

Fall Technical Meeting of the Western States Section of the Combustion Institute (WSS/CI 2017 Fall Meeting)

Laramie, Wyoming, USA
2 – 3 October 2017

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For permission requests, please contact Western States Section/Combustion Institute
at the address below.

Western States Section/Combustion Institute
P.O. Box 969 M S 9052
Livermore, California 94551-0969
USA

Phone: 925-294-3840
Fax: 925-294-2276

<http://wssci.us/>

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Western States Section/Combustion Institute

**2017 FALL TECHNICAL MEETING
WESTERN STATES SECTION OF THE COMBUSTION INSTITUTE
Hosted by University of Wyoming, Laramie, WY**

Sunday, 1 October 2017

4:00 pm WSSCI Board Meeting: Salon B in the University of Wyoming Conference Center

Monday, 2 October 2017

7:30 – 5:00 Registration: University of Wyoming Conference Center Lobby

7:30 – 8:00 Continental Breakfast: University of Wyoming Conference Center Lobby

8:00 - 8:15 Welcome Address: Dr. Edmund Synakowski, *Vice President for Research and Economic Development, University of Wyoming*
Welcome Remarks: Prof. Fletcher Miller, *WSSCI Chair, San Diego State University*
Prof. Erica Belmont, *University of Wyoming*

8:15 – 9:15 Plenary Lecture in Salon C: **Dr. Timothy Ombrello, Air Force Research Lab**
Session Chair: Erica Belmont, *University of Wyoming*

BREAK			
	Laminar Flames I Salon A Session Chair: A.L. Sánchez	Turbulent Flames I Salon B Session Chair: G. Blanquart	Fire I Salon C Session Chair: S. McAllister
9:15 – 9:25			
9:25 – 9:45	1A01: Porous wall-fed liquid fueled miniature tubular flame burner <i>V.M. Sauer, J.S. Battner, D. Dunn-Rankin</i>	1B01: Flame stability of turbulent premixed jet flames of large hydrocarbon fuels <i>N.E. Schorn, J. Bonebreak, D.L. Blunck</i>	1C01: Investigation of merging flames in horizontal and vertical geometries <i>M. Rhamati, C. Harper, M. Butler, T.H. Fletcher</i>
9:45 – 10:05	1A02: Flame propagation in narrow channels at varying Lewis number <i>X. Ma, S. Shen, J. Wongwiwat, J. Gross, P. Ronney</i>	1B02: Implementing and assessing the importance of multicomponent transport properties using direct numerical simulations of premixed, turbulent flames <i>A.J. Fillo, J. Schlup, G. Blanquart, K.E. Niemeyer</i>	1C02: Modeling the Coanda effect with FDS and STARCCM+ to predict the effect of fires on slopes for implications of wildland firefighter safety <i>B. Billings, M. Roberts, B. Butler, T.H. Fletcher</i>
10:05 – 10:25	1A03: Laminar flame speeds of associated gas mixtures measured with flat flame method <i>F. Arafin, E. Belmont</i>	1B03: Dependence of intermittency on turbulence intensity, fuel type, and simulation fidelity in premixed reacting flows <i>S.H.R. Whitman, C.A.Z. Towery, A.Y. Poludnenko, P.E. Hamlington</i>	1C03: Plume attachment in wildfires on slopes: Temperature measurements in a laboratory-scale analog <i>T.P. Grumstrup, M.A. Finney</i>
10:25 – 10:45	1A04: Experimental and numerical study of freely propagating propane cool flames <i>M. Hajilou, E. Belmont</i>	1B04: Lagrangian analysis of enstrophy in turbulent premixed flames <i>R. Darragh, C.A.Z. Towery, A.Y. Poludnenko, P.E. Hamlington</i>	1C04: The onset of puffing of pool fires <i>W. Coenen, D. Moreno, A.L. Sánchez, F.A. Williams</i>
10:45 – 11:00			BREAK

