

**2019 FALL TECHNICAL MEETING
WESTERN STATES SECTION OF THE COMBUSTION INSTITUTE
Hosted by Sandia National Laboratories - Albuquerque, NM**

Monday, 14 October 2019

7:30 – 4:00 Registration: Foyer

7:30 – 8:00 Breakfast: Salon F

8:00 - 8:20 Welcome Address in Salon E: Amanda Dodd, *Computational Science and Analysis, Sandia National Laboratories*

Welcome Remarks: John Hewson, *Sandia National Laboratories*

Guillaume Blanquart, *Section Chair, U.S. Western States Section*

8:20 – 9:20 Plenary Lecture in Salon E: Hai Wang, *Stanford University*

Session Chair: Paul D. Ronney, *University of Southern California*

9:20 – 9:30	Transition to Morning Sessions		
	Fire I Salon E Session Chair: A.J. Kurzawski	Engines I Salons C-D Session Chair: D. Olsen	Heterogeneous Combustion Salons A-B Session Chair: B. Windom
9:30 – 9:50	1A01: Solid-dominant ignition thresholds for cellulose under extreme irradiation <i>J.D. Engerer, A.L. Brown</i>	1B01: High-speed optical measurements of combustion and soot processes in stratified gasoline sprays ignited by a laser-induced plasma <i>H.S. Sim, F. Tagliante, L.M. Pickett, S.A. Skeen</i>	1C01: Thermodynamic characterization of combustion systems <i>D.T. Banuti</i>
9:50 – 10:10	1A02: Parametric sensitivity study of reacting solids exposed to high heat flux environments <i>E.T. Zepper, A.L. Brown, S.N. Scott</i>	1B02: Spatio-temporal progression of two-stage autoignition for diesel sprays in a low-reactivity ambient: n-Heptane pilot-ignited premixed natural gas <i>R. Rajasegar, Y. Niki, Z. Li, M. Musculus</i>	1C02: Combustion and droplet behavior of jet fuel surrogates in a two-phase reacting flow <i>S. Lucas, R. Alsulami, M. Hageman, M. Knadler, B. Windom</i>
10:10 – 10:30	1A03: Investigation of radiation-kinetics interactions in near-limit flames in low-pressure downward flame spread <i>S. Bhattacharjee, L. Carmignani, K. Dong</i>	1B03: Investigating boundary layer flashback of a high turbulence intensity jet flame at gas turbine conditions <i>N. Auwaijan, V. McDonell</i>	1C03: Flame blowout and liftoff of jet fuels with different physical and chemical properties <i>R. Alsulami, B. Windell, S. Lucas, B. Windom</i>
10:30 – 10:50	1A04: Constructing and accessing tabulated chemistry for fire scenarios <i>E. Armstrong, M.A. Hansen, R.C. Knaus, J.C. Hewson, J.C. Sutherland</i>	1B04: Reduced chemical kinetics model for low-speed pre-ignition investigation <i>K. Tran, K.E. Niemeyer, C.L. Hagen</i>	1C04: Effect of carbon-based nanomaterial additives on droplet evaporation characteristics of crude oil <i>G. Singh, M. Esmaeilpour, A. Ratner</i>
10:50 – 11:10	BREAK – Foyer		

