Ethan Zepper¹, David Louie¹, Louis Restrepo²</i> ¹ <i>Sandia National Laboratories</i> ² <i>Atkins NS</i>	1B08: Activated carbon as a potential char surrogate in char kinetics studies <i>Madison Kelley¹, Sean Smith², Jason Porter¹</i> ¹ <i>Colorado School of Mines</i> ² <i>Red Rocks Community College</i>	1C08: Field test of Cryogenic Carbon Capture with coal, biomass, municipal waste, and natural gas <i>Kyler Stitt¹, Dave Frankman¹, Aaron Sayre¹, Larry L. Baxter²</i> ¹ <i>Sustainable Energy Solutions</i> ² <i>Brigham Young University</i>
12:20 – 1:25	LUNCH- On Your Own		
1:40 – 2:40	Invited Presentation: Prof. Fokion Egolfopoulos, University of Southern California Title : Transport-chemistry interactions in simple and complex flows: reassessing assumptions, practices, and relevance to applications Session Chair: Guillaume Blanquart		
	Engines/Diagnostics Room 2260 Session Chair: Dale R. Tree	Turbulent Soot/Coal Room 2265 Session Chair: David O. Lignell	
2:40 – 3:00	1A09: Cross-flow influences on spark kernel temperature evolution <i>N. Sebastian Okhovat, David L. Blunck</i> <i>Oregon State University</i>	1B09: The effect of oxygen enrichment on soot formation and thermal radiation in turbulent, non-premixed methane flames <i>Christopher R. Shaddix, Timothy C. Williams</i> <i>Sandia National Laboratories</i>	
3:00 - 3:20	1A10: Experimental evaluation of a miniature liquid film combustor with secondary air injection <i>André Pereira da Silva¹, Vinicius Maron Sauer², Derek Dunn-Rankin²</i> ¹ <i>Faculdade de Tecnologia de Sorocaba</i> ² <i>University of California, Irvine</i>	1B10: Simulating soot-formation in oxy coal combustion using Large-Eddy Simulation <i>Alexander J. Josephson, David O. Lignell</i> <i>Brigham Young University</i>	

	Engines/Diagnostics Room 2260 Session Chair: Dale R. Tree	Turbulent Soot/Coal Room 2265 Session Chair: David O. Lignell
3:30 - 3:40	1A11: Temperature measurement using infrared spectral band emissions from H₂O <i>Daniel J. Ellis, Dale R. Tree</i> <i>Brigham Young University</i>	1B11: Soot formation in round ethylene jet flames using One-Dimensional Turbulence <i>Victoria B. Lansinger, David O. Lignell</i> <i>Brigham Young University</i>
3:40 - 4:00	1A12: Investigation of scaling laws for combustion engine performance <i>Sean P. Brown, Shyam K. Menon, Chris L. Hagen</i> <i>Oregon State University</i>	1B12: Thermogravimetric analysis of raw and torrefied biomass co-combustion with coal <i>E. Beagle, C. Dunn, E.L. Belmont</i> <i>University of Wyoming</i>
4:00 - 4:20	BREAK - Brigham Young University Conference Center	
	Laminar Flames Room 2260 Session Chair: Erica Belmont	Cookstoves/Oil Shale Room 2265 Session Chair: Berna Hascakir
4:20 - 4:40	1A13: Numerical simulation of methane/air flames including ions and excited species <i>C.-F. López-Cámara¹, G. Éplénier², J. Tinajero³, D. Dunn-Rankin³</i> ¹ <i>Universitat Rovira i Virgili</i> ² <i>École Nationale Supérieure de Mécanique et d'Aérotechnique</i> ³ <i>University of California, Irvine</i>	1B13: Ex-situ extraction of Green River oil shale by combustion <i>Matthew Kozlowski, Taniya Kar, Berna Hascakir</i> <i>Texas A&M University</i>
4:40 - 5:00	1A14: Global linear stability analysis of jet diffusion-flame flickering <i>D. Moreno¹, W. Coenen², A. Sevilla², J. Carpio³, A. Liñan³, A.L. Sánchez¹</i> ¹ <i>University of California, San Diego</i> ² <i>Universidad Carlos III de Madrid</i> ³ <i>Universidad Politécnica de Madrid</i>	1B14: Measurement of syngas composition in a Top-Lit Up-Draft semi-gasifier cookstove under varying modes of operation <i>Jessica Tryner, James Tillotson, Jeffrey Mohr, Anthony J. Marchese</i> <i>Colorado State University</i>
5:00 - 5:20	1A15: Flame merging experiments in low speed, non-premixed natural gas flames <i>Chen Shen, David O. Lignell, Thomas H. Fletcher</i> <i>Brigham Young University</i>	1B15: Carbon monoxide emissions during transient combustion events in a Top-Lit Up-Draft semi-gasifier cookstove <i>James Tillotson, Jessica Tryner, Jeffrey Mohr, Anthony J. Marchese</i> <i>Colorado State University</i>
5:20 - 5:40	1A16: Mechanism of pulsations of a triple flame in mixing layer arising due to thermo-diffusive instability with Lewis number greater than unity <i>David Bhatt, Satyanarayanan Chakravarthy</i> <i>Indian Institute of Technology Madras</i>	1B16: Solid fuel cookstove emissions: Effect of intermittent use <i>Jin Dang, Derek Dunn-Rankin, Rufus Edwards</i> <i>University of California Irvine</i>
6:00	Reception – The Skyroom at the Wilkinson Student Center, Brigham Young University Upcoming Events 21 – 22 March, 2016 WSSCI Spring Meeting Seattle, WA 31 July – 5 August, 2016 36th International Symposium on Combustion COEX, Seoul, Korea	