	Laminar Flames II Salon A Session Chair: Y.-C. Chien	Turbulent Flames II Salon B Session Chair: P. Hamlington	Fire II Salon C Session Chair: S. Bhattacharjee
11:00 – 11:20	1A05: Temperature profiles and extinction limits of a coflow water-laden methane/air diffusion flame <i>M. Vicariotto, P. Martinez, D. Dunn-Rankin</i>	1B05: PLIF-assisted discrimination of gas and liquid velocities for 5 kHz PIV in a liquid-fueled pressurized combustor <i>H. Ozogul, H. Ek, I. Chtere, B. Emerson, T. Lieuwen</i>	1C05: Model sensitivities in LES predictions of buoyant methane fire plumes <i>H. Koo, J.C. Hewson, S.P. Domino, R.C. Knaus</i>
11:20 – 11:40	1A06: Experimental and computational investigation of autoignition of jet fuels and surrogates in nonpremixed flows at elevated pressures <i>G. Mairinger, A. Frassoldati, A. Cuoci, M. Pelucchi, E. Pucher, K. Seshadri</i>	1B06: Laboratory investigation of down-scaling effects on low swirl burners <i>A. Frank, P. Therkelsen, J.-Y. Chen, V.H. Rapp, R.K. Cheng</i>	1C06: Direct numerical simulation of wildland fires at small scales <i>N.T. Wimer, A.S. Makowecki, A.Y. Poludnenko, C.M. Hoffman, J.W. Daily, G.B. Rieker, P.E. Hamlington</i>
11:40 – 12:00	1A07: A novel formulation for unsteady counterflow flames using a thermal-conductivity-weighted coordinate <i>A. Weiss, M. Vera, A. Liñán, A.L. Sánchez, F. Williams</i>	1B07: Evaporation and autoignition studies of liquid n-alkane droplets in lean, high pressure methane/air mixtures in a rapid compression machine <i>J. Mohr, C. Gould, A. Zdanowicz, A. Marchese</i>	1C07: The effect of pressure and external heating on the Nomex flame spread limits (LOC) <i>M. Thomsen, X. Huang, C. Fernandez-Pello, A. Alonso, D.L. Urban, G.A. Ruff</i>
12:00 – 12:20	1A08: Global diffusion flame extinction strain rate experiments of single large hydrocarbon fuels <i>A. Jadhav, R. Alsulami, B.C. Windom</i>	1B08: Preliminary study of the interactions between detonation chemistry and magnetohydrodynamics <i>M.F. Zaiger, K.E. Niemeyer</i>	1C08: Heat transfer optimization in simulated microgravity combustion <i>S. Hossain, I.S. Witchman</i>
12:20 – 1:20	LUNCH – Box Lunches are available in the University of Wyoming Conference Center Lobby Women in Combustion Lunch – Salon B		
	Microcombustion and Transport Salon A Session Chair: P.D. Ronney	Kinetics I Salon B Session Chair: K.E. Niemeyer	Fire III Salon C Session Chair: T.P. Grumstrup
1:20 – 1:40	1A09: Hydrocarbon-fueled electrical power generator with no moving parts <i>J. Wongwiwat, P. Bhuripanyo, V. McCloyn, P. Ronney</i>	1B09: Uncertainty of transport parameters in flame models: A database from virial coefficient measurements <i>D.I. Pineda, T.A. Casey, X. Shi, J.-Y. Chen</i>	1C09: Correlating mass burning rate and flame spread rate for thin PMMA: Implications on pyrolysis temperature <i>L. Carmignani, S. Bhattacharjee</i>
1:40 - 2:00	1A10: Impact of pressure on simulated FREI combustion <i>P. Sharma, M. Ayoobi, M. McNenly, I. Schoegl</i>	1B10: Influence of blending methyl decanoate with <i>n</i> -decane on ignition delay times in a fuel ignition tester <i>R. Leathers, S. Stuhlman, K. Kumar, S. Beyerlein, C.-J. Sung</i>	1C10: Two-dimensional heat transfer analysis within non-thermally thin poly(methyl methacrylate) that is burned in a narrow channel apparatus <i>N.A. Lage, F.J. Miller</i>
2:00 - 2:20	1A11: Computational performance of chemistry and transport calculations in NGA <i>J. Schlup, N. Burali, G. Beardsell, G. Blanquart</i>	1B11: Ignition delay times and Derived Cetane Numbers of canola, corn, and soy derived bio-diesel <i>S. Stuhlman, C. Dunkel, R. Leathers, K. Kumar, D. Shrestha, S. Beyerlein, C.-J. Sung</i>	1C11: Temperature measurement of glowing firebrands with multi-color pyrometry <i>J.L. Urban, D. Shirazi, M. Vicariotto, D. Murphy, D. Dunn-Rankin, C. Fernandez-Pello</i>