	Fire II Salon E Session Chair: S.N. Scott	Engines II Salons C-D Session Chair: V. McDonell	Chemical Kinetics Salons A-B Session Chair: N. Labbe
11:10 – 11:30	1A05: Modeling high heat flux combustion of coniferous trees using chemically reacting Lagrangian particles <i>H. Mendoza, A. Brown, A. Ricks</i>	1B05: Ignition, flame propagation, and end-gas autoignition studies of natural gas/EGR blends in a rapid compression machine <i>J. Mohr, A. Zdanowicz, J. Tryner, K. Gustafson, J. Venegas, B. Windom, D. Olsen, A. Marchese</i>	1C05: Thermal analysis of iodine-based surface reactions on aluminum particles <i>I. Shancita, K.K. Miller, M.L. Pantoya</i>
11:30 – 11:50	1A06: Stability of laminar flames on inclined fuel surfaces <i>R.S.P. Hakes, W. Coenen, A.L. Sánchez, M.J. Gollner, F.A. Williams</i>	1B06: The effect of EGR on knock suppression, efficiency, and emissions in a stoichiometric, spark ignited, natural gas engine <i>S. Bayliff, A. Marchese, B. Windom, D. Olsen</i>	1C06: <i>n</i> -Heptane autoignition and speciation in a rapid compression expansion machine <i>S. Van Horn, K. Kumar</i>
11:50 – 12:10	1A07: Understanding the role of low pressure on upward flame spread over thin cotton <i>M. Thomsen, S. Fereres, C. Fernandez-Pello, D.L. Urban, G.A. Ruff</i>	1B07: Effect of fuel reactivity and end-gas temperature on autoignition and flame propagation rate in primary reference fuel mixtures at elevated temperature and pressure <i>A. Zdanowicz, J. Mohr, J. Tryner, K. Gustafson, B. Windom, D.B. Olsen, G. Hampson, A.J. Marchese</i>	1C07: Termolecular chemistry facilitated by radical-radical recombinations and their impact on flame speed predictions <i>Y. Tao, A.W. Jasper, Y. Georgievskii, S.J. Klippenstein, R. Sivaramakrishnan</i>
12:10 – 12:30	1A08: On the boundary layer surrounding fire whirls <i>A.D. Weiss, P. Rajamanickam, W. Coenen, A.L. Sánchez, F.A. Williams</i>	1B08: Operation of a SI engine fueled by simulated exhaust anode tail-gas from a SOFC <i>A. Balu, T. Bandhauer, B. Windom, S. Garland, R. Braun, D.B. Olsen</i>	1C08: Comparing mechanism reduction methods with pyMARS: Python-based Model Automatic Reduction Software <i>P.O. Mestas, K.E. Niemeyer</i>
12:30 – 1:30	LUNCH – Salon F Women in Combustion Lunch – Salon F		
	Fire III Salon E Session Chair: M. Thomsen	Engines III Salons C-D Session Chair: R. Rajasegar	Coal and Biomass Combustion Salons A-B Session Chair: J.C. Sutherland
1:30 – 1:50	1A09: Modeling soot emissions in coarse grid simulations <i>A.J. Josephson, R.R. Linn</i>	1B09: 3-D Modeling of the CFR engine for the investigation of knock on natural gas <i>D. Bestel, B. Windom, D. Olsen, A. Marchese, S. Bayliff, H. Xu</i>	1C09: Insight on required conditions to achieve MILD coal combustion <i>H. Zhou, J. McConnell, T.A. Ring, J.C. Sutherland</i>
1:50 - 2:10	1A10: Smoldering combustion of cellulose, hemicellulose, and lignin: Investigating the roles of fuel composition, density, oxygen concentration and moisture content <i>W.J. Jayasuriya, K.E. Niemeyer</i>	1B10: Predictive modeling of a spark ignition SOFC anode tailgas engine <i>M. Countie, B. Windom, T. Bandhauer, S. Garland, R. Braun, D. Olsen</i>	1C10: Development of a digital twin for a biomass boiler: Preliminary results <i>O. Diaz, J.C. Parra, S. Harding, L. Marshall, S. Smith, J. Thornock, M. Hradisky, J. Spinti, P. Smith</i>