Tuesday, 6 October 2015

7:15 – 4:00 **Registration: Brigham Young University Conference Center Reception Area**7:15 – 7:45 **Continental Breakfast: Brigham Young University Conference Center**7:45 - 8:00 **Opening Remarks and Announcements: David O. Lignell, Brigham Young University**8:00 – 9:00 **Invited Presentation: Mark Finney, USDA Forest Service**
Title: Experiments lead to new insights into wildfire spread
Session Chair: Thomas Fletcher, Brigham Young University

9:00 – 9:20

BREAK – Brigham Young University Conference Center**Solid Combustion/Flame Spread**
Room 2260
Session Chair: Brad Adams**Heterogeneous/Supersonic Microcombustion**
Room 2265
Session Chair: Kyle Niemeyer

9:20 – 9:40

2A01: Opposed flow flame spread over fire resistant fabric with external radiation, reduced pressure and elevated oxygen
M. Thomsen¹, D.C. Murphy¹, C. Fernandez-Pello¹, D.L. Urban², G. Ruff²
¹University of California, Berkeley
²NASA John H. Glenn Research Center**2B01: Analysis of catalyst placement strategies for efficient heat harvesting in a radiant Heterogeneous/Homogeneous heat-recirculating microcombustor**
Erik D. Tolmachoff, C. Mike Waits
U.S. Army Research Laboratory

9:40 - 10:00

2A02: Measurement of thermal radiation in stabilized downward spreading flame
Grayson Lange, Matthew Laue, Kenneth Keivens, Subrata Bhattacharjee
*San Diego State University***2B02: Diffusion-flame ignition by shock-wave impingement on a supersonic mixing layer**
César Huete¹, Antonio L. Sánchez¹, Forman A. Williams¹, Javier Urzay²
¹University of California, San Diego
²Stanford University

10:00 - 10:20

2A03: The role of fuel thickness in opposed-flow flame spread in a quiescent microgravity environment
Subrata Bhattacharjee, Aslihan Simsek, Ivan Ivisic
*San Diego State University***2B03: Estimates of liquid species diffusivities in *n*-propanol/glycerol mixture droplets burning in reduced gravity**
B.D. Shaw, C.L. Vang
University of California, Davis

10:20 - 10:40

2A04: A numerical model for the determination of biomass ignition from a hotspot
Patrick McArdle, John Williams, Andrew Beavers, Xinfeng Gao
*Colorado State University***2B04: Kinetic modeling of cellulose fractional pyrolysis**
Hayat Bemadji, Lavrent Khachatryan, Slawo Lomnicki
Louisiana State University

10:40 – 11:00

BREAK - Brigham Young University Conference Center

	Fire Room 2260 Session Chair: Sara McAllister	Laminar Flames Room 2265 Session Chair: Derek Dunn-Rankin
11:00 – 11:20	2A05: The ignition and burning of live fuels studied using natural variation in fuel characteristics <i>Jonathan R. Gallacher¹, Victoria B. Lansinger¹, Samantha Smith¹, Ashley Doll¹, David R. Weise², Thomas H. Fletcher¹</i> ¹ Brigham Young University ² USDA Forest Service	2B05: Effect of lift-off height on structure of freely propagating toluene flames <i>E.L. Belmont¹, T.M. Ombrello²</i> ¹ The University of Wyoming ² Air Force Research Laboratory, Wright-Patterson Air Force Base
11:20 – 11:40	2A06: Attachment of flames on slopes <i>Devin C. Kimball¹, Bret W. Butler², Thomas H. Fletcher¹</i> ¹ Brigham Young University ² USDA Forest Service	2B06: Fundamental aspects of structure of laminar premixed flames based on Rate-Ratio Asymptotic analysis <i>Kalyanasundaram Seshadri, Vaishali Amin</i> <i>University of California at San Diego</i>
11:40 – 12:00	2A07: Modeling and analysis of intermediate thickness PMMA sheets burning in microgravity opposed flow <i>Tirthesh J. Shah¹, Fletcher J. Miller¹, Sandra Olson², Indrek Wichman³</i> ¹ San Diego State University ² NASA Glenn Research Center at Lewis Field ³ Michigan State University	2B07: Estimation of flame speed model parameter using Ensemble Kalman Filter algorithm <i>Xinfeng Gao, Yijun Wang, Nathaniel Overton, Ian May</i> <i>Colorado State University</i>
12:00 - 12:20	2A08: Flame spread in a Hagen-Poiseuille-Couette Narrow channel <i>Ghaleb Hamdan, Fletcher J. Miller</i> <i>San Diego State University</i>	2B08: Effects of thermal diffusion on lean hydrogen combustion using tabulated chemistry <i>Jason Schlup, Guillaume Blanquart</i> <i>California Institute of Technology</i>
12:40	ADJOURN BYU Combustion Lab Tours: Please meet in the Clyde Engineering Building inside the South West Doors (Please see Map) Upcoming Events: 21 – 22 March, 2016 WSSCI Spring Meeting Seattle, WA 31 July – 5 August, 2016 36th International Symposium on Combustion COEX, Seoul, Korea	