	Microcombustion and Transport Salon A Session Chair: P.D. Ronney	Kinetics I Salon B Session Chair: K.E. Niemeyer	Fire III Salon C Session Chair: T.P. Grumstrup
2:20 - 2:40	1A12: Modeling a pressurized coal feed system <i>T. Schroedter, B. Adams</i>	1B12: Missing experimental data and rate parameter inference for $\text{H}_2+\text{OH}=\text{H}_2\text{O}+\text{H}$ <i>T.A. Casey, H. Najm</i>	1C12: Pyrolysis of live vegetation at slow heating rates <i>E. Amini, M.-S. Safdari, M. Rahmati, J. Howarth, J. DeYoung, T.H. Fletcher</i>
2:40 - 3:00	1A13: A new efficient model for multicomponent membrane separation and application to the Argon Power Cycle <i>F. Chourou, M.S. Aznar, J.-Y. Chen, A. Dreizler</i>	1B13: Probing the pyrolysis chemistry of ethyl propionate in a microreactor <i>C. Rogers, J. Porterfield, J. Daily, B. Ellison, N. Labbe</i>	1C13: Effect of reduced plume entrainment on the burning rate of porous fuel beds <i>S. McAllister</i>
3:00 - 3:15	BREAK		
	Innovative Technologies Salon A Session Chair: J. Cole	Kinetics II Salon B Session Chair: H. Najm	Coal and Biomass I Salon C Session Chair: B. Adams
3:15 - 3:35	1A14: Kinetic study of ethane pyrolysis in an internal combustion engine <i>Z. Taie, D. Wagner, C. Hagen</i>	1B14: A new jet-stirred reactor for chemical kinetics experiments <i>A.A. Davani, P.D. Ronney</i>	1C14: Comparison of laminar pulverized coal flame experiment and simulation <i>C. Dunn, E. Beagle, M. Stoellinger, E. Belmont</i>
3:35 - 3:55	1A15: Flame stability and liftoff heights of a surrogate jet fuel burned near MILD combustion conditions <i>P. Weide, D. Blunck</i>	1B15: Numerical design of a novel microreactor to study short residence time combustion <i>T. Fan, C. Rogers, J.W. Daily, B. Ellison, N. Labbe</i>	1C15: A fast-running simulation tool for axisymmetric oxy-coal combustors <i>T. Williams, B. Adams</i>
3:55 - 4:15	1A16: Estimation of multiple model parameters using a data-assimilated CFD algorithm <i>Y. Wang, X. Gao</i>	1B16: Comparison and analysis of chemical kinetic models for toluene autoignition <i>M.A. Mayer, K.E. Niemeyer</i>	1C16: Modeling effects of annealing on coal char reactivity to O_2 and CO_2 based on preparation conditions <i>T. Holland, T.H. Fletcher</i>
4:15 - 4:35	1A17: Investigation of argon oxy combustion with low molecular weight fuels: Improving thermodynamic efficiency <i>C. Scudiere, J.-Y. Chen, R. Dibble, M. Aznar</i>	1B17: Investigating stiffness detection metrics for chemical kinetics <i>A. Alferman, K.E. Niemeyer</i>	1C17: Co-gasification of coal and biochar in modified drop tube reactor and TGA <i>E. Beagle, Y. Wang, D. Bell, E. Belmont</i>
4:35 - 4:55	1A18: Preliminary design and development of an ultra high efficiency Stirling engine heater head <i>M.S. Aznar, A. Frank, P.L. Therkelesen, V. Rapp, R.K. Cheng</i>	1B18: pyMARS: An open software package for reducing chemical kinetics models <i>P.O. Mestas, P. Clayton, K.E. Niemeyer</i>	1C18: Comparison of raw and torrefied healthy and beetle kill pine in co-combustion with coal <i>A. Howell, E. Beagle, E. Belmont</i>
6:00	Reception – Laramie Historic Railroad Depot 1st & S 1st St, Laramie		



Western States Section/Combustion Institute

Tuesday, 3 October 2017

7:30 – 1:00 **Registration:** University of Wyoming Conference Center Lobby7:30 – 8:00 **Continental Breakfast:** University of Wyoming Conference Center Lobby8:00 - 8:05 **Opening Remarks and Announcement:** Prof. Erica Belmont, *University of Wyoming*8:05 – 9:05 **Plenary Lecture: Dr. Daniel Dietrich, NASA***Session Chair: Dr. Fletcher Miller, University of California San Diego*