	Fire III Salon E Session Chair: M. Thomsen	Engines III Salons C-D Session Chair: R. Rajasegar	Coal and Biomass Combustion Salons A-B Session Chair: J.C. Sutherland
2:10 - 2:30	1A11: Differences in production of pyrogenic biochar between healthy and beetle-affected trees in the Medicine Bow-Routt Badger Creek fire <i>A. Howell, V.R. Zambrano, M. Bretfeld, E. Belmont</i>	1B11: Combustion modelling and simulation of dilute syngas fuels in a CFR engine <i>G. Padhi, A. Balu, S. Garland, D. Olsen, T. Bandhauer, B. Windom</i>	1C11: Modeling the effect of ash build-up in fire-side furnace on radiation heat transfer <i>J.C. Parra-Álvarez, O. Díaz-Ibarra, T. Ring, S. Smith, M. Zhou, B. Isaac, P. Smith</i>
2:30 – 2:50	1A12: Initiation of pyrolysis from high flux exposures <i>A.L. Brown, J.D. Engerer, A.J. Ricks, J. Christian</i>	1B12: On the application of the Livengood-Wu correlation towards assessing the impact of compression history on compression ignition combustion in a multi-mode engine <i>A. Shah, S.S. Goldsborough, D.E. Longman, T. Rockstroh</i>	1C12: Improvement of computational efficiency for discrete ordinate radiation calculations through the use of dimensionally adaptive mesh techniques <i>T. Williams, B. Adams</i>
2:50 - 3:10	BREAK - Foyer		
	Fire IV Salon E Session Chair: A.L. Brown	Diagnostics and Detonations Salons C-D Session Chair: H.S. Sim	Mixing/Micro/Turbulent Salons A-B Session Chair: V.H. Rapp
3:10 - 3:30	1A13: Effect of ambient pressure on the piloted ignition and subsequent flame spread across simulated electrical wires <i>L. Gagnon, J.L Urban, C. Fernandez-Pello, V.P. Carey, Y. Konno, O. Fujita</i>	1B13: Analysis of laser focusing effect on quantification of LII images <i>C.R. Shaddix, T.C. Williams</i>	1C13: The cross-scale flux of kinetic energy by baropycnal work in premixed reacting flows <i>C.A.Z. Towery, J. Urzay, A.Y. Poludnenko, P.E. Hamlington</i>
3:30 - 3:50	1A14: Predicting limits of cascading failure of thermal runaway in stacks of Li-ion pouch cells <i>A.J. Kurzawski, R. Shurtz, L. Torres-Castro, J. Lamb, J.C. Hewson</i>	1B14: Theoretical uncertainty analysis of a high-temperature ammonia diagnostic <i>Z. Ferman, J. Kalman</i>	1C14: Advanced heat recirculating counterflow reactors utilizing additive manufacturing <i>P. Radyjowski, D. Bourell, J.L. Ellzey</i>
3:50 - 4:10	1A15: Infrared measurements of forward heat conduction during simulated microgravity flame spread in the narrow channel apparatus <i>M. Berry, F. Miller, S. Olson, I. Wichman</i>	1B15: Emissivity measurements of YAG:Dy and MgFGeO:Mn <i>W. Flores-Brito, P. Vorobieff, J.T. Mahaffey, A. Vackel, K.N.G. Hoffmeister</i>	1C15: Can machine learning predict fuel properties accurately? <i>M.A. Mayer, T. Huntington, A. Comesana, V.H. Rapp, K.E. Niemeyer</i>
4:10 – 4:30	1A16: Numerical simulation of high-speed oxy-fuel detonation in a pulse detonation tube using space-time Conservation Element and Solution Element (CE/SE) method <i>S.K. Karra, S.V. Apte</i>	1B16: Characterization of small-arms muzzle flash using high-speed thermal infrared imaging <i>M. Larson, V. Morton, F. Marcotte, B. Saute</i>	1C16: Effects of fluidizing gas on copper-manganese mixed oxide's reactivity for chemical looping combustion of CH ₄ <i>T. Barua, S. Horlick, B. Padak</i>
5:00	Reception – Salon F		



Western States Section/Combustion Institute

Tuesday, 15 October 2019

7:30 – 12:00 Registration: Foyer

7:30 – 8:00 Breakfast: Salon F

8:00 - 8:05 Opening Remarks and Announcement in Salon E: John Hewson, *Sandia National Laboratories*

8:05 – 9:05 Plenary Lecture in Salon E: Sara McAllister, *U.S. Forest Service*

Session Chair: Fletcher Miller, *San Diego State University*

9:05 – 9:15	Transition to Morning Sessions		
	Laminar Flames I Salon E Session Chair: A.L. Sánchez	Soot I Salons C-D Session Chair: E. Belmont	Turbulent Flames Salons A-B Session Chair: D. Lignell
9:15 – 9:35	2A01: Counterflow combustion with multiple flames under high strain rates <i>W.A. Sirignano</i>	2B01: Influence of physical properties of conventional, alternative, and surrogate jet fuels on soot formation in a spray flame <i>R. Alsulami, B. Windell, B. Windom</i>	2C01: Reproducing the local characteristics of compressible turbulent flows at a low cost: Derivation and application <i>G. Beardsell, G. Blanquart</i>
9:35 - 9:55	2A02: Near-limit H_2 - O_2 - N_2 combustion in nonpremixed counterflow mixing layers <i>J. Carpio, P. Rajamanickam, A.L. Sánchez, P.D. Ronney, F.A. Williams</i>	2B02: Carbon nanoparticle production through propane pyrolysis experimentation and modeling <i>N. Bauer, F. Miller</i>	2C02: Stochastic simulation of turbulent reacting flows with variable Schmidt numbers <i>D. Lignell, T. Starick, I. Wheeler, J. Frei</i>
9:55 - 10:15	2A03: A high flux forest fire scenario for assessing relative model accuracy for CFD tools <i>A.L. Brown, H. Mendoza, E. Koo, J. Reisner</i>	2B03: Aerosol formation from biomass and major biomass constituents <i>L. McLaughlin, E. Belmont</i>	2C03: Soot and radiation interactions in turbulent jet flames studied with Reynolds-averaged Navier-Stokes simulations <i>A. Baumgart, T. Voskuilen, P. Sakievich, J. Hewson</i>
10:15 - 10:35	2A04: The combined effects of chemical order and stoichiometry on nonpremixed edge flames <i>F. Al-Malki, P. Ronney</i>	2B04: Modeling soot in oxy-coal combustion systems using Large Eddy Simulations <i>K. Brinkerhoff, A. Josephson, B. Isaac, J. Thornock, A. Fry, D. Lignell</i>	2C04: Combustion in regenerative air-fuel glass furnace <i>C.-H. Hung</i>
10:35 – 10:55	BREAK - Foyer		

	Laminar Flames II Salon E Session Chair: W.A. Sirignano	Soot II Salons C-D Session Chair: A.J. Josephson
10:55 – 11:15	2A05: Normal strain rate and pressure effects using detailed and global chemistry models in a CH ₄ -air counterflow flame <i>C.-F. López-Cámara, A.J. Juanós, W.A. Sirignano</i>	2B05: A Python-based platform to investigate soot formation and growth <i>B. Blanksma-Stark, K.E. Niemeyer</i>
11:15 – 11:35	2A06: Investigation of the effect of ozone on flame propagation of n-heptane cool flames at sub-atmospheric pressures <i>M.Q. Brown, E.L. Belmont</i>	2B06: Simulating soot formation in model flames <i>W. Pejpichestakul, A. Cuoci, T. Faravelli, J.F. Glusman, H.A. Michelsen, J.W. Daily</i>
11:35 – 11:55	2A07: Experimental characterization of freely propagating <i>n</i> -decane cool flames at sub-atmospheric pressures <i>M.C. Brown, E.L. Belmont</i>	2B07: A numerical study of soot formation in diesel impinged spray combustion and its comparison with experiments <i>Z. Zhao, M. Tang, L. Zhao, X. Zhu, S.-Y. Lee</i>
11:55 - 12:15		
12:15	Adjourn Cantera Workshop in Salons C-D open to all Sandia National Laboratories Tour individuals that signed up only	