9:05 – 9:15	BREAK		
	Diagnostics Salon A <i>Session Chair: B.C. Windom</i>	Engines Salon B <i>Session Chair: D.B. Olsen</i>	Coal and Biomass II Salon C <i>Session Chair: T.H. Fletcher</i>
9:15 – 9:35	2A01: Exploring continuous monitoring methods for SO ₃ in flue gas conditions <i>A. Biasioli, Y.-C. Chien, D. Dunn-Rankin</i>	2B01: Investigation of non-ideal gasoline-ethanol vaporization behavior using an ethanol, cyclohexane, and benzene surrogate <i>S. Burke, M. Ratcliff, R. McCormick, D. Bartholet, B. Windom</i>	2C01: Sub-model fidelity in pulverized coal combustion simulations <i>C. Dunn, M. Stoellinger</i>
9:35 - 9:55	2A02: Strategy for background-free measurements of high-speed OH in turbulent flames using SLIPI <i>B. Zhou, J.H. Frank</i>	2B02: Performance of a compression ignition engine fueled with renewable diesel blends produced from hydrothermal liquefaction, fast pyrolysis, and conversion of ethanol to diesel <i>J. Tryner, K. Albrecht, J. Billing, R.T. Hallen, A.J. Marchese</i>	2C02: Smoldering behavior of compacted sawdust <i>P.P. Radyjowski, R.H. Bush, J.L. Ellzey</i>
9:55 - 10:15	2A03: Direct comparison of simulated OH fluorescence and experimental results in a non-premixed laminar diffusion coflow flame at high pressure conditions <i>D. Escobet-Martin, A. Torredemer, Y.-C. Chien, D. Dunn-Rankin</i>	2B03: Crankcase blow-by gas particulate matter characterization and filtration on a John Deere 4.5 l diesel engine <i>B.D. Rice, J. Tillotson, D.B. Olsen</i>	2C03: Impact of particle properties on radiative heat flux in an oxy-coal reactor <i>T. Hosler, B. Adams</i>
10:15 - 10:35	2A04: Light extinction based image analysis technique for rotating fluidized beds <i>Z. Lavrich, Z. Taie, D. Wagner, C. Hagen</i>	2B04: Evaluation of fuel savings for a ship system with variable frequency drives and energy storage using a Cummins QSK50 Tier 4 diesel engine <i>J. Moothart, D.M. Wise, D.B. Olsen</i>	2C04: CFD simulations of hydropyrolysis <i>G.D. Baldwin, C.W. Dunn, M. Stoellinger</i>
10:35 – 10:50	BREAK		

	Heterogeneous and Soot Salon A Session Chair: D.O. Lignell	Turbulent Flames III Salon B Session Chair: M. Stoellinger	Laminar Flames III Salon C Session Chair: K. Seshadri
10:50 – 11:10	2A05: Opposed-flow heterogeneous reactor for partial oxidation of methane <i>Y. Lin, X. Li, M.V. Twigg, W.F. Northrop</i>	2B05: Lagrangian analysis of premixed autoignition in compressible turbulence <i>C.A.Z. Towery, R. Darragh, A.Y. Poludnenko, P.E. Hamlington</i>	2C05: Impact of acoustic-induced pressure fluctuations on the dynamics of laminar premixed flames <i>G. Beardsell, G. Blanquart</i>
11:10 – 11:30	2A06: Preliminary analysis of smoldering combustion in cellulose and hemicellulose mixtures <i>T.C. Mulky, K.E. Niemeyer</i>	2B06: The effect of spray burner outlet configuration, nozzle position and nozzle type on the flame behavior and stability of liquid fuels <i>R.A. Alsulami, B.C. Windom</i>	2C06: Impact of non-ideal corrections to equation of state, thermodynamics, and chemical kinetics on one-dimensional freely propagating flame structure <i>S. Yellapantula, J.B. Bell, E. Motheau, M.S. Day, R.W. Grout</i>
11:30 – 11:50	2A07: Effects of fuel composition and packing density on horizontal smoldering propagation <i>B.D. Smucker, D.A. Cowan, D.L. Blunck</i>	2B07: Nitrogen oxide emissions from reacting jets in vitiated crossflow <i>M.D. Sirignano, V. Nair, B. Emerson, J. Seitzman, T.C. Liewen</i>	2C07: Numerical simulations of a co-flow methane/air flame including ions and excited species under different gravity conditions <i>C.-F. Lopez-Camara, D. Dunn-Rankin</i>
11:50 - 12:10	2A08: Flame temperature effect on the transition between soot and graphitic carbon products in premixed stagnation flames <i>J. Camacho</i>	2B08: Effect of stoichiometric mixture fraction on hydrogen edge-flames in a counter-flow burner <i>Z. Zhou, P.D. Ronney</i>	2C08: Influences of stoichiometry on steadily propagating triple flames in counterflows <i>P. Rajamanickam, W. Coenen, A.L. Sánchez, F.A. Williams</i>
12:10 – 12:30	2A09: Modeling soot formation from solid complex fuels <i>A.J. Josephson, E. Hopkins, R.R. Linn, D.O. Lignell</i>	2B09: Transported and presumed joint PDF modeling of turbulent jet flames <i>V. Jagannath, M. Stoellinger</i>	2C09: A new reduced thermal diffusion model for H and H ₂ <i>J. Schlup, G. Blanquart</i>
12:30 – 12:50			2C10: Thermal explosions in spherical vessels at large Rayleigh numbers <i>D. Moreno, I. Iglesias, A.L. Sánchez, A. Liñán, F.A. Williams</i>
12:50	Adjourn		