2019 WSSCI Fall Technical Meeting Author List

<i>AuthorPaper #</i>	<i>Author Paper #</i>	<i>Author Paper #</i>	<i>Author Paper #</i>
Adams, B.1C12	Daily, J.W. 2B06	Jasper, A.W. 1C07	Mohr, J.1B05, 1B07
Al-Malki, F. 2A04	Diaz, O. 1C10	Jayasuriya, W.J. 1A10	Morton, V. 1B16
Alsulami, R. 1C02, 1C03, 2B01	Díaz-Ibarra, O. 1C11	Josephson, A. 2B04	Musculus, M. 1B02
Apte, S.V. 1A16	Dong, K. 1A03	Josephson, A.J. 1A09	Niemeyer, K.E. 1A10, 1B04, 1C08, 1C15, 2B05
Armstrong, E. 1A04	Ellzey, J.L. 1C14	Juanós, A.J. 2A05	Niki, Y. 1B02
Auwaijan, N.1B03	Engerer, J.D. 1A01, 1A12	Kalman, J. 1B14	Olsen, D.B. 1B05, 1B06, 1B07, 1B08, 1B09, 1B10, 1B11
Balu, A. 1B08, 1B11	Esmaeilpour, M. 1C04	Karra, S.K. 1A16	Olson, S. 1A15
Bandhauer, T. .. 1B08, 1B10, 1B11	Faravelli, T. 2B06	Klippenstein, S.J. 1C07	Padak, B. 1C16
Banuti, D.T.1C01	Fereres, S. 1A07	Knadler, M. 1C02	Padhi, G. 1B11
Barua, T.1C16	Ferman, Z. 1B14	Knaus, R.C. 1A04	Pantoya, M.L. 1C05
Bauer, N.2B02	Fernandez-Pello, C. ... 1A07, 1A13	Konno, Y. 1A13	Parra, J.C. 1C10
Baumgart, A.2C03	Flores-Brito, W. 1B15	Koo, E. 2A03	Parra-Álvarez, J.C. 1C11
Bayliff, S. 1B06, 1B09	Frei, J. 2C02	Kumar, K. 1C06	Pejpichestakul, W. 2B06
Beardsell, G.2C01	Fry, A. 2B04	Kurzawski, A.J. 1A14	Pickett, L.M. 1B01
Belmont, E.L.1A11, 2A06, 2A07, 2B03	Fujita, O. 1A13	Lamb, J. 1A14	Poludnenko, A.Y. 1C13
Berry, M. 1A15	Gagnon, L. 1A13	Larson, M. 1B16	Radyjowski, P. 1C14
Bestel, D.1B09	Garland, S. 1B08, 1B10, 1B11	Lee, S.-Y. 2B07	Rajamanickam, P. 1A08, 2A02
Bhattacharjee, S. 1A03	Georgievskii, Y. 1C07	Li, Z. 1B02	Rajasegar, R. 1B02
Blanksma-Stark, B.2B05	Glusman, J.F. 2B06	Lignell, D.2B04, 2C02	Rapp, V.H. 1C15
Blanquart, G.2C01	Goldsborough, S.S. 1B12	Linn, R.R. 1A09	Ratner, A. 1C04
Bourell, D.1C14	Gollner, M.J. 1A06	Longman, D.E. 1B12	Reisner, J.2A03
Braun, R. 1B08, 1B10	Gustafson, K. 1B05, 1B07	López-Cámara, C.-F. 2A05	Ricks, A.J. 1A05, 1A12
Bretfeld, M. 1A11	Hageman, M. 1C02	Lucas, S. 1C02, 1C03	Ring, T.A.1C09, 1C11
Brinkerhoff, K.2B04	Hagen, C.L. 1B04	Mahaffey, J.T. 1B15	Rockstroh, T. 1B12
Brown, A.L.1A01, 1A02, 1A05, 1A12, 2A03	Hakes, R.S.P. 1A06	Marchese, A.1B05, 1B06, 1B07, 1B09	Ronney, P.D. 2A02, 2A04
Brown, M.C. 2A07	Hamlington, P.E. 1C13	Marcotte, F. 1B16	Ruff, G.A. 1A07
Brown, M.Q. 2A06	Hampson, G. 1B07	Marshall, L. 1C10	Sakievich, P. 2C03
Carey, V.P. 1A13	Hansen, M.A. 1A04	Mayer, M.A. 1C15	Sánchez, A.L. 1A06, 1A08, 2A02
Carmignani, L. 1A03	Harding, S. 1C10	McConnell, J. 1C09	Saute, B. 1B16
Carpio, J. 2A02	Hewson, J.C. 1A04, 1A14, 2C03	McDonell, V. 1B03	Scott, S.N. 1A02
Christian, J. 1A12	Hoffmeister, K.N.G. 1B15	McLaughlin, L. 2B03	Shaddix, C.R. 1B13
Coenen, W.1A06, 1A08	Horlick, S. 1C16	Mendoza, H. 1A05, 2A03	Shah, A. 1B12
Comesana, A.1C15	Howell, A. 1A11	Mestas, P.O. 1C08	Shancita, I. 1C05
Countie, M.1B10	Hradisky, M. 1C10	Michelsen, H.A. 2B06	Shurtz, R. 1A14
Cuoci, A.2B06	Hung, C.-H. 2C04	Miller, F.1A15, 2B02	
	Huntington, T. 1C15	Miller, K.K. 1C05	
	Isaac, B. 1C11, 2B04		

AuthorPaper #

Sim, H.S.1B01
Singh, G.1C04
Sirignano, W.A.2A01, 2A05
Sivaramakrishnan, R.1C07
Skeen, S.A.1B01
Smith, P.1C10, 1C11
Smith, S.1C10, 1C11
Spinti, J.1C10
Starick, T.2C02
Sutherland, J.C.1A04, 1C09
Tagliante, F.1B01
Tang, M.2B07
Tao, Y.1C07
Thomsen, M.1A07
Thornock, J.1C10, 2B04
Torres-Castro, L.1A14
Towery, C.A.Z.1C13
Tran, K.1B04
Tryner, J.1B05, 1B07
Urban, D.L.1A07
Urban, J.L.1A13
Urzay, J.1C13
Vackel, A.1B15
Van Horn, S.1C06
Venegas, J.1B05
Vorobieff, P.1B15
Voskuilen, T.2C03
Weiss, A.D.1A08
Wheeler, I.2C02
Wichman, I.1A15
Williams, F.A.1A06,
.....1A08, 2A02
Williams, T.1C12
Williams, T.C.1B13
Windell, B.1C03, 2B01
Windom, B.1B05, 1B06, 1B07,
.....1B08, 1B09, 1B10,
.....1B11, 1C02, 1C03, 2B01
Xu, H.1B09

Author Paper #

Zambrano, V.R.1A11
Zdanowicz, A.1B05, 1B07
Zepper, E.T.1A02
Zhao, L.2B07
Zhao, Z.2B07
Zhou, H.1C09
Zhou, M.1C11
Zhu, X.2B07